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SHELL-MODEL SEMI-EMPIRICAL NUCLEAR MASSES (II)

BY

N. ZELDES, A. GRILL AND A. SIMIEVIC

København 1967
Kommissionær: Munksgaard

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Synopsis

The mass table used in part (I) is revised by using newer experimental data. Nuclear structure effects previously revealed by second- and third-order mass differences are re-examined and confirmed with the help of the newer data. The previously developed semi-empirical shell-model mass equation is further elaborated and represents nuclear masses beyond the $1p$ shell with an accuracy of about 170 keV. Some remarks concerning the liquid-drop model mass equation are made. A table of calculated masses is appended.

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CONTENTS

We dedicate this work to the memory of our beloved teacher Professor Giulio Racah.

INTRODUCTION

In a previous paper[1] (hereafter referred to as I) a preliminary version of a semi-empirical shell-model mass equation was developed, which reproduced the experimental masses based on the up-to-1962 measured mass spectroscopic doublets with an accuracy of about 200 keV beyond the $1f_{7/2}$ shell. For lighter nuclei the deviations were considerably higher, indicating that higher approximations would be needed.

In the meantime, newer and generally much more accurate mass doublets were measured and reported at the Vienna Conference on Nuclidic Masses in the mass region Ga to Xe[2-5] and in the rare-earth region from Nd to Lu[6-8]) as well. In some cases, the newer values differed considerably from the values on which the analysis of our previous paper was based. Therefore it seemed appropriate to interrupt the analysis, summarize the results at that point, and continue with the newer data after checking with their help the validity of the results obtained thus far.

In the region from Ga to Xe, the newer Minnesota mass doublets were so accurate that a proper least-squares calculation would shift them by very few tens of keV at most. Such small differences could not be relevant to our study of nuclear masses; consequently, we decided in this region to use the Minnesota mass tables[4,5] supplemented by some nuclear data[9]. On the other hand, in the rare-earth region the newer mass doublets were found sometimes internally inconsistent and sometimes disagreeing by up to a few hundred keV with the nuclear data. Therefore we made a proper least-squares calculation of the masses in the region $A = 132$ to $A = 199$ before continuing the shell-model analysis. In the newly measured regions we then plotted graphs of the local values of the various nuclear interaction parameters similar to those in the previous work and used them to check and modify where necessary the results obtained that far. This is described in part II of the present work.

In July 1964, we obtained from Professor Mattauch a preprint of the 1964 atomic mass table[10-12]. We compared the masses we were using with the table, and the differences were found to be at most very few tens of keV up to $A = 132$ (mean absolute deviation of 14 keV) and somewhat higher in the region $A = 132$ to $A = 199$ and in the region beyond that (mean absolute deviations of 45 keV and 40 keV, respectively). The differences between the masses used by us before and the 1964 mass tables are shown in fig. 1 and in most cases are seen to be within the limits of the errors

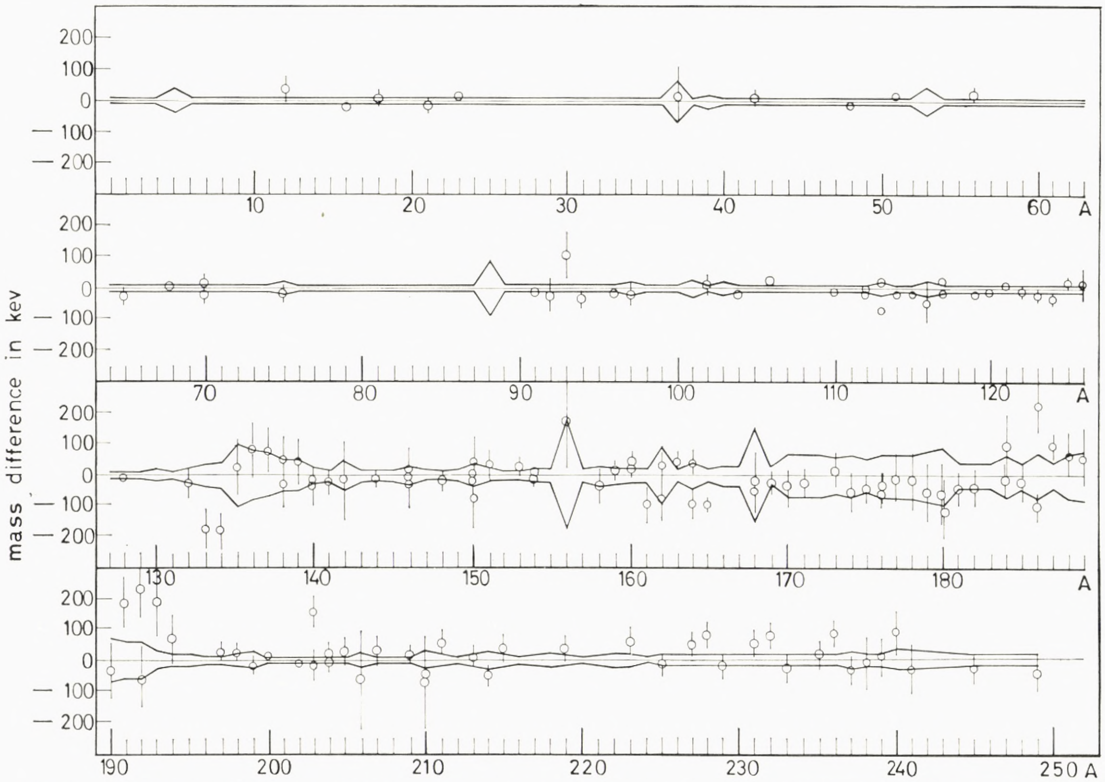

Fig. 1. Differences between the masses used by us first and the 1964 mass table. Only primary masses with differences larger than 10 keV are shown. The points correspond to the masses used by us and the assigned errors are given with them. The thin lines running symmetrically below and above the abscissa represent the errors assigned in the 1964 mass table.

assigned to the masses. In these cases they are probably due to the somewhat different procedures which were used in assigning weights to the data in the calculation of the mass tables*. However, there are some conspicuous deviations at $A = 133$, 134 and $A = 186$ to $A = 192$, as well as smaller discrepancies in the heavier nuclei beyond $A = 228$. These are due as well to some different experimental data which were used in the calculations.

We were then faced with the problem which masses to use in the determination of the coefficients of our mass equation. Below $A = 132$ and above $A = 199$, the 1964 mass table was definitely superior, having been calculated by a uniform least-squares procedure from the latest experimental data. In the region $A = 132$ to $A = 199$ we tried to fit the mass equation both to our masses and to those of the 1964 mass table. The goodness-of-fit was about the same, the mass equation showing no preference of one set of masses over the other. For the sake of uniformity, we then decided to use the 1964 mass table throughout with some additions or changes due to newer data and given in table 1 below.

* See the detailed discussion in subsect. 2.2 of (I).

In part I we describe some of the details of our mass calculation. We do this mainly in order to point out inconsistencies in the input data. The numerical shell-model analysis is described in part III. The graphs given in part II, although drawn partly from somewhat different masses, can still be applied as a guide in this analysis, due to the small differences between the two sets of masses. Finally, in part IV, some remarks based on the results of the preceding analysis are made concerning the liquid-drop model mass equation.

The appendix contains a table of about forty five hundred calculated masses with some of their frequently occurring mass differences. It was calculated by Mr. J. Stein of the Theoretical Physics Department of the Hebrew University.

Part I.

THE EXPERIMENTAL DATA

1. The Mass Table

As explained in the introduction, we based our study on the 1964 mass table[(10)], which was kindly communicated to us by Professor Mattauch before publication. Some secondary masses added to or changed from the table are given in table 1, mentioned in the introduction. The data used in the determination of these masses are given together with the other secondary data in table 6b below.

Table 2 gives the masses calculated by us in the mass region $A = 132$ to $A = 199$ before we obtained the 1964 mass table.

2. Adjustment of the Data from $A = 132$ to $A = 199$

As in (I), we adopted the procedure of Everling *et al.*[(13)] used in the calculation of the 1961[(14)] and 1964 mass tables of dividing the masses into primary and secondary ones. The whole range of masses from $A = 132$ to $A = 199$ was divided into four parts, between which no connections existed, which were adjusted separately. The masses of the bordering stable Xe and Hg nuclei were taken directly from the table used in (I) and left out of the least-squares adjustment. The adjusted masses with their interconnections and subregion boundaries are shown in fig. 2, which is patterned after the analogous figures accompanying the 1961 and 1964 mass tables.

The collection of data for the primary adjustment was terminated in the summer of 1964. Secondary masses were added and changed from time to time up to the summer of 1965.

2.1. Preliminary Treatment of the Mass Doublets

The primary and secondary mass doublets used in the calculation are given in tables 3a and b, respectively. Some rejected mass doublets and the reasons for

TABLE 1.
Secondary masses added to or changed from the 1964 mass table.

Nucleide		$\Delta M(^{12}C = 0)$ (keV)	Nucleide		$\Delta M(^{12}C = 0)$ (keV)
^{20}Na	*c*	6 917 ± 74	^{127}Cs	*c*	− 86 341 ± 64
^{24}Al	*c*	− 102 ± 50	^{132}Ba	*c, p*	− 88 387 ± 122
^{28}P	*c*	− 7 169 ± 60	^{132}La	*c*	− 83 735 ± 169
^{34}A	*n*	− 18 371 ± 25	^{131}Ce	*d*	
^{46}K	*n*	− 35 420 ± 18	^{136}Ce	*c, p*	− 86 626 ± 219
^{40}Sc	*c*	− 20 387 ± 60	^{139}Pr	*c*	− 85 050 ± 53
^{42}Ti	*d*		^{147}Pr	*n*	− 75 475 ± 201
^{48}Cr	*c*	− 42 828 ± 31	^{142}Pm	*c, p*	− 81 190 ± 101
^{67}Ni	*n*	− 63 191 ± 300	^{144}Pm	*n*	− 81 408 ± 58
^{60}Zn	*n*	− 54 197 ± 26	^{157}Eu	*c*	− 69 441 ± 31
^{78}Ge	*n*	− 71 778 ± 202	^{159}Eu	*c, p*	− 66 366 ± 92
^{83}Se	*n*	− 75 719 ± 101	^{160}Eu	*d*	
^{75}Br	*c*	− 69 141 ± 50	^{149}Gd	*c, p*	− 75 157 ± 26
^{86}Br	*c*	− 75 659 ± 500	^{151}Gd	*n*	− 74 205 ± 33
^{89}Kr	*d*		^{152}Tb	*c*	− 70 870 ± 43
^{80}Rb	*d*		^{153}Dy	*c, p*	− 69 186 ± 27
^{93}Sr	*c*	− 79 950 ± 60	^{168}Ho	*c*	− 60 213 ± 104
^{84}Y	*d*		^{170}Ho	*d*	
^{95}Ru	*c*	− 83 680 ± 37	^{165}Tm	*n*	− 62 875 ± 37
^{98}Rh	*d*		^{175}Hf	*n*	− 54 690 ± 112
^{101}Pd	*c*	− 85 404 ± 24	^{188}W	*c*	− 38 444 ± 44
^{114}Ag	*c*	− 84 868 ± 400	^{196}Ir	*n*	− 29 233 ± 25
^{115}Ag	*c, p*	− 84 889 ± 100	^{257}Fm	*n*	88 279 ± 72
^{106}In	*c, p*	− 80 628 ± 100	^{256}Mv	*n*	86 849 ± 76
^{126}Sb	*c, p*	− 86 351 ± 73	^{257}Mv	*n*	88 531 ± 38
^{127}Xe	*c*	− 88 441 ± 23			

The error of a secondary mass in table 1 is the square root of the sum of the squares of the error of the mass from the 1964 mass table and the experimental error of the *Q*-value from both of which the secondary mass was calculated. Mass values which are changed from the value in the 1964 mass table are denoted by *c* and new mass values are denoted by *n*. Some of the changed masses were changed mainly because of the considerably improved accuracy of the new value; these are denoted by *p*. Masses which were deleted from the 1964 mass table are denoted by *d*. They were rejected because the experimental data on which they are based are in gross disagreement with nuclear systematics. Of these, ^{42}Ti is actually mentioned in a footnote on p. 76 of ref. 12 as due to a misunderstanding.

their rejection are shown in table 3c. The doublets consist essentially of three groups. First, the Minnesota doublets of JOHNSON and NIER(15) and of BHANOT, JOHNSON and NIER(16,17); secondly, the Georgia doublets of DEMIRKHANOV *et al.*(7,8,18,19) and, thirdly, the very accurate isotopic doublets measured at Hamilton by BARBER *et al.*(6).

As in (I) we first carried out a consistency check for each group of over-determined interconnected mass doublets and calculated its consistency factor by which the errors of the mass doublets of this group should be multiplied before entering a com-

TABLE 2

The recalculated $A = 132$ to $A = 199$ part of the mass table.

Nucleide	$\Delta M(^{12}C = 0)$ (keV)	Nucleide	$\Delta M(^{12}C = 0)$ (keV)
^{132}Te	− 85 173 ± 43	^{142}La	− 80 135 ± 141
		^{143}La	− 78 366 ± 87
^{132}I	− 85 678 ± 40		
^{133}I	− 86 103 ± 74	^{136}Ce	− 86 545 ± 219
^{134}I	− 83 966 ± 60	^{138}Ce	− 87 747 ± 72
^{136}I	− 79 417 ± 100	^{139}Ce	− 87 159 ± 62
		^{140}Ce	− 88 147 ± 36
^{132}Xe	− 89 268 ± 3	^{141}Ce	− 85 512 ± 36
^{133}Xe	− 87 903 ± 54	^{142}Ce	− 84 645 ± 138
^{134}Xe	− 88 116 ± 3	^{143}Ce	− 81 666 ± 33
^{135}Xe	− 86 585 ± 88	^{144}Ce	− 80 499 ± 27
^{136}Xe	− 86 417 ± 4	^{146}Ce	− 75 852 ± 136
^{137}Xe	− 82 684 ± 90		
		^{139}Pr	− 85 051 ± 65
^{132}Cs	− 87 219 ± 47	^{140}Pr	− 84 802 ± 44
^{133}Cs	− 88 331 ± 54	^{141}Pr	− 86 092 ± 36
^{134}Cs	− 86 972 ± 58	^{142}Pr	− 83 866 ± 29
^{135}Cs	− 87 745 ± 87	^{143}Pr	− 83 106 ± 26
^{136}Cs	− 86 229 ± 81	^{144}Pr	− 80 812 ± 26
^{137}Cs	− 86 763 ± 71	^{145}Pr	− 79 660 ± 31
^{139}Cs	− 81 091 ± 212	^{146}Pr	− 76 852 ± 93
		^{147}Pr	− 75 477 ± 201
^{132}Ba	− 88 383 ± 122		
^{133}Ba	− 87 843 ± 54	^{141}Nd	− 84 290 ± 37
^{134}Ba	− 89 036 ± 60	^{142}Nd	− 86 020 ± 25
^{135}Ba	− 87 955 ± 87	^{143}Nd	− 84 039 ± 24
^{136}Ba	− 89 059 ± 78	^{144}Nd	− 83 808 ± 24
^{137}Ba	− 87 939 ± 71	^{145}Nd	− 81 465 ± 29
^{138}Ba	− 88 442 ± 69	^{146}Nd	− 80 972 ± 26
^{139}Ba	− 85 091 ± 69	^{147}Nd	− 78 177 ± 23
^{140}Ba	− 83 347 ± 59	^{148}Nd	− 77 450 ± 28
^{141}Ba	− 80 082 ± 110	^{149}Nd	− 74 412 ± 29
^{142}Ba	− 77 935 ± 173	^{150}Nd	− 73 680 ± 30
		^{151}Nd	− 70 959 ± 106
^{132}La	− 83 731 ± 169		
^{133}La	− 85 643 ± 207	^{141}Pm	− 80 670 ± 203
^{134}La	− 85 266 ± 78	^{142}Pm	− 81 200 ± 103
^{135}La	− 86 905 ± 173	^{143}Pm	− 82 939 ± 152
^{136}La	− 86 189 ± 105	^{144}Pm	− 81 409 ± 58
^{138}La	− 86 732 ± 70	^{145}Pm	− 81 324 ± 31
^{139}La	− 87 429 ± 60	^{146}Pm	− 79 497 ± 73
^{140}La	− 84 397 ± 58	^{147}Pm	− 79 078 ± 21
^{141}La	− 83 082 ± 47	^{148}Pm	− 76 910 ± 27

TABLE 2 (continued).

Nucleide	$\Delta M(^{12}C = 0)$ (keV)
^{149}Pm	− 76 081 ± 21
^{150}Pm	− 73 632 ± 26
^{151}Pm	− 73 359 ± 35
^{153}Pm	− 70 701 ± 104
^{143}Sm	− 79 539 ± 207
^{144}Sm	− 81 981 ± 28
^{145}Sm	− 80 671 ± 31
^{146}Sm	− 81 034 ± 70
^{147}Sm	− 79 303 ± 21
^{148}Sm	− 79 369 ± 21
^{149}Sm	− 77 152 ± 20
^{150}Sm	− 77 062 ± 20
^{151}Sm	− 74 551 ± 34
^{152}Sm	− 74 755 ± 20
^{153}Sm	− 72 531 ± 27
^{154}Sm	− 72 404 ± 22
^{155}Sm	− 70 149 ± 26
^{156}Sm	− 69 331 ± 30
^{145}Eu	− 77 911 ± 43
^{146}Eu	− 77 153 ± 71
^{147}Eu	− 77 524 ± 152
^{148}Eu	− 76 281 ± 50
^{150}Eu	− 74 758 ± 78
^{151}Eu	− 74 627 ± 35
^{152}Eu	− 72 898 ± 21
^{153}Eu	− 73 332 ± 27
^{154}Eu	− 71 663 ± 24
^{155}Eu	− 71 787 ± 22
^{156}Eu	− 70 046 ± 26
^{157}Eu	− 69 448 ± 35
^{158}Eu	− 67 331 ± 301
^{159}Eu	− 66 344 ± 95
^{148}Gd	− 76 286 ± 30
^{149}Gd	− 75 156 ± 37
^{150}Gd	− 75 808 ± 73
^{151}Gd	− 74 208 ± 37
^{152}Gd	− 74 715 ± 23
^{153}Gd	− 73 089 ± 27
^{154}Gd	− 73 641 ± 23
^{155}Gd	− 72 034 ± 22
^{156}Gd	− 72 493 ± 21
^{157}Gd	− 70 776 ± 23
^{158}Gd	− 70 631 ± 22
^{159}Gd	− 68 564 ± 34
^{160}Gd	− 67 901 ± 25
^{161}Gd	− 65 554 ± 91
^{148}Tb	− 70 666 ± 301
^{149}Tb	− 71 416 ± 47
^{150}Tb	− 71 105 ± 103
^{151}Tb	− 71 589 ± 155
^{152}Tb	− 70 875 ± 46
^{157}Tb	− 70 716 ± 25
^{158}Tb	− 69 459 ± 56
^{159}Tb	− 69 511 ± 33
^{160}Tb	− 67 810 ± 31
^{161}Tb	− 67 554 ± 44
^{163}Tb	− 64 631 ± 59
^{152}Dy	− 70 151 ± 32
^{153}Dy	− 69 185 ± 37
^{154}Dy	− 70 453 ± 88
^{156}Dy	− 70 689 ± 146
^{158}Dy	− 70 406 ± 58
^{159}Dy	− 69 131 ± 39
^{160}Dy	− 69 636 ± 31
^{161}Dy	− 68 138 ± 44
^{162}Dy	− 68 143 ± 30
^{163}Dy	− 66 311 ± 31
^{164}Dy	− 65 900 ± 30
^{165}Dy	− 63 599 ± 23
^{166}Dy	− 62 589 ± 22
^{152}Ho	− 63 741 ± 302
^{153}Ho	− 64 961 ± 56
^{160}Ho	− 66 436 ± 105
^{162}Ho	− 65 993 ± 42
^{163}Ho	− 66 301 ± 33
^{164}Ho	− 64 924 ± 47
^{165}Ho	− 64 891 ± 21
^{166}Ho	− 63 070 ± 21
^{167}Ho	− 62 287 ± 102
^{168}Ho	− 60 230 ± 104
^{169}Ho	− 58 826 ± 105

TABLE 2 (continued).

Nucleide	$\Delta M(^{12}C = 0)$ (keV)	Nucleide	$\Delta M(^{12}C = 0)$ (keV)
^{162}Er	– 66 435 ± 75	^{174}Hf	– 55 598 ± 60
^{163}Er	– 65 091 ± 34	^{175}Hf	– 54 729 ± 110
^{164}Er	– 65 954 ± 42	^{176}Hf	– 54 477 ± 58
^{165}Er	– 64 520 ± 22	^{177}Hf	– 52 733 ± 72
^{166}Er	– 64 917 ± 20	^{178}Hf	– 52 285 ± 78
^{167}Er	– 63 287 ± 21	^{179}Hf	– 50 323 ± 87
^{168}Er	– 63 000 ± 28	^{180}Hf	– 49 585 ± 97
^{169}Er	– 60 926 ± 31	^{181}Hf	– 47 448 ± 54
^{170}Er	– 60 045 ± 49	^{182}Hf	– 46 156 ± 113
^{171}Er	– 57 654 ± 49	^{183}Hf	– 43 008 ± 207
^{172}Er	– 56 526 ± 53		
		^{177}Ta	– 51 574 ± 72
^{164}Tm	– 61 992 ± 47	^{178}Ta	– 50 373 ± 79
^{165}Tm	– 62 955 ± 37	^{179}Ta	– 50 213 ± 87
^{166}Tm	– 61 882 ± 23	^{180}Ta	– 48 921 ± 64
^{168}Tm	– 61 277 ± 59	^{181}Ta	– 48 471 ± 54
^{169}Tm	– 61 266 ± 31	^{182}Ta	– 46 456 ± 53
^{170}Tm	– 59 586 ± 48	^{183}Ta	– 45 208 ± 53
^{171}Tm	– 59 144 ± 49	^{184}Ta	– 42 890 ± 54
^{172}Tm	– 57 414 ± 52	^{185}Ta	– 41 414 ± 74
^{173}Tm	– 56 350 ± 57	^{186}Ta	– 38 884 ± 204
^{174}Tm	– 54 013 ± 108		
^{176}Tm	– 49 219 ± 115	^{180}W	– 49 481 ± 83
		^{181}W	– 48 276 ± 62
^{166}Yb	– 61 622 ± 122	^{182}W	– 48 192 ± 52
^{168}Yb	– 61 375 ± 104	^{183}W	– 46 276 ± 52
^{170}Yb	– 60 552 ± 48	^{184}W	– 45 630 ± 52
^{171}Yb	– 59 242 ± 49	^{185}W	– 43 314 ± 55
^{172}Yb	– 59 280 ± 50	^{186}W	– 42 544 ± 41
^{173}Yb	– 57 670 ± 48	^{187}W	– 39 725 ± 40
^{174}Yb	– 57 053 ± 42	^{188}W	– 38 367 ± 51
^{175}Yb	– 54 862 ± 45		
^{176}Yb	– 53 419 ± 56	^{182}Re	– 45 332 ± 56
^{177}Yb	– 50 856 ± 88	^{185}Re	– 43 745 ± 55
		^{186}Re	– 41 663 ± 77
^{173}Lu	– 56 980 ± 57	^{187}Re	– 41 035 ± 39
^{174}Lu	– 55 656 ± 57	^{188}Re	– 38 716 ± 51
^{175}Lu	– 55 329 ± 45	^{189}Re	– 37 780 ± 88
^{176}Lu	– 53 464 ± 56	^{190}Re	– 35 472 ± 312
^{177}Lu	– 52 236 ± 72	^{184}Os	– 43 911 ± 99
^{178}Lu	– 50 035 ± 93	^{185}Os	– 42 763 ± 55
^{179}Lu	– 48 973 ± 100	^{186}Os	– 42 734 ± 77
^{180}Lu	– 46 285 ± 139	^{187}Os	– 41 036 ± 39

TABLE 2 (continued).

Nucleide	$\Delta M(^{12}C = 0)$ (keV)	Nucleide	$\Delta M(^{12}C = 0)$ (keV)
^{188}Os	− 40 837 ± 49	^{193}Pt	− 34 226 ± 99
^{189}Os	− 38 780 ± 86	^{194}Pt	− 34 654 ± 59
^{190}Os	− 38 572 ± 87	^{195}Pt	− 32 772 ± 40
^{191}Os	− 36 171 ± 75	^{196}Pt	− 32 625 ± 35
^{192}Os	− 35 968 ± 73	^{197}Pt	− 30 388 ± 26
^{193}Os	− 33 130 ± 88	^{199}Pt	− 27 417 ± 54
^{194}Os	− 32 321 ± 60		
		^{192}Au	− 32 715 ± 89
^{186}Ir	− 38 903 ± 80	^{194}Au	− 32 145 ± 61
^{188}Ir	− 38 005 ± 52	^{195}Au	− 32 551 ± 40
^{190}Ir	− 36 572 ± 218	^{196}Au	− 31 148 ± 25
^{191}Ir	− 36 485 ± 75	^{197}Au	− 31 138 ± 24
^{192}Ir	− 34 502 ± 74	^{198}Au	− 29 565 ± 22
^{193}Ir	− 34 262 ± 88	^{199}Au	− 29 107 ± 21
^{194}Ir	− 32 418 ± 60		
^{195}Ir	− 31 772 ± 108	^{196}Hg	− 31 835 ± 17
^{196}Ir	− 29 225 ± 41	^{198}Hg	− 30 953 ± 14
^{197}Ir	− 28 388 ± 202	^{199}Hg	− 29 567 ± 19
^{188}Pt	− 37 496 ± 72	^{196}Tl	− 27 235 ± 151
^{190}Pt	− 37 079 ± 80	^{198}Tl	− 27 493 ± 81
^{192}Pt	− 35 955 ± 74	^{199}Tl	− 28 467 ± 300

The errors of the primary masses (see fig. 2) are the internal errors resulting from the least-squares adjustment given by the square roots of the diagonal elements of the correlation matrix. In order to obtain the external errors these have to be multiplied by the consistency factor of the corresponding region given in table 7. The errors of the secondary masses were calculated from those of the primary masses and from the experimental errors of the secondary data in the same way as mentioned below table 1.

mon least squares adjustment with other mass doublets and nuclear reaction and decay data. The results are given in table 4. For the sake of completeness we added also Johnson and Nier's doublets, considered already in (I), and the later Georgia masses from La to Nd, which have not been used in the mass calculation. It is seen that the consistency of the Georgia doublets is far from satisfactory, whereas that of the Minnesota doublets is on the whole very good.

As an additional check, we performed for each of the above groups of doublets, measured at the same laboratory during the same period, a least-squares adjustment in which the masses of the light atoms like H,C,^{13}C, N and O were treated as unknowns to be determined from the mass doublets on equal footing with the masses of the heavier atoms. Some of the results are shown in tables 5 a and b. This is a rather sensitive test as, due to the large number of C and H atoms in the hydrocarbon members of the mass doublets, their statistical errors come out very small, indicating very clearly when their values are wrong. Thus, BHANOT *et al.*[(17)], measuring hydrocarbon

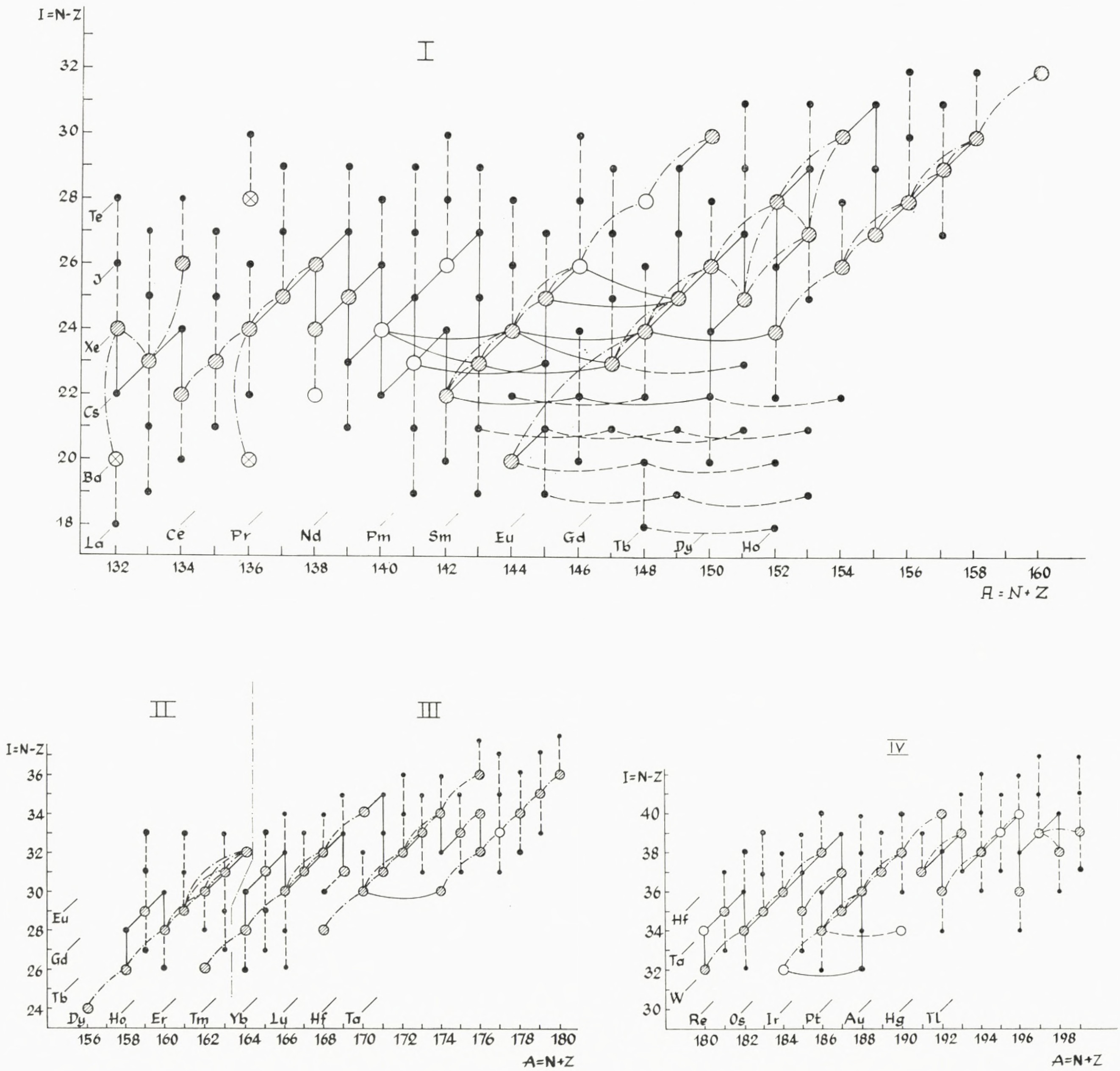

Fig. 2. Survey of the input data for the calculation of table 2. Legend: circles – nucleides occurring in nature, dots – artificially produced nucleides, hatched circles – primary nucleides determined by mass spectroscopic doublets, crosses – secondary nucleides determined by mass spectroscopic doublets, full line – primary reactions or decays, dashed line – secondary reactions or decays, dot- and dash arc – connection by isotopic doublets, dot- and dash line – boundary between two regions adjusted separately.

TABLE 3a

Primary mass doublets used in the calculation of table 2.

Doublet	Input value[a] (keV)	Ref.	Adjusted value[b] (keV)	δ/σ
$^{133}Cs-^{132}Xe$[e]	933 ± 56[c, d]	M 57 a	936	− 0.0578
$C_{10}H_{13}-^{133}Cs$	183126 ± 65	M 57 a	183084	0.6479
$^{134}Xe-^{133}Cs$[e]	198 ± 56[d]	M 57 a	215	− 0.3053
$C_{10}H_{14}-^{134}Ba$	191228 ± 75	M 57 a	191079	2.0021*
$^{135}Ba-^{134}Ba$	1138 ± 56[d]	M 57 a	1081	1.0121
$^{13}CC_9H_{14}-^{135}Ba$	193127 ± 93	M 57 a	193121	0.0632
$^{136}Ba-^{135}Ba$	− 1050 ± 56[d]	M 57 a	− 1104	0.9740
$C_{10}H_{16}-^{136}Ba$	205689 ± 84	M 57 a	205680	0.1059
$^{137}Ba-^{136}Ba$	1166 ± 56[d]	M 57 a	1120	0.8197
$^{13}CC_9H_{16}-^{137}Ba$	207728 ± 56	M 57 a	207683	0.8025
$^{138}Ba-^{137}Ba$	− 529 ± 56[d]	M 57 a	− 503	− 0.4614
$C_{10}H_{18}-^{138}Ba$	219787 ± 75	M 57 a	219640	1.9797
$C_{10}H_{18}-^{138}La$	218055 ± 186	M 57 a	217929	0.6746
$^{13}CC_9H_{18}-^{139}La$	221836 ± 56	M 57 a	221751	1.5142
$C_{10}H_{22}-^{142}Nd$	246521 ± 28	M 57 a	246372	5.3548*
$^{143}Nd-^{142}Nd$	1967 ± 56[d]	M 57 a	1981	− 0.2517
$^{13}CC_{10}H_{10}-^{143}Nd$	160238 ± 93	M 57 a	160051	2.0132*
$^{144}Nd-^{143}Nd$	226 ± 56[d]	M 57 a	232	− 0.0998
$C_{10}H_5F-^{144}Nd$	118977 ± 65	M 57 a	118765	3.2493*
$^{144}Nd^{35}Cl-^{142}Nd^{37}Cl$	4964 ± 5[f]	H 64	4968	− 0.8091
$^{145}Nd-^{144}Nd$	2293 ± 56[d]	M 57 a	2343	− 0.8992
$C_{10}H_6F-^{145}Nd$	124155 ± 177	M 57 a	123712	2.5064*
$^{146}Nd-^{145}Nd$	468 ± 56[d]	M 57 a	493	− 0.4570
$^{146}Nd^{35}Cl-^{144}Nd^{37}Cl$	5592 ± 5[f]	H 64	5592	− 0.0614
$^{148}Nd^{35}Cl-^{146}Nd^{37}Cl$	6278 ± 6[f]	H 64	6277	0.1054
$^{150}Nd^{35}Cl-^{148}Nd^{37}Cl$	6526 ± 5[f]	H 64	6526	0.0879
$C_9H_{10}O_2-^{150}Nd$	137163 ± 65	M 57 a	137095	1.0475
$C_{10}H_5F-^{144}Sm$	117254 ± 84	M 57 a	116938	3.7726*
$C_9{}^{13}CH_9N-^{144}Sm$	153646 ± 82	R 63	153567	0.9577
$C_{10}H_8O-^{144}Sm$	135476 ± 91	R 63	135554	− 0.8543
$C_8H_5NO_2-^{147}Sm$	109162 ± 72	R 63	109137	0.3518
$C_9H_7O_2-^{147}Sm$	120811 ± 30	R 63	120851	− 1.3224
$^{148}Sm-^{147}Sm$	103 ± 79	R 63	− 66	2.1498*
$^{148}Sm^{35}Cl_2-^{144}Sm^{37}Cl_2$ ...	8113 ± 11[f]	H 64	8123	− 0.9181
$C_8{}^{13}CH_7O_2-^{148}Sm$	123908 ± 102	R 63	124042	− 1.3143
$C_9H_8O_2-^{148}Sm$	128110 ± 47	R 63	128206	− 2.0600*
$C_9H_{10}NO-^{148}Sm$	150218 ± 56	R 63	150384	− 2.9834*
$^{149}Sm-^{148}Sm$	2126 ± 56	R 63	2218	− 1.6500
$^{149}Sm-^{148}Sm$	2228 ± 56[d]	M 57 a	2218	0.1865
$^{149}Sm-^{147}Sm$	2158 ± 104	R 63	2150	0.0744
$^{149}Sm^{35}Cl-^{147}Sm^{37}Cl$	4897 ± 5[f]	H 64	4906	− 1.8966
$C_8{}^{13}CH_8O_2-^{149}Sm$	129095 ± 52	R 63	129114	− 0.3574
$C_8{}^{13}CH_{10}NO-^{149}Sm$	151274 ± 82	R 63	151291	− 0.2117

TABLE 3a (continued).

Doublet	Input value[a]) (keV)	Ref.	Adjusted value[b]) (keV)	δ/σ
$C_9H_{11}NO$–^{149}Sm	155383 ± 59	R 63	155455	– 1.2281
^{150}Sm–^{149}Sm	139 ± 54	R 63	90	0.9076
^{150}Sm–^{149}Sm	95 ± 56[d])	M 57 a	90	0.0885
$^{150}Sm^{35}Cl$–$^{148}Sm^{37}Cl$	5078 ± 6[f])	H 64	5063	2.5457*
$C_9H_{12}NO$–^{150}Sm	162641 ± 84	R 63	162654	– 0.1559
^{150}Sm–^{148}Sm	2263 ± 91	R 63	2308	– 0.4904
$C_8{}^{13}CH_{11}NO$–^{150}Sm	158372 ± 45	R 63	158489	– 2.6282*
$C_{12}H_6$–^{150}Sm	120906 ± 250	R 63	120795	0.4446
^{152}Sm–^{150}Sm	2387 ± 56	R 63	2307	1.4461
$^{152}Sm^{35}Cl$–$^{150}Sm^{37}Cl$	5057 ± 5[f])	H 64	5063	– 1.1886
$C_{12}H_8$–^{152}Sm	132976 ± 57	R 63	133065	– 1.5486
^{154}Sm–^{152}Sm	2481 ± 77	R 63	2350	1.7006
$^{154}Sm^{35}Cl$–$^{152}Sm^{37}Cl$	5105 ± 5[f])	H 64	5107	– 0.3712
$C_{12}H_{10}$–^{154}Sm	145147 ± 52	R 63	145291	– 2.8047*
^{151}Eu–^{150}Sm	2604 ± 111	R 63	2434	1.5309
$C_{12}H_7$–^{151}Eu	125952 ± 158	M 57 a	125649	1.9159
$C_{13}H_{11}$–^{151}EuO	159875 ± 177	M 57 a	159540	1.8928
$C_{12}H_7$–^{151}Eu	125670 ± 66	R 63	125648	0.3261
$C_{10}H_{15}O$–^{151}Eu	179290 ± 118	R 63	179222	0.5798
^{152}Sm–^{151}Eu	89 ± 84	R 63	– 127	2.5700*
^{153}Eu–^{152}Sm	1438 ± 75	R 63	1423	0.1966
^{154}Sm–^{153}Eu	1008 ± 75	R 63	927	1.0742
^{153}Eu–^{151}Eu	1460 ± 59	R 63	1296	2.7827*
$C_9{}^{13}CH_{16}O$–^{153}Eu	188090 ± 68	R 63	188340	– 3.6700*
$C_{11}{}^{13}CH_8$–^{153}Eu	134692 ± 54	R 63	134766	– 1.3759
$C_{12}H_9$–^{153}Eu	138881 ± 32	R 63	138931	– 1.5349
$C_{12}H_8$–^{152}Gd	133075 ± 48	R 63	133025	1.0401
^{154}Gd–^{152}Gd	1305 ± 48	R 63	1074	4.8114*
^{154}Gd–^{152}Gd	1028 ± 84	M 60	1074	– 0.5448
$^{154}Gd^{35}Cl$–$^{152}Gd^{37}Cl$	3741 ± 28	H 64	3830	– 3.1804*
$C_{10}{}^{13}C_2H_8$–^{154}Gd	137881 ± 90	R 63	138200	– 3.5313*
$C_{11}{}^{13}CH_9$–^{154}Gd	142091 ± 102	R 63	142364	– 2.6829*
$C_{10}H_6N_2$–^{154}Gd	122929 ± 233	R 63	123101	– 0.7382
$C_{12}H_{10}$- ^{154}Gd	146375 ± 38	R 63	146529	– 3.9996*
^{155}Gd–^{154}Gd	1379 ± 58	R 63	1607	– 3.9717*
^{155}Gd–^{154}Gd	1705 ± 56	M 57 b	1607	1.7500
$C_{12}H_{11}$–^{155}Gd	152316 ± 69	R 63	152210	1.5305
$C_{10}{}^{13}C_2H_9$–^{155}Gd	143860 ± 134	R 63	143881	– 0.1570
$C_{11}{}^{13}CH_{10}$–^{155}Gd	148026 ± 40	R 63	148046	– 0.4990
$C_{10}H_7N_2$–^{155}Gd	128737 ± 37	R 63	128782	– 1.2335
^{156}Gd–^{155}Gd	– 544 ± 32	R 63	– 459	– 2.6982*
$^{156}Gd^{155}$–Gd	– 390 ± 56	M 57 b	– 459	1.2296
$^{156}Gd^{35}Cl$–$^{154}Gd^{37}Cl$	3911 ± 6[f])	H 64	3904	1.1439
$C_{11}{}^{13}CH_{11}$–^{156}Gd	155908 ± 41	R 63	155793	2.7899*

TABLE 3a (continued).

Doublet	Input value[a]) (keV)	Ref.	Adjusted value[b]) (keV)	δ/σ
$C_{12}H_{12}$–^{156}Gd	160136 ± 42	R 63	159957	4.2321*
$C_{10}{}^{13}C_2H_{10}$–^{156}Gd	151652 ± 53	R 63	151629	0.4355
$C_{10}H_8N_2$–^{156}Gd	136606 ± 37	R 63	136530	2.0908*
^{157}Gd–^{156}Gd	1735 ± 58	R 63	1717	0.3243
^{157}Gd–^{156}Gd	1725 ± 34	M 57 b, M 60	1717	0.2412
$C_9{}^{13}CH_8N_2$–^{157}Gd	138013 ± 62	R 63	137938	1.2044
$C_{10}H_9N_2$–^{157}Gd	142252 ± 59	R 63	142102	2.5186*
$C_{10}H_5O_2$–^{157}Gd	97876 ± 59	R 63	97747	2.1697*
^{158}Gd–^{157}Gd	365 ± 46	R 63	145	4.7821*
^{158}Gd–^{157}Gd	167 ± 34	M 57 b, M 60	145	0.6471
^{158}Gd–^{156}Gd	1863 ± 84	M 60	1862	0.0102
$^{158}Gd^{35}Cl$–$^{156}Gd^{37}Cl$	4616 ± 5[f])	H 64	4617	– 0.2483
$C_{10}H_6O_2$–^{158}Gd	104735 ± 32	R 63	104891	– 4.9217*
^{160}Gd–^{158}Gd	2778 ± 84	M 60	2730	0.5707
$^{160}Gd^{35}Cl$–$^{158}Gd^{37}Cl$	5486 ± 6[f])	H 64	5486	0.0707
$C_{12}H_{16}$–^{160}Gd	184567 ± 50	R 63	184521	0.9277
$C_{10}H_7O_2$–^{159}Tb	111063 ± 31	R 63	111060	0.1233
$C_9{}^{13}CH_6O_2$–^{159}Tb	106969 ± 62	R 63	106895	1.1791
$C_{10}H_8N_2$–^{156}Dy	135181 ± 204	R 63	134726	2.2346*
^{158}Dy–^{156}Dy	187 ± 93	M 60	282	– 1.0210
$C_{10}H_6O_2$–^{158}Dy	105130 ± 208	R 63	104666	2.2300*
^{160}Dy–^{158}Dy	808 ± 93	M 60	770	0.4078
$C_{12}H_{16}$–^{160}Dy	186332 ± 144	R 63	186256	0.5257
^{161}Dy–^{160}Dy	1660 ± 56	M 57 b	1498	2.8806*
^{198}Hg–$^{161}Dy^{37}Cl$	69050 ± 119	R 63	68951	0.8295
$C_{13}H_5$–^{161}Dy	104551 ± 53	R 63	104582	– 0.5865
^{162}Dy–^{161}Dy	– 102 ± 56	M 57 b	– 5	– 1.7342
$^{161}Dy^{37}Cl$–$^{162}Dy^{35}Cl$	– 2873 ± 142	R 63	– 2750	– 0.8598
$^{162}Dy^{35}Cl$–$^{161}Dy^{35}Cl$	73 ± 49	R 63	– 5	1.5995
$^{162}Dy^{37}Cl$–$^{161}Dy^{37}Cl$	141 ± 149	R 63	– 5	0.9822
^{162}Dy–^{161}Dy	21 ± 85	R 63	– 5	0.3042
^{162}Dy–^{160}Dy	1458 ± 93	M 60	1493	– 0.3826
$^{162}Dy^{35}Cl$–$^{160}Dy^{37}Cl$	4243 ± 8[g])	H 64	4249	– 0.7648
^{199}Hg–$^{162}Dy^{37}Cl$	70474 ± 87	R 63	70342	1.5104
$C_{13}H_6$–^{162}Dy	111880 ± 40	R 63	111876	0.1057
$^{163}Dy^{35}Cl$–$^{162}Dy^{35}Cl$	2016 ± 74	R 63	1833	2.4643*
$^{162}Dy^{37}Cl$–$^{163}Dy^{35}Cl$	– 4722 ± 89	R 63	– 4588	– 1.4960
$^{163}Dy^{37}Cl$–$^{162}Dy^{37}Cl$	2025 ± 85	R 63	1833	2.2647*
^{163}Dy–^{162}Dy	1849 ± 81	R 63	1833	0.2032
^{163}Dy–^{162}Dy	1812 ± 56	M 57 b	1833	– 0.3632
$^{163}Dy^{35}Cl$–$^{161}Dy^{37}Cl$	4847 ± 132	R 63	4583	2.0088*
^{198}Hg–$^{163}Dy^{35}Cl$	64250 ± 79	R 63	64368	– 1.5012
^{200}Hg–$^{163}Dy^{37}Cl$	68486 ± 89	R 63	68591	– 1.1745
$C_{13}H_7$–^{163}Dy	117274 ± 76	R 63	117332	– 0.7586

Table 3a (continued).

Doublet	Input value[a]) (keV)	Ref.	Adjusted value[b]) (keV)	δ/σ
$^{164}Dy^{35}Cl-^{163}Dy^{35}Cl$	503 ± 53	R 63	410	1.7422
$^{163}Dy^{37}Cl-^{164}Dy^{35}Cl$	– 3132 ± 115	R 63	– 3166	0.2946
$^{164}Dy^{37}Cl-^{163}Dy^{37}Cl$	365 ± 102	R 63	410	– 0.4454
$^{164}Dy-^{163}Dy$	415 ± 60	R 63	410	0.0825
$^{164}Dy-^{163}Dy$	443 ± 56	M 57 b	410	0.5887
$^{164}Dy-^{162}Dy$	2168 ± 93	M 60	2243	– 0.8055
$^{164}Dy^{35}Cl-^{162}Dy^{37}Cl$	4981 ± 8[g])	H 64	4999	– 2.2867*
$^{164}Dy^{35}Cl-^{162}Dy^{37}Cl$	5206 ± 40	R 63	4999	5.1264*
$^{164}Dy^{35}Cl-^{161}Dy^{37}Cl$	5225 ± 102	R 63	4993	2.2774*
$^{199}Hg-^{164}Dy^{35}Cl$	65282 ± 66	R 63	65344	– 0.9356
$^{201}Hg-^{164}Dy^{37}Cl$	69938 ± 89	R 63	70016	– 0.8760
$C_{12}{}^{13}CH_7-^{164}Dy$	120081 ± 72	R 63	120046	0.4929
$C_{13}H_8-^{164}Dy$	124180 ± 81	R 63	124210	– 0.3779
$^{202}Hg-^{165}Ho^{37}Cl$	69368 ± 69	R 63	69301	0.9636
$^{200}Hg-^{165}Ho^{35}Cl$	64378 ± 42	R 63	64416	– 0.8968
$C_{11}{}^{13}CH_6N-^{165}Ho$	114537 ± 68	R 63	114612	– 1.1045
$C_{12}H_7N-^{165}Ho$..........	118793 ± 36	R 63	118776	0.4768
$C_{13}H_9-^{165}Ho$	130442 ± 37	R 63	130490	– 1.2929
$C_{13}H_6-^{162}Er$............	110307 ± 231	R 63	110168	0.6019
$C_{12}H_4N-^{162}Er$	98352 ± 101	R 63	98454	– 1.0144
$^{164}Er-^{162}Er$	518 ± 65	R 63	482	0.5530
$^{164}Er-^{162}Er$	474 ± 88	M 60	482	– 0.0868
$^{199}Hg-^{164}Er^{35}Cl$	65490 ± 110	R 63	65397	0.8435
$C_{12}H_6N-^{164}Er$	112589 ± 53	R 63	112550	0.7431
$^{166}Er-^{164}Er$	1131 ± 63	R 63	1036	1.5103
$^{166}Er^{35}Cl-^{164}Er^{35}Cl$	1029 ± 106	R 63	1036	– 0.0679
$^{166}Er-^{164}Er$	1080 ± 84	M 60	1036	0.5142
$^{201}Hg-^{166}Er^{35}Cl$	66306 ± 48	R 63	66277	0.5940
$C_{13}H_{10}-Er^{166}$	137612 ± 79	R 63	137804	– 2.4420*
$C_{12}H_8N-Er^{166}$	126131 ± 80	R 63	126091	0.5048
$C_{12}H_8N-^{166}Er$	126095 ± 39	R 63	126091	0.1074
$^{167}Er-^{166}Er$	1604 ± 42	R 63	1630	– 0.6205
$^{167}Er-^{166}Er$	1624 ± 56	M 57 b	1630	– 0.1071
$^{204}Hg-^{167}Er^{37}Cl$	70261 ± 83	R 63	70353	– 1.1151
$^{202}Hg-^{167}Er^{35}Cl$	64954 ± 82	R 63	64941	0.1564
$C_{13}H_{11}-^{167}Er$	143291 ± 177	R 63	143463	– 0.9733
$C_{12}H_9N-^{167}Er$	131814 ± 71	R 63	131749	0.9136
$C_{12}H_9N-^{167}Er$	131780 ± 37	R 63	131749	0.8357
$^{168}Er-^{167}Er$	265 ± 42	R 63	287	– 0.5405
$^{168}Er-^{167}Er$	312 ± 56	M 57 b	287	0.4454
$^{168}Er-^{166}Er$	1918 ± 88	M 60	1917	0.0024
$C_{12}H_{10}N-^{168}Er$	138677 ± 60	R 63	138751	– 1.2402
$C_{11}{}^{13}CH_9N-^{168}Er$	134616 ± 39	R 63	134587	0.7434
$^{170}Er-^{168}Er$	3216 ± 95	R 63	2954	2.7508*

TABLE 3 a (continued).

Doublet	Input value[a)] (keV)	Ref.	Adjusted value[b)] (keV)	δ/σ
$^{170}Er-^{168}Er$	2907 ± 89	M 60	2954	− 0.5313
$C_{12}H_{12}N-^{170}Er$	150153 ± 95	R 63	150374	− 2.3201*
$^{204}Hg-^{169}Tm^{35}Cl$	65596 ± 91	R 63	65577	0.2108
$C_{12}H_{11}N-^{169}Tm$	144302 ± 57	R 63	144306	− 0.0771
$C_{12}H_{10}N-^{168}Yb$	136929 ± 122	R 63	137126	− 1.6152
$^{170}Yb-^{168}Yb$	845 ± 237	R 63	823	0.0909
$^{170}Yb-^{168}Yb$	914 ± 84	M 60	823	1.0789
$C_{11}{}^{13}CH_{11}N-^{170}Yb$	146538 ± 248	R 63	146716	− 0.7157
$C_{11}H_8ON-^{170}Yb$	116771 ± 177	R 63	116989	− 1.2281
$C_{12}H_{12}N-^{170}Yb$	150736 ± 51	R 63	150880	− 2.8277*
$^{171}Yb-^{170}Yb$	1132 ± 71	R 63	1310	− 2.5127*
$^{171}Yb-^{170}Yb$	1458 ± 56	M 57 b	1310	2.6511*
$C_{11}{}^{13}CH_{12}N-^{171}Yb$	152890 ± 95	R 63	152694	2.0623*
$C_{10}H_7ON_2-^{171}Yb$	111436 ± 319	R 63	111254	0.5700
$^{172}Yb-^{171}Yb$	− 49 ± 267	R 63	− 38	− 0.0413
$^{172}Yb-^{171}Yb$	74 ± 56	M 57 b	− 38	2.0045*
$^{172}Yb-^{170}Yb$	1507 ± 87	M 60	1272	2.7154*
$C_{10}H_6O_2N-^{172}Yb$	96458 ± 71	R 63	96403	0.7743
$^{173}Yb-^{172}Yb$	1839 ± 140	R 63	1610	1.6346
$^{173}Yb-^{172}Yb$	1731 ± 56	M 57 b	1610	2.1590*
$C_{10}H_7O_2N-^{173}Yb$	102279 ± 75	R 63	102081	2.6478*
$C_{14}H_5-^{173}Yb$	94104 ± 79	R 63	94114	− 0.1230
$^{174}Yb-^{173}Yb$	656 ± 59	R 63	616	0.6683
$^{174}Yb-^{173}Yb$	613 ± 56	M 57 b	616	− 0.0597
$^{174}Yb-^{172}Yb$	2311 ± 84	M 60	2227	1.0006
$C_{14}H_6-^{174}Yb$	100883 ± 45	R 63	100786	2.1482*
$^{176}Yb-^{174}Yb$	3723 ± 59	R 63	3634	1.5006
$^{176}Yb-^{174}Yb$	3442 ± 84	M 60	3634	− 2.2943*
$C_{13}H_6N-^{176}Yb$	99840 ± 129	R 63	100015	− 1.3582
$C_{14}H_8-^{176}Yb$	111754 ± 54	R 63	111729	0.4627
$C_{13}{}^{13}CH_6-^{175}Lu$	102238 ± 55	R 63	102186	0.9566
$C_{14}H_7-^{175}Lu$	106297 ± 56	R 63	106350	− 0.9430
$^{176}Lu-^{175}Lu$	1846 ± 91	R 63	1865	− 0.2030
$^{176}Lu-^{175}Lu$	1805 ± 52	M 60	1865	− 1.1496
$C_{14}H_8-^{176}Lu$	111738 ± 74	R 63	111774	− 0.4931
$C_{14}H_6-^{174}Hf$	99208 ± 224	R 61	99331	− 0.5486
$^{176}Hf-^{174}Hf$	1385 ± 84	M 60	1121	3.1478*
$C_{14}H_8-^{176}Hf$	113334 ± 200	R 61	112787	2.7329*
$^{177}Hf-^{176}Hf$	1872 ± 209	R 61	1745	0.6100
$^{177}Hf-^{176}Hf$	1749 ± 38	M 57 b, M 60	1745	0.1271
$^{178}Hf-^{177}Hf$	485 ± 38	M 57 b, M 60	448	0.9848
$^{178}Hf-^{177}Hf$	275 ± 94	R 61	448	− 1.8360
$C_{14}H_{10}-^{178}Hf$	125406 ± 126	R 61	125173	1.8568
$^{179}Hf-^{178}Hf$	2098 ± 128	R 61	1962	1.0642

TABLE 3 a (continued).

Doublet	Input value[a)] (keV)	Ref.	Adjusted value[b)] (keV)	δ/σ
$^{179}Hf-^{178}Hf$	1938 ± 38	M 57 b, M 60	1962	– 0.6443
$C_{14}H_{11}-^{179}Hf$	130342 ± 149	R 61	130499	– 1.0525
$^{180}Hf-^{179}Hf$	746 ± 98	R 61	738	0.0795
$^{180}Hf-^{179}Hf$	735 ± 38	M 57 b, M 60	738	– 0.0870
$C_{14}H_{12}-^{180}Hf$	137018 ± 147	R 61	137050	– 0.2157
$C_{13}H_9O-^{181}Ta$	108975 ± 94	R 61	109333	– 3.8060*
$C_{13}H_{11}N-^{181}Ta$	131361 ± 181	R 61	131511	– 0.8287
$C_{13}H_8O-^{180}W$	103453 ± 121	R 61	103055	3.2889*
$^{182}W-^{180}W$.............	1416 ± 87	M 60	1289	1.4636
$C_{13}H_{10}O-^{182}W$..........	116319 ± 233	R 61	116343	– 0.1054
$C_{12}H_{10}N_2-^{182}W$	126853 ± 72	R 61	126807	0.6432
$^{183}W-^{182}W$	1822 ± 35	M 57 b, M 60	1917	– 2.6862*
$C_{12}H_{11}N_2-^{183}W$	132247 ± 62	R 61	132179	1.1044
$^{184}W-^{183}W$	625 ± 35	M 57 b, M 60	646	– 0.6032
$C_{12}H_{12}N_2-^{184}W$	139085 ± 95	R 61	138822	2.7701*
$^{186}W-^{184}W$	3136 ± 84	M 60	3086	0.5931
$C_{15}H_6-^{186}W$............	86008 ± 63	R 61	86277	– 4.2677*
$C_{15}H_5-^{185}Re$	79978 ± 88	R 61	80188	– 2.3849*
$^{187}Re-^{185}Re$............	2544 ± 84	M 60	2710	– 1.9765
$C_{15}H_7-^{187}Re$	92093 ± 28	R 61	92056	1.3287
$^{186}Os-^{184}Os$	1287 ± 84	M 60	1177	1.3172
$C_{15}H_6-^{186}Os$............	85815 ± 394[h)]	R 59	86467	– 1.6543
$C_{20}H_{10}-^{186}OsO_4$	134704 ± 371[h)]	R 59	134567	0.3690
$^{187}Os-^{186}Os$	2309 ± 394[h)]	R 59	1698	1.5492
$^{187}Os-^{186}Os$	1684 ± 56	M 57 b	1698	– 0.2604
$C_{15}H_7-^{187}Os$	92087 ± 211[h)]	R 59	92057	0.1396
$C_{19}{}^{13}CH_{10}-^{187}OsO_4$	136401 ± 446[h)]	R 59	135993	0.9132
$^{188}Os-^{187}Os$	– 60 ± 394[h)]	R 59	199	– 0.6589
$^{188}Os-^{187}Os$	– 4 ± 56	M 57 b	199	– 3.6271*
$^{188}Os-^{186}Os$	1712 ± 93	M 60	1897	– 1.9948
$C_{15}H_8-^{188}Os$............	99217 ± 289[h)]	R 59	99147	0.2422
$C_{18}H_4-^{188}OsO_2$	79102 ± 840[h)]	R 59	79465	– 0.4316
$C_{20}H_{12}-^{188}OsO_4$.........	147566 ± 183[h)]	R 59	147247	1.7399
$^{189}Os-^{188}Os$	1958 ± 394[h)]	R 59	2057	– 0.2521
$^{189}Os-^{188}Os$	2065 ± 56	M 57 b	2057	0.1377
$C_{15}H_9-^{189}Os$............	104512 ± 289[h)]	R 59	104379	0.4628
$C_{18}H_5-^{189}OsO_2$	84690 ± 394[h)]	R 59	84696	– 0.0161
$C_{19}H_9-^{189}OsO_3$	118764 ± 237[h)]	R 59	118588	0.7447
$^{190}Os-^{189}Os$	583 ± 394[h)]	R 59	208	0.9531
$^{190}Os-^{189}Os$	191 ± 56	M 57 b	208	– 0.2967
$^{190}Os-^{188}Os$	2250 ± 93	M 60	2264	– 0.1546
$C_{15}H_{10}-^{190}Os$	110867 ± 237[h)]	R 59	111460	– 2.5080*
$C_{14}{}^{13}CH_9-^{190}Os$	107172 ± 210[h)]	R 59	107295	– 0.5875
$C_{18}H_6-^{190}OsO_2$	91850 ± 168[h)]	R 59	91778	0.4315

Table 3 a (continued).

Doublet	Input value[a)] (keV)	Ref.	Adjusted value[b)] (keV)	δ/σ
$C_{19}H_{10}$–$^{190}OsO_3$	125905 ± 630[h)]	R 59	125669	0.3746
^{192}Os–^{190}Os	2653 ± 93	M 60	2604	0.5286
$C_{13}N_2H_8$–^{192}Os	99677 ± 289[h)]	R 59	100005	– 1.1361
$C_{18}H_8$–$^{192}OsO_2$	103699 ± 105[h)]	R 59	103751	– 0.4929
$C_{18}{}^{13}CH_{11}$–$^{192}OsO_3$	133460 ± 79[h)]	R 59	133478	– 0.2295
$C_{15}H_{11}$–^{191}Ir	116432 ± 187	R 59	116661	– 1.2217
^{193}Ir–^{191}Ir	2213 ± 88	M 60	2223	– 0.1182
$C_{14}H_9O$–^{193}Ir	95161 ± 93	R 59	95124	0.4029
$C_{13}H_8N_2$–^{192}Pt	99906 ± 206	R 59	99992	– 0.4210
^{194}Pt–^{192}Pt	1436 ± 112	M 60	1302	1.2037
$C_{13}H_{10}N_2$–^{194}Pt	113198 ± 81	R 59	113268	– 0.8636
$C_{14}H_{10}O$–^{194}Pt	102623 ± 218	R 59	102805	– 0.8336
^{195}Pt–^{194}Pt	1982 ± 56	M 57 b	1882	1.7822
^{196}Pt–^{195}Pt	151 ± 56	M 57 b	146	0.0826
^{198}Hg–^{197}Au[i)]	– 45 ± 75	M 60	185	– 3.0858*
^{198}Hg–^{197}Au[i)]	364 ± 224	R 59	185	0.8005
^{199}Hg–^{197}Au[i)]	1578 ± 186	M 60	1571	0.0344
$C_{13}H_{11}ON$–^{197}Au	109481 ± 186	R 59	109441	0.2117
$C_{13}H_{10}ON$–^{197}Au	101976 ± 259	R 59	102153	– 0.6812

a) We give the value of the difference of the mass excesses ($^{12}C = 0$) of the two members of the doublet. The conversion factors used in transforming from the measured values to the values given in the table are (48)

$$1U\ (^{12}C = 12) = 931478 \pm 15\ \text{keV},$$
$$1MU\ (^{16}O = 16) = 931182 \pm 15\ \text{keV},$$

except for the values of R63 where by mistake the older value (13)

$$1U\ (^{12}C = 12) = 931441 \pm 10\ \text{keV}$$

was used. This lowered the input values of some of these doublets by as much as 6 keV.

b) We do not know the errors of the adjusted values, as explained in (I).

c) The errors given are the quoted experimental errors multiplied by the corresponding consistency factor from table 4 in case it was higher than 1, except in the case of Minnesota Os isotopic doublets (refs. M 57 b and M 60) where the quoted experimental errors were retained. We believe the Minnesota Os 1.93 consistency factor from table 4 to be due to the hydrocarbon Os doublets, which were rejected altogether, as explained in the text.

d) The errors of these isotopic doublets are not given in ref. M 57 a. We are indebted to Professor Johnson for sending us their values.

e) The Xe mass from (I) was used with this doublet to furnish an input value for the ^{133}Cs mass excess.

f) This error was used in determining the weight of the datum in the least-squares adjustment. It is higher than the error in the measurement quoted by the authors and includes also the errors of the Cl masses given in the 1961 mass table.

g) By mistake we used an error of 8 keV instead of the correct values of 7 keV and 6 keV for the ^{162}Dy–^{160}Dy and the ^{164}Dy–^{162}Dy doublets, respectively.

h) By mistake the errors of these Georgia Os doublets were obtained by multiplying the errors given by the authors by 2.82 instead of by the consistency factor 2.74 from table 4.

i) The Hg mass from the 1961 mass table was used with this doublet to furnish an input value for the ^{197}Au mass excess.

References to table 3 a:

H 64 R. C. Barner *et al.* (6).
M 57 a W. H. Johnson, Jr. and A. O. Nier (15).
M 57 b W. H. Johnson, Jr. and V. B. Bhanot (16).
M 60 V. B. Bhanot *et al.* (17).
R 59 R. A. Demirkhanov *et al.* (18).
R 61 R. A. Demirkhanov *et al.* (19).
R 63 R. A. Demirkhanov *et al.* (8).

TABLE 3b

Secondary mass doublets used in the calculation of table 2.

Doublet	Value[a]) (keV)	Ref.
$^{132}Ba-^{132}Xe$[b])	885 ± 122[c])	M 57 a
$^{136}Ce-^{136}Ba$	2514 ± 204	M 57 a

a, c) The same as in table 3 a.
b) The Xe mass from (I) was used with this doublet to furnish an input value for the ^{132}Ba mass excess.
References are the same as for table 3 a.

TABLE 3c

Some rejected mass doublets.

Doublet	Value (^{12}C = 0)[a]) (keV)	Ref.	Adjusted value[b]) (keV)	Reason for rejection
$C_{10}H_{18}-^{138}Ce$	218725 ± 186	M 57 a	218944	c)
$C_{10}H_{20}-^{140}Ce$	233997 ± 56	M 57 a	233922	d)
$C_{10}H_{22}-^{142}Ce$	244836 ± 65	M 57 a	244997	c)
$C_{11}H_{9}-^{141}Pr$	151783 ± 28	M 57 a	151691	d)
$C_{10}H_{7}F-^{146}Nd$	130859 ± 56	M 57 a	130507	d)
$^{13}C_{2}C_{8}H_{7}F-^{148}Nd$	133587 ± 56	M 57 a	133234	e)
$^{13}CC_{9}H_{7}F-^{147}Sm$	132312 ± 28	M 57 a	131962	d)
$^{148}Sm-^{147}Sm$	− 63 ± 56	M 57 a	− 66	d)
$C_{9}H_{10}O_{2}-^{150}Sm$	140823 ± 65	M 57 a	140476	d)
$C_{12}H_{8}-^{152}Sm$	133429 ± 121	M 57 a	133065	d)
$C_{12}H_{10}-^{154}Sm$	145609 ± 140	M 57 a	145291	d)
$^{13}CC_{12}H_{12}-^{153}EuO$	169289 ± 373	M 57 a	168657	c)
$C_{11}H_{10}N-^{156}Gd$	148188 ± 112	M 60	148244	f)
$C_{12}H_{16}-^{160}Gd$	184477 ± 84	M 60	184521	f)
$^{13}CC_{9}H_{22}O-^{159}Tb$	228708 ± 102	M 60	228251	f)
$C_{12}H_{16}-^{160}Dy$	186609 ± 102	M 60	186256	f)
$C_{12}H_{18}-^{162}Dy$	199683 ± 84	M 60	199340	f)
$^{165}Ho-C_{12}H_{20}$	− 210556 ± 186	M 60	− 210666	f)
$C_{7}H_{7}F_{4}-^{167}Er$	108362 ± 75	M 60	108364	f)
$C_{12}H_{24}-^{168}Er$	237973 ± 93	M 60	237930	f)
$^{169}Tm-C_{12}H_{24}$	− 236089 ± 93	M 60	- 236196	f)
$C_{12}H_{26}-^{170}Yb$	250255 ± 65	M 60	250059	f)
$C_{8}H_{14}O_{4}-^{174}Yb$	139845 ± 75	M 60	140150	f)
$C_{8}H_{16}O_{4}-^{176}Yb$	150982 ± 130	M 60	151093	f)
$^{13}CC_{12}H_{19}-^{176}Yb$	194952 ± 56	M 60	195029	f)
$C_{13}H_{19}-^{175}Lu$	192950 ± 149	M 60	193815	f, g)
$^{13}CC_{12}H_{19}-^{176}Hf$	195837 ± 37	M 60	196087	f)
$C_{8}H_{10}F_{4}-^{182}W$	115234 ± 37	M 60	115135	f)
$^{13}CC_{7}H_{10}F_{4}-^{183}W$	116537 ± 37	M 60	116343	f)
$^{13}CC_{11}H_{27}N-^{186}W$	245357 ± 121	M 60	245328	f)
$C_{12}H_{27}N-^{185}Re$	243811 ± 75	M 60	243404	f)

Table 3c (continued).

Doublet	Value (^{12}C = 0)[a] (keV)	Ref.	Adjusted value[b] (keV)	Reason for rejection
$^{13}CC_{11}H_{27}N-^{186}Os$	246139 ± 168	M 60	245518	f)
$C_{14}H_{22}-^{190}Os$	199059 ± 93	M 60	198924	f, g)
$^{13}CC_{13}H_{22}-^{191}Ir$	201275 ± 177	M 60	199961	f, g)
$C_{14}H_{28}-^{196}Pt$	236856 ± 112	M 60	236709	f)
$C_{13}H_{11}N_2-^{195}Pt$	118296 ± 93	R 59	118675	h)
$C_{14}H_{11}O-^{195}Pt$..........	107946 ± 196	R 59	108212	h)
$C_{13}H_{12}N_2-^{196}Pt$	125271 ± 103	R 59	125817	i)

a, b) The same as for table 3 a.
c) Value inconsistent with nuclear data or systematics as explained in (I).
d) This datum had a high value of δ/σ in the mass-adjustment carried out in (I), due to its disagreement with nuclear data.
e) By mistake this doublet of M 57 a was omitted as well.
f) Suspected of containing errors due to poor resolution of ^{13}C satellites, as explained in the text.
g) Already mentioned as contradicting nuclear data by the authors.
h) Comparison with nuclear data shows that the ^{195}Pt doublets of R 59 are probably on the average too low by about 380 keV.
i) Comparison with nuclear data shows that this ^{196}Pt doublet of R59 is probably too low by about 560 keV.

References: the same as for table 3 a.

mass unit doublets to check the calibration of their instrument, obtained the seemingly satisfactory value of $8170 \pm 50\ \mu mU$ for the hydrogen mass defect. On the other hand, the least-squares treatment of all their doublets gives for the same mass defect the definitely unsatisfactory (considering the assigned errors) value of $8178 \pm 11\ \mu mU$ (table 5a).

The results of tables 5 a and b are more or less satisfactory for the mass doublets of Johnson and Nier and also for the 1959–1961 doublets of Demirkhanov *et al.* In some sense the non-statistical errors existing in these measurements of Demirkhanov *et al.*, which gave the unsatisfactory consistency factors in table 4, combined at random and averaged to zero when the whole group of doublets together was used to determine the masses of the light H, C and N atoms. On the other hand, the results definitely indicate something wrong with the measurements of Bhanot, Johnson and Nier (and also, as far as the mass of ^{13}C is concerned, with the newer 1965 Georgian doublets added as well to table 5 for the sake of completeness).

In the above mentioned least-squares adjustments, we held the mass defect of the standard (^{16}O in the Minnesota and early Georgia measurements and ^{12}C in the later Georgia doublets) fixed at zero value. With the later Georgia measurements we also tried an adjustment in which ^{12}C was treated as unknown together with the other light atoms. The results are shown in table 5c. However, in this case the errors of the calculated masses become much higher than before, and the whole test becomes less sensitive. This shows the existence of strong correlations between the mass of ^{12}C and the masses of the other light atoms in the least-squares adjustment. In the case

TABLE 4
Consistency factors for interconnected groups of mass doublets.

Nuclei	Number of doublets	Number of masses	Consistency factor	Ref.
Xe, Cs	9	5	0.36	M 57 a
Ba	9	5	0.70	M 57 a
Nd	9	5	0.57	M 57 a
Sm	5	4	0.20	M 57 a
total	32	19	0.58	M 57 a
Gd	8	4	0.56	M 57 b, M 60
Dy	8	5	0.63	M 57 b, M 60
Er	5	3	0.36	M 57 b, M 60
Yb	11	6	0.55	M 57 b, M 60
Hf	9	5	0.84	M 57 b, M 60
W	8	4	0.61	M 57 b, M 60
Os	8	5	1.93	M 57 b, M 60
total	57	32	0.87	M 57 b, M 60
Sm, Eu	32	9	1.92	R 63
Gd	22	6	1.03	R 63
Tb	2	1	1.34	R 63
Dy	26	4	2.28	R 63
Ho	5	1	1.38	R 63
Er	22	6	1.46	R 63
Tm	2	1	0.22	R 63
Yb	18	7	1.27	R 63
Lu	3	1	1.63	R 63
total	132	36	1.72	R 63
Hf	8	5	2.29	R 61
Ta	2	1	2.52	R 61
W	2	1	0.29	R 61
total	12	7	2.10	R 61
Os	21	6	2.74	R 59
Pt	4	2	0.48	R 59
Au	3	1	0.75	R 59
total	28	9	2.48	R 59
La, Ce	29	6	1.56	R 65
Pr	3	1	0.83	R 65
Nd	30	7	1.12	R 65
total	62	14	1.34	R 65

References: the same as for table 3 a plus the following:
R 65 R. A. DEMIRKHANOV *et al.* (20).

TABLE 5
Mass excess of light atoms determined by least-squares from heavier-atoms mass doublets.

H	C	^{13}C	N	O	Ref.
		(a) $\mu MU(^{16}O = 16)$ $\Delta M(^{16}O) = 0$			
8143.5 ± 5.2	3813.4 ± 11.8	7456.8 ± 37.7			M 57 a
8177.8 ± 11.2	3776.6 ± 23.9	7498.5 ± 47.6	7601.9 ± 105.2		M 60
8146.1 ± 31.0	3841.8 ± 38.4	7602.5 ± 167.3	7560.5 ± 149.7		R 59, R 61
8145.63 ± 0.08	3815.01	7488.3 ± 0.7	7526.19 ± 0.17	0	1961 mass table
		(b) $\mu U(^{12}C = 12)$ $\Delta M(^{12}C) = 0$			
7819.1 ± 5.4		3350.7 ± 19.3	3055.5 ± 19.3	−5127.5 ± 23.6	R 63
7823.5 ± 3.2		3310.1 ± 16.2	3079.2 ± 14.8	−5075.9 ± 10.3	R 65
7825.22 ± 0.08	0	3354.3 ± 0.7	3074.38 ± 0.17	−5085.06 ± 0.28	1961 mass table
		(c) $\mu U(^{12}C = 12)$ $\Delta M(^{12}C)$ free			
7853.4 ± 10.7	463.8 ± 129.9	3845.7 ± 139.6	3603.0 ± 154.6	−4484.5 ± 181.4	R 63
7834.0 ± 8.9	129.3 ± 102.8	3449.2 ± 111.9	3230.2 ± 121.1	−4904.8 ± 136.5	R 65

References: the same as for table 4.

of the newer 1965 Georgia doublets, the resulting mass defect of ^{12}C can still be considered not to differ significantly from zero. However, something must be wrong with the 1963 doublets.

The final check for the acceptance or rejection of mass-spectroscopic data was their comparison with well-established nuclear reaction and decay energies. Both the Minnesota and the Georgia doublets were often in disagreement with the nuclear data by hundreds of keV. Here the agreement of Bhanot, Johnson and Nier's values was on the whole worse. The resolving power of the Minnesota mass spectrograph used in these measurements was not sufficient to resolve ^{13}C satellites from the main lines of doublets and supplied a possible obvious reason for these discrepancies as well as for those mentioned above in connection with table 5. On the other hand, the resolving power of the spectrograph of Demirkhanov *et al.* was sufficient to resolve the ^{13}C satellites. Consequently, we decided to use only the isotopic doublets of Bhanot, Johnson and Nier, which do not involve carbon atoms, and to reject their hydrocarbon doublets as well as many of those of Johnson and Nier, which were found in (I) to be in bad disagreement with well-established nuclear data. On the other hand, we retained most of Demirkhanov's doublets, multiplying their errors by the appropriate consistency factor (in case it was higher than 1) from table 4.

2.2. Nuclear Reaction and Decay Data

The primary and secondary nuclear reaction and decay data are given in tables 6a and 6b, respectively. The same preliminary treatment was given to them as in (I).

Table 6a
Primary reaction and decay energies used in the calculation of table 2.

Nuclear reaction or decay	Input value (keV)	Ref.	Adjusted value[b] (keV)	δ/σ
^{132}Cs (β^+) ^{132}Xe[d]	2080 ± 25[a, c]	Ta 63	2048	1.2624
^{133}Cs (γ, n) ^{132}Cs	– 9025 ± 56	61-2-90	– 9183	2.8276*
^{133}Cs (d, p) ^{134}Cs	4500 ± 100	61-2-108	4488	0.1231
^{133}Cs (n, γ) ^{134}Cs	6702 ± 15	61-2-108	6712	– 0.6932
^{134}Cs (β^-) ^{134}Ba	2060 ± 10	61-2-104	2065	– 0.4497
^{137}Ba (γ, n) ^{136}Ba	– 6949 ± 38	61-2-135	– 6951	0.0568
^{138}Ba (γ, n) ^{137}Ba	– 8510 ± 80	61-3-81	– 8574	0.8043
^{138}Ba (d, p) ^{139}Ba	2495 ± 9	Bi 62, Sp 63	2495	0.0065
^{139}Ba (β^-) ^{139}La	2340 ± 40	61-3-90	2339	0.0291
^{138}La (E.C.) ^{138}Ba	1650 ± 50	Kö 61	1710	– 1.2024
^{139}La (γ, n) ^{138}La	– 8782 ± 22	61-3-92	– 8768	– 0.6088
^{139}La (d, p) ^{140}La	2861 ± 29	59-1-92, Bi 62	2814	1.6155
^{140}La (β^-) ^{140}Ce	3800 ± 30	59-1-89	3750	1.6712
^{139}Ce (E.C.) ^{139}La	270 ± 6	61-3-93	270	0.0013
^{140}Ce (γ, n) ^{139}Ce	– 9050 ± 200	59-1-93	– 9059	0.0436
^{140}Ce (d, p) ^{141}Ce	3209 ± 9	61-4-34, Ho 61, Sp 63	3211	– 0.2691
^{141}Ce (β^-) ^{141}Pr	580 ± 5	61-4-33	581	– 0.1426
^{142}Ce (γ, n) ^{141}Ce	– 7150 ± 200	59-1-100	– 7205	0.2761
^{142}Ce (d, p) ^{143}Ce	2860 ± 70	61-4-45	2867	– 0.0966
^{143}Ce (β^-) ^{143}Pr	1440 ± 10	61-4-44	1440	– 0.0138
^{140}Pr (β^+) ^{140}Ce	3332 ± 18	59-1-94, Br 60, Bo 61, Ch 61	3344	– 0.6860
^{141}Pr (γ, n) ^{140}Pr	– 9378 ± 21	61-4-35	– 9361	– 0.8003
^{141}Pr (n, γ) ^{142}Pr	5830 ± 30	59-1-102	5845	– 0.4851
^{141}Pr (d, p) ^{142}Pr	3619 ± 25	Bi 62, Sp 63	3620	– 0.0337
^{142}Pr (β^-) ^{142}Nd	2153 ± 8	59-1-101	2154	– 0.1402
^{143}Pr (β^-) ^{143}Nd	933 ± 5	61-4-46	933	– 0.0069
^{142}Nd (d, p) ^{143}Nd	3790 ± 80[e]	61-4-46	3866	– 0.9470
^{143}Nd (γ, n) ^{142}Nd	– 6150 ± 100	61-4-46	– 6090	– 0.5953
^{143}Nd (n, γ) ^{144}Nd	7814 ± 8	Ba 59	7840	– 3.2830*
^{143}Nd (n, α) ^{140}Ce	9710 ± 60	Ch 62 a	9754	– 0.7377
^{144}Nd (α) ^{140} Ce	1900 ± 20	To 60	1914	– 0.6998
^{145}Nd (n, γ) ^{146}Nd	7580 ± 10	Ba 59	7578	0.1804
^{149}Nd (β^-) ^{149}Pm	1669 ± 10	Go 64	1669	– 0.0151
^{150}Nd (γ, n) ^{149}Nd	– 7400 ± 200	5–6–9[f]	– 7340	– 0.3014
^{145}Pm (α) ^{141}Pr	2300 ± 40	Nu 62	2343	– 1.0842
^{145}Pm (E.C.) ^{145}Nd	140 ± 10	59-1-122	141	– 0.0905
^{149}Pm (β^-) ^{149}Sm	1071 ± 2	5-2-20	1071	– 0.0030
^{144}Sm (d, p) ^{145}Sm	4533 ± 10	Ke 63	4537	– 0.3616
^{145}Sm (E.C.) ^{145}Pm	645 ± 15	59-1-123	653	– 0.5423
^{146}Sm (α) ^{142}Nd	2544 ± 34	To 60, Gr 64	2560	– 0.4750
^{147}Sm (α) ^{143}Nd	2283 ± 8	Ka 60, To 60, Gr 61, Si 62	2311	– 3.5180*

Table 6a (continued).

Nuclear reaction or decay	Input value (keV)	Ref.	Adjusted value[b]) (keV)	δ/σ
^{147}Sm (n, α) ^{144}Nd	10090 ± 60	Ch 62 b	10151	− 1.0235
^{147}Sm (d, p) ^{148}Sm	5920 ± 10	Ke 64	5913	0.6680
^{148}Sm (α) ^{144}Nd	2200 ± 30[g])	61-4-60	2013	6.2208*
^{148}Sm (d, p) ^{149}Sm	3648 ± 12	5-2-21	3630	1.5369
^{149}Sm (α) ^{145}Nd	1900 ± 50[g])	5-2-21	1887	0.2503
^{149}Sm (n, α) ^{146}Nd	9397 ± 35	Ch 62 b, Ma 62	9466	− 1.9624
^{149}Sm (γ, n) ^{148}Sm	− 5900 ± 60	5-2-21	− 5854	− 0.7622
^{149}Sm (n, γ) ^{150}Sm	7983 ± 4	5-6-13	7981	0.4533
^{149}Sm (d, p) ^{150}Sm	5764 ± 4	5-6-13	5756	1.8808
^{150}Sm (d, p) ^{151}Sm	3309 ± 16	5-5-14	3336	− 1.6780
^{151}Sm (β^-) ^{151}Eu	76 ± 1	5-5-14	76	− 0.1049
^{152}Sm (d, p) ^{153}Sm	3645 ± 12	5-5-37	3623	1.8208
^{152}Sm (n, γ) ^{153}Sm	5850 ± 30	5-5-37	5848	0.0713
^{153}Sm (β^-) ^{153}Eu	804 ± 5	5-5-33	800	0.7705
^{154}Sm (d, p) ^{155}Sm	3589 ± 12	5-5-56	3591	− 0.1955
^{155}Sm (β^-) ^{155}Eu	1634 ± 15	5-5-55	1638	− 0.2444
^{150}Eu (β^+) ^{150}Sm	2820 ± 300	Yo 63	2304	1.7210
^{150}Eu (β^-) ^{150}Gd	1046 ± 16	5-6-20[f])	1050	− 0.2236
^{151}Eu (γ, n) ^{150}Eu	− 8040 ± 110	5-5-16	− 7940	− 0.9059
^{152}Eu (β^+) ^{152}Sm	1857 ± 3	5-6-37[f])	1857	0.1488
^{152}Eu (β^-) ^{152}Gd	1814 ± 7	5-6-37[f])	1817	− 0.4074
^{153}Eu (γ, n) ^{152}Eu	− 8650 ± 130	5-5-38	− 8505	− 1.1188
^{155}Eu (β^-) ^{155}Gd	247 ± 3	5-5-57	247	− 0.0489
^{150}Gd (α) ^{146}Sm	2800 ± 10	5-6-23	2801	− 0.1397
^{152}Gd (α) ^{148}Sm	2204 ± 21	To 60, Ma 61	2229	− 1.1839
^{155}Gd (n, γ) ^{156}Gd	8529 ± 4	5-6-97	8530	− 0.2689
^{157}Gd (γ, n) ^{156}Gd	− 6364 ± 65	5-5-77	− 6355	− 0.1428
^{157}Gd (n, γ) ^{158}Gd	7927 ± 5[h])	5-6-114	7926	0.1563
^{157}Gd (d, p) ^{158}Gd	5706 ± 5	5-6-115	5702	0.8983
^{158}Tb (β^-) ^{158}Dy	944 ± 10	5-6-116	947	− 0.2606
^{159}Tb (γ, n) ^{158}Tb	− 8148 ± 31	5-5-87	− 8123	− 0.8080
^{159}Tb (d, p) ^{160}Tb	4165 ± 20	5-6-143	4145	0.9783
^{160}Tb (β^-) ^{160}Dy	1827 ± 3	5-6-133[f])	1827	0.1468
^{163}Dy (γ, n) ^{162}Dy	− 6320 ± 110	6-1-20	− 6239	− 0.7378
^{163}Dy (d, p) ^{164}Dy	5434 ± 5	6-1-32	5436	− 0.4279
^{164}Ho (β^-) ^{164}Er	990 ± 30	6-1-34[f])	1029	− 1.3160
^{165}Ho (γ, n) ^{164}Ho	− 8116 ± 42	6-4-22	− 8039	− 1.8426
^{165}Ho (n, γ) ^{166}Ho	6250 ± 10	6-4-53[f])	6250	− 0.0114
^{166}Ho (β^-) ^{166}Er	1847 ± 5	6-4-44[f])	1847	− 0.0057
^{166}Er (d, p) ^{167}Er	4209 ± 10	6-1-48	4217	− 0.7544
^{167}Er (γ, n) ^{166}Er	− 6560 ± 80	Ge 60	− 6441	− 1.4843
^{167}Er (n, γ) ^{168}Er	7760 ± 30	6-4-77[f])	7784	− 0.8046
^{168}Er (d, p) ^{169}Er	3773 ± 12	6-1-64	3773	− 0.0115
^{169}Er (β^-) ^{169}Tm	340 ± 2	6-1-64[f])	340	− 0.0019

TABLE 6a (continued).

Nuclear reaction or decay	Input value (keV)	Ref.	Adjusted value[b]) (keV)	δ/σ
^{170}Er (d, p) ^{171}Er	3450 ± 10	6-4-110	3455	– 0.4726
^{171}Er (β^-) ^{171}Tm	1490 ± 2	6-4-107	1490	– 0.0945
^{171}Tm (β^-) ^{171}Yb	98 ± 1	6-4-111[f])	98	– 0.0472
^{173}Yb (γ, n) ^{172}Yb	– 6500 ± 80	6-4-A 2	– 6461	– 0.4897
^{174}Lu (E.C.) ^{174}Yb	1360 ± 40	Pr 62	1398	– 0.9420
^{175}Lu (γ, n) ^{174}Lu	– 7801 ± 49	6-4-A 2	– 7744	– 1.1540
^{176}Lu (β^-) ^{176}Hf	1020 ± 20	6-4-A 2	1013	0.3532
^{174}Hf (α) ^{170}Yb	2560 ± 30	6-4-A 2	2528	1.0534
^{180}Ta (β^-) ^{180}W	490 ± 40	6-4-A 2	561	– 1.7633
^{181}Ta (γ, n) ^{180}Ta	– 7643 ± 22	60-2-116	– 7622	– 0.9699
^{181}Ta (d, p) ^{182}Ta	3830 ± 6	Sp 63, Er 64	3832	– 0.3212
^{181}Ta (n, γ) ^{182}Ta	6060 ± 8	60-1-133	6057	0.4203
^{182}Ta (β^-) ^{182}W	1736 ± 8	60-1-129	1736	– 0.0079
^{182}W (d, p) ^{183}W	3912 ± 5	Sp 63	3930	– 3.6074*
^{182}W (n, γ) ^{183}W	6192 ± 8	59-6-119, Tr 62	6155	4.6566*
^{183}W (γ, n) ^{182}W	– 6290 ± 50	59-6-118	– 6155	– 2.7051*
^{183}W (n, γ) ^{184}W	7422 ± 20	60-1-145, Tr 62	7426	– 0.1815
^{184}W (n, γ) ^{185}W	5773 ± 20	59-6-131, Tr 62	5755	0.8929
^{185}W (β^-) ^{185}Re	432 ± 5	59-6-130	431	0.2534
^{186}W (γ, n) ^{185}W	– 7280 ± 60	59-5-135	– 7302	0.3623
^{186}W (n, γ) ^{187}W	5246 ± 9	59-6-119, Tr 62	5253	– 0.7277
^{187}W (β^-) ^{187}Re	1308 ± 4	59-2-103, Ba 63	1309	– 0.3234
^{186}Re (β^-) ^{186}Os	1071 ± 1	59-5-136	1071	0.0411
^{187}Re (γ, n) ^{186}Re	– 7180 ± 80	Ge 60	– 7443	3.2855*
^{187}Re (β^-) ^{187}Os	1.2 ± 0.1	Wa 62 a	1.2	– 0.0050
^{187}Os (d, p) ^{188}Os	5602 ± 20	Wa 62 b	5647	– 2.2737*
^{188}Ir (β^+) ^{188}Os	2833 ± 10	Wa 61	2831	0.1572
^{191}Ir (n, γ) ^{192}Ir	6088 ± 10	5-3-45	6089	– 0.0788
^{192}Ir (β^+) ^{192}Os	1468 ± 10	5-3-37	1466	0.1719
^{192}Ir (β^-) ^{192}Pt	1453 ± 5	5-3-37	1453	– 0.0437
^{193}Ir (γ, n) ^{192}Ir	– 7790 ± 50	61-3-103	– 7831	0.8171
^{188}Pt (α) ^{184}Os	3950 ± 50	Ka 63	3989	– 0.7860
^{188}Pt (E.C.) ^{188}Ir	523 ± 30	59-3-129	509	0.4717
^{193}Pt (E.C.) ^{193}Ir	45 ± 30	61-3-100	35	0.3197
^{194}Pt (γ, n) ^{193}Pt	– 8290 ± 140	5-2-36	– 8499	1.4915
^{194}Pt (d, p) ^{195}Pt	3910 ± 200	61-4-99	3965	– 0.2728
^{195}Pt (γ, n) ^{194}Pt	– 6185 ± 40	61-4-99, Ge 60	– 6189	0.1067
^{195}Pt (n, γ) ^{196}Pt	7920 ± 12	5-2-36	7925	– 0.4132
^{196}Au (β^+) ^{196}Pt	1485 ± 15	5-2-37	1477	0.5387
^{196}Au (β^-) ^{196}Hg[i])	685 ± 17[j])	5-2-37	687	– 0.0985
^{197}Au (γ, n) ^{196}Au	– 8048 ± 21	5-1-25	– 8061	0.6359
^{197}Au (n, γ) ^{198}Au	6494 ± 8	5-2-58	6498	– 0.5554
^{198}Au (β^-) ^{198}Hg[i])	1374 ± 14[j])	5-2-54	1388	– 0.9720

(The footnotes to Table 6a, see on page 28.)

Table 6a (continued).

a) The error given is, as in (I), the larger of the internal and external errors when more than one measurement of the same reaction or decay was available.
b) Same as for tables 3a and c.
c) By mistake the value 2080 ± 25 keV was used, instead of the correct value 2090 ± 25 keV.
d) The ^{132}Xe mass from (I) was used with this decay energy to derive an input value for the ^{132}Cs mass excess.
e) According to Dr. A. F. Jeans of Oxford (private communication, June 1965) the correct value should be 3890 ± 20 keV, which is in much better agreement with the adjusted value. We are grateful to Dr. Jeans for supplying us with this information.
f) The value differs from the newer value quoted now in the newer Nuclear Data Sheets.
g) This Q_α value is unreliable according to ref. (21).
h) By mistake the value 7927 ± 5 keV was used, instead of the correct value 7933 ± 5 keV.
i) The Hg mass from the 1961 mass table was used with this datum to furnish an input value for the Au mass excess.
j) This error was used in determining the weight of the datum in the least-squares adjustment. It includes the error assigned to the Hg mass in the 1961 mass table.

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Table 6b

Secondary reaction and decay data used in the calculation of tables 1 and 2.

Nuclear reaction or decay	Q-value (keV)	Ref.	Nuclear reaction or decay	Q-value (keV)	Ref.
^{20}Ne (^{3}He, t) ^{20}Na	– 13 978 ± 74[a])	Do 65, Pe 65	^{135}La (β^+) ^{135}Ba	1 050 ± 150	Kö 62
^{24}Mg (^{3}He, t) ^{24}Al	– 13 850 ± 50	Ri 65	^{136}La (β^+) ^{136}Ba	2 870 ± 70	61-2-127
^{28}Si (^{3}He, t) ^{28}P	– 14 340 ± 60	Ri 65	^{138}La (β^-) ^{138}Ce	1 015 ± 15	61-3-82
^{32}S (^{3}He, n) ^{34}Ar	– 782 ± 25	Mi 65	^{141}La (β^-) ^{141}Ce	2 430 ± 30	61-4-32
^{48}Ca (d, α) ^{46}K	1 915 ± 15	Ma 64 a	^{142}La (β^-) ^{142}Ce	4 510 ± 30	Pr 64
^{40}Ca (^{3}He, t) ^{40}Sc	– 14 480 ± 60	Ri 65	^{143}La (β^-) ^{143}Ce	3 300 ± 80	61-4-43
^{46}Ti (^{3}He, n) ^{48}Cr	5 565 ± 31	Mi 65	^{144}Ce (β^-) ^{144}Pr	313 ± 8	LB 61, p. 2–322
^{67}Ni (β^-) ^{67}Cu	4 100 ± 300	Me 65			
^{58}Ni (^{3}He, n) ^{60}Zn	829 ± 26	Mi 65	^{146}Ce (β^-) ^{146}Pr	1 000 ± 100	59-1-126
^{78}Ge (β^-) ^{78}As	972 ± 30	Fr 65	^{139}Pr (β^+) ^{139}Ce	2 108 ± 20	61-3-94, Bi 63 a
^{83}Se (β^-) ^{83}Br	3 300 ± 100	Ba 62			
^{75}Br (β^+) ^{75}Se	3 025 ± 50	Ba 61	^{144}Pr (β^-) ^{144}Nd	2 996 ± 10	LB 61, p. 2–322
^{86}Br (β^-) ^{86}Kr	7 600 ± 500	Wi 63			
^{93}Sr (β^-) ^{93}Y	4 300 ± 56	Ba 65	^{145}Pr (β^-) ^{145}Nd	1 805 ± 10	59-1-120
^{95}Ru (β^+) ^{95}Tc	2 370 ± 30	Ri 63	^{146}Pr (β^-) ^{146}Nd	4 120 ± 89	59-1-127, Da 64
^{101}Pd (β^+) ^{101}Rh	1 989 ± 15	Ev 65			
^{114}Ag (β^-) ^{114}Cd	5 150 ± 400	60-3-92	^{147}Pr (β^-) ^{147}Nd	2 700 ± 200	Ho 64
^{115}Ag (β^-) ^{115}Cd	3 200 ± 100	Ba 64	^{141}Nd (β^+) ^{141}Pr	1 802 ± 9	61-4-36, Bi 63 b
^{106}In (β^+) ^{106}Cd	6 500 ± 100	Ca 62			
^{126}Sb (β^-) ^{126}Te	3 702 ± 73	60-6-107, Dr 62, Dr 63	^{147}Nd (β^-) ^{147}Pm	901 ± 9	We 60
			^{151}Nd (β^-) ^{151}Pm	2 400 ± 100	5-5-5
^{132}Te (β^-) ^{132}I	505 ± 15	61-2-74	^{141}Pm (β^+) ^{141}Nd	3 620 ± 200	61-4-37
^{132}I (β^-) ^{132}Xe[b])	3 590 ± 40	61-2-75	^{142}Pm (β^+) ^{142}Nd	4 820 ± 100	LB 61, p. 2–318
^{133}I (β^-) ^{133}Xe	1 800 ± 50	61-2-87			
^{134}I (β^-) ^{134}Xe[b])	4 150 ± 60	61-2-100	^{143}Pm (E.C.) ^{143}Nd	1 100 ± 150	Kö 61
^{136}I (β^-) ^{136}Xe[b])	7 000 ± 100	61-2-124	^{146}Pm (β^-) ^{146}Sm	1 537 ± 19	Fu 60, Pa 63
^{127}Xe (E.C.) ^{127}I	543 ± 23	Br 64	^{147}Pm (β^-) ^{147}Sm	225 ± 3	59-1-138
^{133}Xe (β^-) ^{133}Cs	428 ± 4	61-2-88	^{148}Pm (β^-) ^{148}Sm	2 459 ± 17	61-4-56, Ba 63 a
^{135}Xe (β^-) ^{135}Cs	1 160 ± 10	61-2-117			
^{137}Xe (β^-) ^{137}Cs	4 079 ± 56	Ho 63, On 64	^{150}Pm (β^-) ^{150}Sm	3 430 ± 60	5-6-10
^{127}Cs (E.C.) ^{127}Xe	2 100 ± 60	61-1-79	^{151}Pm (β^-) ^{151}Sm	1 192 ± 7	5-5-6, Be 64
^{135}Cs (β^-) ^{135}Ba	210 ± 5	61-2-118	^{153}Pm (β^-) ^{153}Sm	1 830 ± 100	5-5-32
^{136}Cs (β^-) ^{136}Ba	2 830 ± 20	61-2-126	^{143}Sm (β^+) ^{143}Pm	3 400 ± 140	61-4-47, Gr 59
^{137}Cs (β^-) ^{137}Ba	1 176 ± 2	61-2-133			
^{139}Cs (β^-) ^{139}Ba	4 000 ± 200	61-3-89	^{156}Sm (β^-) ^{156}Eu	715 ± 15	5-6-89
^{133}Ba (E.C.) ^{133}Cs	488 ± 5	61-2-91	^{145}Eu (β^+) ^{145}Sm	2 760 ± 30	Dz 60
^{140}Ba (β^-) ^{140}La	1 050 ± 10	59-1-87	^{146}Eu (β^+) ^{146}Sm	3 881 ± 9	61-3-143, Fu 62
^{141}Ba (β^-) ^{141}La	3 000 ± 100	Fr 62			
^{142}Ba (β^-) ^{142}La	2 200 ± 100	Fr 62	^{147}Eu (α) ^{143}Pm	2 990 ± 10	Si 62
^{132}La (β^+) ^{132}Ba	4 652 ± 117	61-2-82, Ju 65	^{148}Eu (β^+) ^{148}Sm	3 088 ± 45	61-4-61, Ba 63 b
^{133}La (β^+) ^{133}Ba	2 200 ± 200	61-2-94	^{148}Eu (α) ^{144}Pm	2 703 ± 30	To 64
^{134}La (β^+) ^{134}Ba	3 770 ± 50	Bi 65 a	^{154}Eu (β^-) ^{154}Gd	1 978 ± 5	5-6-67

TABLE 6b (continued).

Nuclear reaction or decay	Q-value (keV)	Ref.	Nuclear reaction or decay	Q-value (keV)	Ref.
^{156}Eu (β^-) ^{156}Gd	2 447 ± 16	5-6-90	^{172}Tm (β^-) ^{172}Yb	1 866 ± 16	6-4-A 2
^{157}Eu (β^-) ^{157}Gd	1 328 ± 26	5-5-76, Ka 64, Sh 64	^{173}Tm (β^-) ^{173}Yb	1 320 ± 30	6-4-A 2
			^{174}Tm (β^-) ^{174}Yb	3 040 ± 100	6-4-A 2
^{158}Eu (β^-) ^{158}Gd	3 300 ± 300	5-6-112	^{176}Tm (β^-) ^{176}Yb	4 200 ± 100	Ta 61
^{159}Eu (β^-) ^{159}Gd	2 220 ± 89	5-5-84	^{166}Yb (E.C.) ^{166}Tm	260 ± 120	6-4-63
^{148}Gd (α) ^{144}Sm	3 270 ± 10	Si 62	^{175}Yb (β^-) ^{175}Lu	467 ± 3	6-4-A 2
^{149}Gd (α) ^{145}Sm	3 090 ± 20	Si 64	^{177}Yb (β^-) ^{177}Lu	1 380 ± 50	6-4-A 2
^{151}Gd (α) ^{147}Sm	2 670 ± 30	Si 64	^{173}Lu (E.C.) ^{173}Yb	690 ± 30	6-4-A 2
^{153}Gd (E.C.) ^{153}Eu	243 ± 3	5-5-39	^{177}Lu (β^-) ^{177}Hf	497 ± 2	6-4-A 2
^{159}Gd (β^-) ^{159}Tb	947 ± 7	5-5-85	^{178}Lu (β^-) ^{178}Hf	2 250 ± 50	6-4-A 2
^{161}Gd (β^-) ^{161}Tb	2 000 ± 80	5-5-97	^{179}Lu (β^-) ^{179}Hf	1 350 ± 50	6-4-A 2
^{148}Tb (β^+) ^{148}Gd	5 620 ± 300	61-4-63	^{180}Lu (β^-) ^{180}Hf	3 300 ± 100	6-4-A 2
^{149}Tb (α) ^{145}Eu	4 070 ± 20	To 60	^{175}Hf (E.C.) ^{175}Lu	600 ± 100	59-2-92
^{150}Tb (β^+) ^{150}Gd	4 703 ± 72	Bo 61, Zh 60	^{181}Hf (β^-) ^{181}Ta	1 023 ± 4	60-2-113
^{151}Tb (α) ^{147}Eu	3 510 ± 30	Ma 64 b	^{182}Hf (β^-) ^{182}Ta	300 ± 100	Wi 61
^{152}Tb (β^+) ^{152}Gd	3 840 ± 40	Dz 62, Gr 61	^{183}Hf (β^-) ^{183}Ta	2 200 ± 200	59-6-116
^{157}Tb (E.C.) ^{157}Gd	60 ± 10	5-5-78, Fu 64	^{177}Ta (β^+) ^{177}Hf	1 159 ± 5	6-4-A 2
^{161}Tb (β^-) ^{161}Dy	584 ± 6	5-5-98	^{178}Ta (β^+) ^{178}Hf	1 912 ± 10	6-4-A 2
^{163}Tb (β^-) ^{163}Dy	1 680 ± 50	6-1-18	^{179}Ta (E.C.) ^{179}Hf	110 ± 4	6-4-A 2
^{152}Dy (α) ^{148}Gd	3 710 ± 10	To 60, Ma 64 b, Ma 64 c	^{183}Ta (β^-) ^{183}W	1 068 ± 10	59-6-117
			^{184}Ta (β^-) ^{184}W	2 740 ± 15	Ve 64
^{153}Dy (α) ^{149}Gd	3 546 ± 6	To 60, Ma 64 b, Ma 64 c	^{185}Ta (β^-) ^{185}W	1 900 ± 50	59-6-129
			^{186}Ta (β^-) ^{186}W	3 660 ± 200	59-5-134
^{154}Dy (α) ^{150}Gd	2 930 ± 50	Ma 61	^{181}W (E.C.) ^{181}Ta	195 ± 31	60-2-118, Jo 61
^{159}Dy (E.C.) ^{159}Tb	380 ± 20	5-5-88			
^{165}Dy (β^-) ^{165}Ho	1 292 ± 9	6-4-11	^{188}W (β^-) ^{188}Re	349 ± 3	Bu 64
^{166}Dy (β^-) ^{166}Ho	481 ± 5	6-4-42	^{182}Re (β^+) ^{182}W	2 860 ± 20	Ba 63 c
^{152}Ho (α) ^{148}Tb	4 500 ± 20	Ma 63	^{188}Re (β^-) ^{188}Os	2 121 ± 13	59-3-123, Bu 64
^{153}Ho (α) ^{149}Tb	4 030 ± 30	Ma 63			
^{160}Ho (β^+) ^{160}Dy	3 200 ± 100	5-6-149	^{189}Re (β^-) ^{189}Os	1 000 ± 20	Cr 63
^{162}Ho (β^+) ^{162}Dy	2 150 ± 30	6-1-7	^{190}Re (β^-) ^{190}Os	3 100 ± 300	5-3-6
^{163}Ho (E.C.) ^{163}Dy	10 ± 10	6-1-21	^{185}Os (E.C.) ^{185}Re	982 ± 4	59-6-134
^{167}Ho (β^-) ^{167}Er	1 000 ± 100	6-1-46	^{191}Os (β^-) ^{191}Ir	314 ± 2	5-3-21, Pl 63
^{168}Ho (β^-) ^{168}Er	2 770 ± 100	6-4-74	^{193}Os (β^-) ^{193}Ir	1 132 ± 5	61-3-101
^{169}Ho (β^-) ^{169}Er	2 100 ± 100	Mi 63	^{194}Os (β^-) ^{194}Ir	97 ± 2	Wi 64
^{163}Er (β^+) ^{163}Ho	1 210 ± 6	6-1-22	^{186}Ir (β^+) ^{186}Os	3 831 ± 20	Em 63
^{165}Er (E.C.) ^{165}Ho	371 ± 5	6-4-23	^{190}Ir (β^+) ^{190}Os	2 000 ± 200	5-3-5, 5-3-9
^{172}Er (β^-) ^{172}Tm	888 ± 5	Gu 62, He 61, Or 61	^{194}Ir (β^-) ^{194}Pt	2 236 ± 10	61-4-70
			^{195}Ir (β^-) ^{195}Pt	1 000 ± 100	61-4-97
^{164}Tm (β^+) ^{164}Er	3 962 ± 20	Ab 60	^{196}Ir (β^-) ^{196}Pt	3 400 ± 21	Bi 65 b
^{165}Tm (E.C.) ^{165}Er	1 565 ± 30	Pr 65	^{197}Ir (β^-) ^{197}Pt	2 000 ± 200	5-1-20
^{166}Tm (β^+) ^{166}Er	3 035 ± 12	6-4-56	^{190}Pt (α) ^{186}Os	3 230 ± 20	5-3-12
^{169}Tm (γ, n) ^{168}Tm	− 8 060 ± 50	6-1-66	^{197}Pt (β^-) ^{197}Au	750 ± 10	5-1-21
^{170}Tm (β^-) ^{170}Yb	966 ± 4	6-4-91	^{199}Pt (β^-) ^{199}Au	1 690 ± 50	Jo 63

TABLE 6b (continued).

Nuclear reaction or decay	Q-value (keV)	Ref.	Nuclear reaction or decay	Q-value (keV)	Ref.
^{192}Au (β^+) ^{192}Pt	3 240 ± 50	5-3-47	^{198}Tl (β^+) ^{198}Hg$^{d)}$	3 460 ± 80	5-2-60
^{194}Au (β^+) ^{194}Pt	2 509 ± 15	61-4-83	^{199}Tl (E.C.) ^{199}Hg$^{d)}$	1 100 + 400 − 200	5-3-64
^{195}Au (E.C.) ^{195}Pt	221 ± 2	61-4-100			
^{199}Au (β^-) ^{199}Hg$^{c)}$	460 ± 10	5-3-59	^{257}Fm (α) ^{253}Cf	6 664 ± 40	Hu 64
^{196}Tl (β^+) ^{196}Hg$^{d)}$	4 600 ± 150	5-2-43	^{256}Mv (α) ^{252}Es	7 284 ± 30	Si 65
			^{257}Mv (α) ^{253}Es	7 182 ± 30	Si 65

a) The same as in table 6 a.
b) The Xe mass from (I) was used with this datum to furnish a value for the I mass excess.
c) The Hg mass from the 1961 mass table was used with this datum to furnish a value for the Au mass excess.
d) The Hg mass from the 1961 mass table was used with this datum to furnish a value for the Tl mass excess.

References to table 6 b:

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3. Consistency of the Data and Reliability of the Mass Values

Table 7 summarizes the number of data and the consistency factor in the four adjusted subregions. The consistency factor is unsatisfactory in all four regions. The last column in tables 3a and 6a gives the value of δ/σ of the input data and conveys a rough idea of their contributions to χ^2. Of the 411 primary input data, 71 have an absolute value of δ/σ larger than 2. These are marked by an asterisk in the δ/σ column. Similarly to table 9 in (I), the numbers in brackets in table 7 give the number of input data and what becomes of the consistency factor in each of the four regions when these data, which are inconsistent with the rest, are omitted. We shall now comment briefly on some of the disagreeing data.

(i) *Nuclear reaction and decay energies.* There are only nine such data as com-

TABLE 7
Consistency data of the least-squares mass adjustment.

Region	No. of masses	No. of primary masses n	No. of primary input data N	$f = \sqrt{\chi^2/(N-n)}$ Computed	Theoretical
I. ^{132}Te–^{160}Gd	131	56	174 (141)	2.04 (1.10)	1.00 ± 0.07
II. ^{156}Dy–^{164}Dy....	20	10	47 (38)	1.63 (0.99)	0.12
III. ^{162}Er–^{180}Hf	57	29	97 (82)	1.49 (1.02)	0.09
IV. ^{180}Ta–^{199}Tl.....	69	33	93 (79)	1.77 (0.89)	0.09
total	277	128	411 (340)	1.81 (1.02)	0.04

The numbers in brackets give the corresponding values when the "inconsistent" data are excluded, as mentioned in the text.

pared to 62 mass doublets, which reflects the high proportion of mass doublets in the totality of the input data in the present mass region (283 out of 411).

First, there is the ^{133}Cs (γ, n) ^{132}Cs Q-value, which seems to be too high by 158 keV, as, together with the ^{132}Cs (β^+) ^{132}Xe Q-value, it gives for the ^{133}Cs–^{132}Xe mass difference a value higher by 240 keV than the mass spectroscopic measurements of Johnson and Nier.

Secondly, there are the ^{143}Nd (n, γ) ^{144}Nd and ^{147}Sm (α) ^{143}Nd Q-values which seem to be too low by 26 and 28 keV, respectively, and the ^{148}Sm (α) ^{144}Nd Q-value which is too high by 187 keV. This is due to a discrepancy of 248 keV between the ^{148}Sm–^{147}Sm mass difference obtained from these three data and from the directly measured ^{147}Sm (d, p) ^{148}Sm Q-value. However, the ^{148}Sm (α) ^{144}Nd Q-value is probably wrong (see remark (g) to table 6a), and perhaps no real discrepancy exists in this case.

Then, there are the mutually contradicting ^{182}W (d, p) ^{183}W, ^{182}W (n, γ) ^{183}W and ^{183}W (γ, n) ^{182}W Q-values. However, the (d, p) reaction is now known (see caption to table 2 in ref.(12)) to lead to an excited state at 46 keV of ^{183}W, which settles the disagreement between the first two data. There are now also two additional accurate ^{182}W (d, p) ^{183}W measurements in essential agreement with them (see table 2 of ref.(12)), and it seems that the ^{183}W (γ, n) ^{182}W value must be too low by about 100 keV.

Finally, there are the ^{187}Re (γ, n) ^{186}Re and the ^{187}Os (d, p) ^{188}Os Q-values, which seem to be too high by 263 keV and too low by 45 keV, respectively. These discrepancies are essentially due to the facts that the ^{187}Re (γ, n) ^{186}Re Q-value, combined with the very accurate ^{186}Re (β^-) ^{186}Os and ^{187}Re (β^-) ^{187}Os Q-values, disagrees by 277 keV with the Minnesota ^{187}Os–^{186}Os mass difference, and similarly the ^{187}Os (d, p) ^{188}Os value disagrees by 248 keV with the Minnesota ^{188}Os–^{187}Os mass difference.

(ii) *Some isotopic mass doublets.* The Hamilton value of the ^{150}Sm–^{148}Sm mass difference seems to be too high by 15 keV. This is due to its disagreement by 36 keV with the value obtained for this mass difference from the accurate ^{148}Sm (d, p) ^{149}Sm and ^{149}Sm (n, γ) ^{150}Sm Q-values.

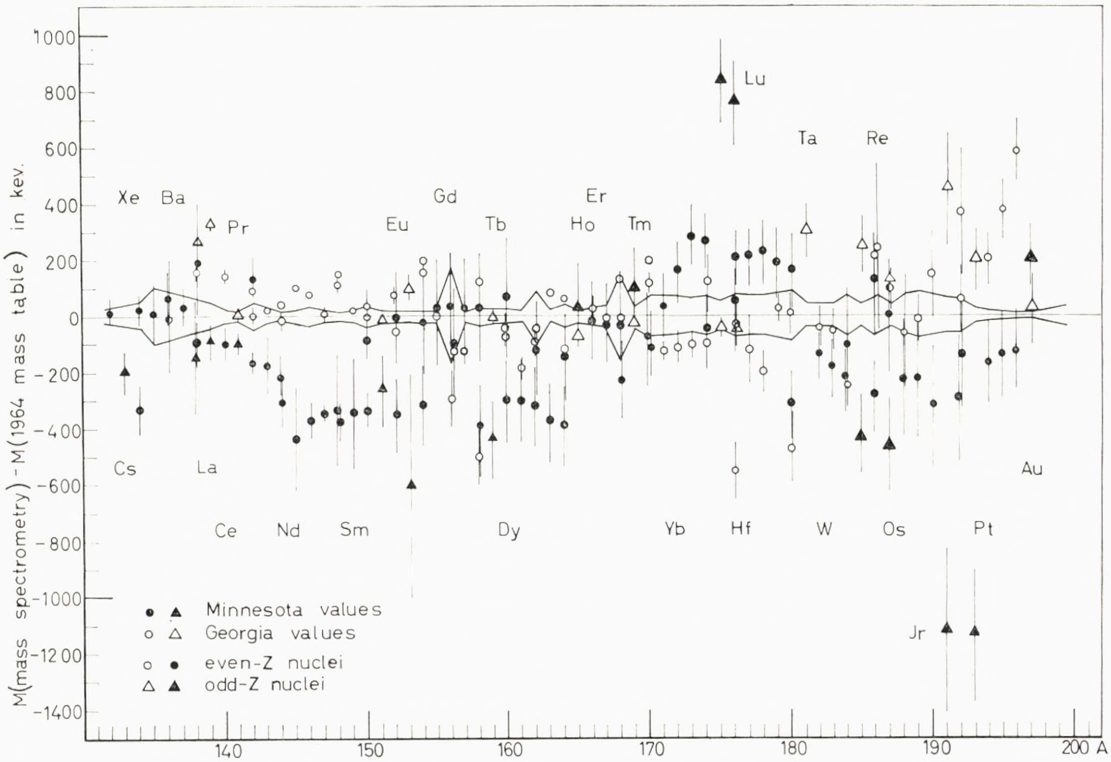


Fig. 3. Differences between Minnesota and Georgia masses and between the 1964 mass table from $A = 132$ to $A = 197$. The points correspond to the mass-spectroscopic values and the assigned experimental errors are given with them. The thin lines running symmetrically below and above the abscissa represent the errors assigned in the 1964 mass table.

The ^{173}Yb–^{172}Yb Minnesota mass difference seems to be by 121 keV too high. This is mainly due to its disagreement by 160 keV with the ^{173}Yb (γ, n) ^{172}Yb Q-value.

Then, there are the ^{183}W–^{182}W and ^{188}Os–^{187}Os Minnesota mass differences, which seem to be too low by 95 keV and by 203 keV, respectively. The ^{183}W–^{182}W discrepancy is mainly due to the erroneous ^{182}W (d, p) ^{183}W Q-value, and the ^{188}Os–^{187}Os disagreement is due to a discrepancy of 248 keV with the ^{187}Os (d, p) ^{188}Os Q-value, both of which were already mentioned in connection with the inconsistent reaction data.

Finally, there are the Hamilton ^{154}Gd–^{152}Gd and ^{164}Dy–^{162}Dy mass doublets, which seem to have values too small by 89 keV and by 18 keV, respectively, and the Minnesota ^{161}Dy–^{160}Dy, ^{171}Yb–^{170}Yb, ^{172}Yb–^{171}Yb and ^{172}Yb–^{170}Yb doublets, which seem to have values too large by 162, 148, 112 and 235 keV, respectively. All these discrepancies are due to their disagreement by some few hundred keV with the numerous Gd, Dy and Yb mass doublets of Demirkhanov *et al.* The same must be true for the discrepancies of the Minnesota ^{176}Yb–^{174}Yb and ^{176}Hf–^{174}Hf isotopic doublets.

(iii) *Inconsistent hydrocarbon doublets.* The general trends of their deviations are seen in fig. 3, which shows the differences between the purely mass-spectroscopic mass values and the final values from the 1964 mass table. The newer values[20] of Demirkhanov *et al.* are included as well, for the sake of completeness. The figure displays systematic deviations of a few hundred keV, which are caused by discrepancies of a similar magnitude between the mass-spectroscopic mass differences of neighbouring elements, and the values obtained for these differences from nuclear reaction and decay data.

We like to add a remark concerning the reliability of all the masses included in the 1964 mass table, which were applied to determine the coefficients in the shell-model mass equation. Up to $A = 132$ and beyond $A = 199$ the assigned errors are usually quite small, the mean absolute deviations being 54 keV and 40 keV, respectively. From $A = 132$ to $A = 199$ they are somewhat higher, with a mean absolute value of 69 keV (or 68 keV in our table 2). However, the unsatisfactory overall consistency factor* of 1.81 from table 7 suggests that the assigned errors in this region should be approximately doubled, and the differences of sometimes several hundred keV shown in fig. 3 between the mass spectroscopic values and the final adjusted mass values suggest the possibility of even higher errors in this region. The less regular systematics in this region as compared to neighbouring regions might also point at possible experimental errors of this order of magnitude.

Part II.
QUALITATIVE RESTUDY OF NUCLEAR STRUCTURE EFFECTS

4. Systematics of Second and Third Order Mass Differences

In this section we give graphs** of Δ_{nn}, Δ_{np}, Δ_{pp}, δ_n, δ_p and δ_{pn} calculated from the newer mass values, as explained in the introduction. The empirical definition of these parameters is given in eqs. (11), (12) and (14) of (I), and the graphs (figs. 4–7) are intended to replace the corresponding graphs there (figs. 5–8 of (I)) when discussing nuclear structure effects below. We also plotted the following quantities

$$\Delta_{\alpha n}(N,Z) = Q_\alpha(N,Z) - Q_\alpha(N-2,Z) = -\Delta_{nn}(N,Z) - \Delta_{np}(N-2,Z), \qquad (1a)$$

$$\Delta_{\alpha p}(N,Z) = Q_\alpha(N,Z) - Q_\alpha(N,Z-2) = -\Delta_{pp}(N,Z) - \Delta_{np}(N,Z-2), \qquad (1b)$$

* In the adjustment of the 1964 mass table, the region ^{135}I–^{180}Hf also came out with a higher consistency factor than the other regions (table A, ref. (12)). However, this consistency factor of 1.31 is better than our value of 1.81 and the input data look more consistent, because of the generally smaller weights assigned to the mass spectroscopic data in ref. (12).

** Up to $A = 70$ the graphs are the same as in (I). From $A = 70$ to $A = 132$ they are based on the new Minnesota mass tables (4, 5). From $A = 132$ to $A = 199$ they are based on table 2, supplemented by some additional masses from the 1964 mass table. Beyond $A = 199$ they are based on the 1964 mass table.

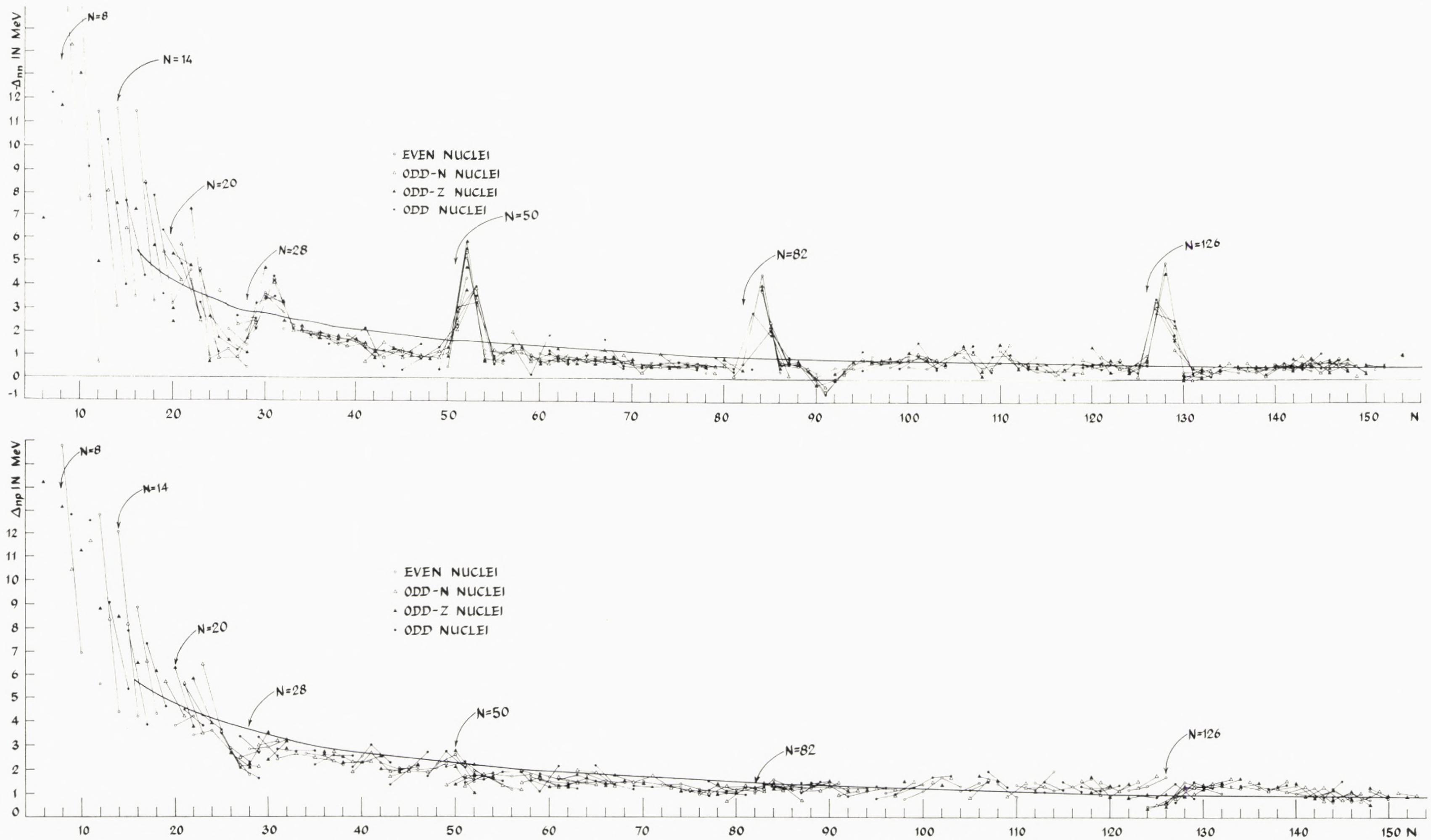


Fig. 4. Upper part. $-\Delta_{nn}$ as function of N. Lower part. Δ_{np} as function of N. Neighbouring isotopes of the same parity type are connected by a line. The monotonously decreasing thick lines running among the experimental points in the upper and lower parts show the $-\Delta_{nn}$ and Δ_{np} values, respectively, of odd-mass beta stable nuclei according to the liquid-drop part of Cameron's 1957 mass equation (43, 44) and are discussed in sect. 14.

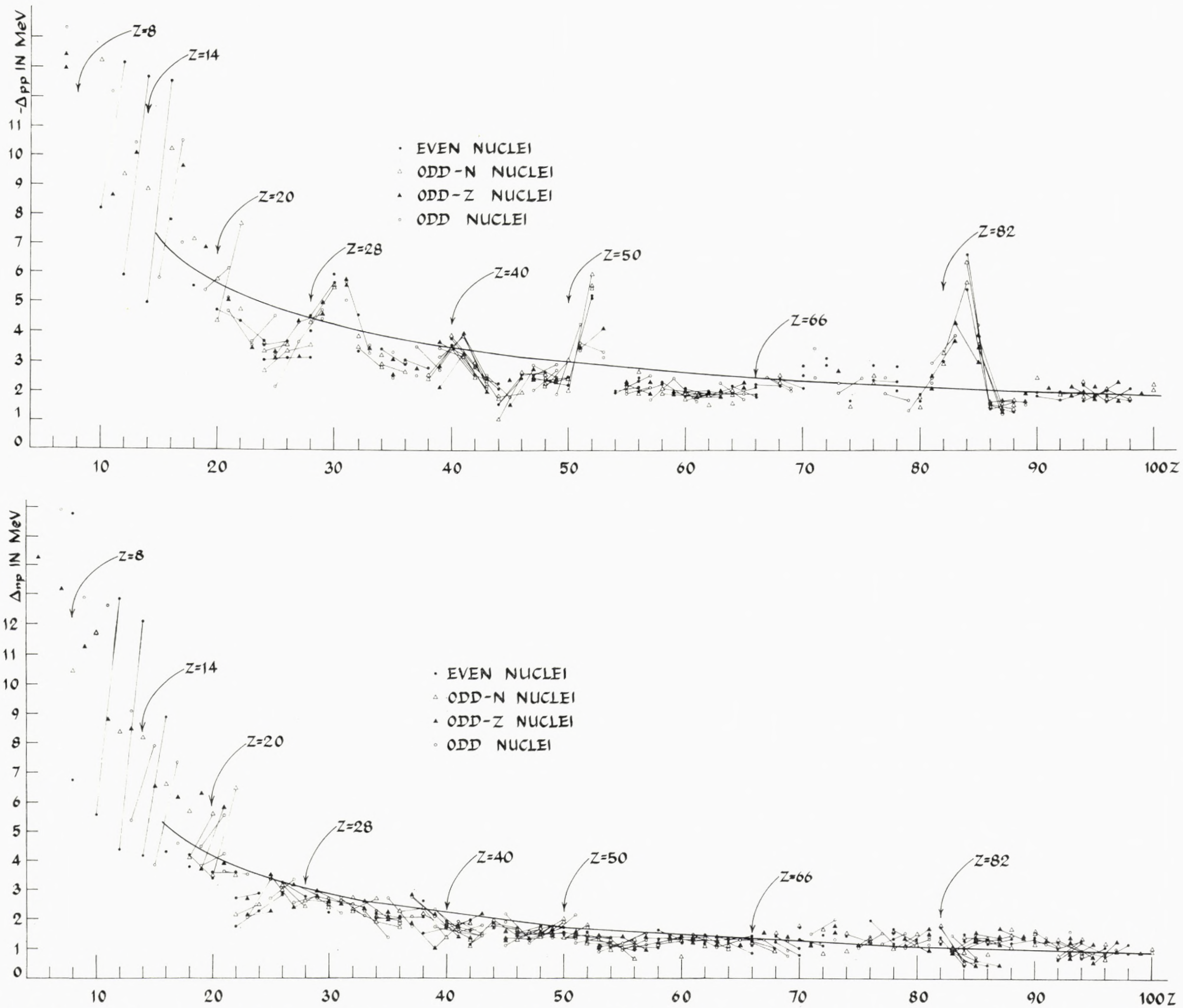


Fig. 5. Upper part. $-\Delta_{pp}$ as function of Z. Lower part. Δ_{np} as function of Z. Neighbouring isotones of the same parity type are connected by a line. The monotonously decreasing thick lines running among the experimental points in the upper and lower parts show the $-\Delta_{pp}$ and Δ_{np} values, respectively, of odd-mass beta stable nuclei according to the liquid drop part of Cameron's 1957 mass equation, as in fig. 4.

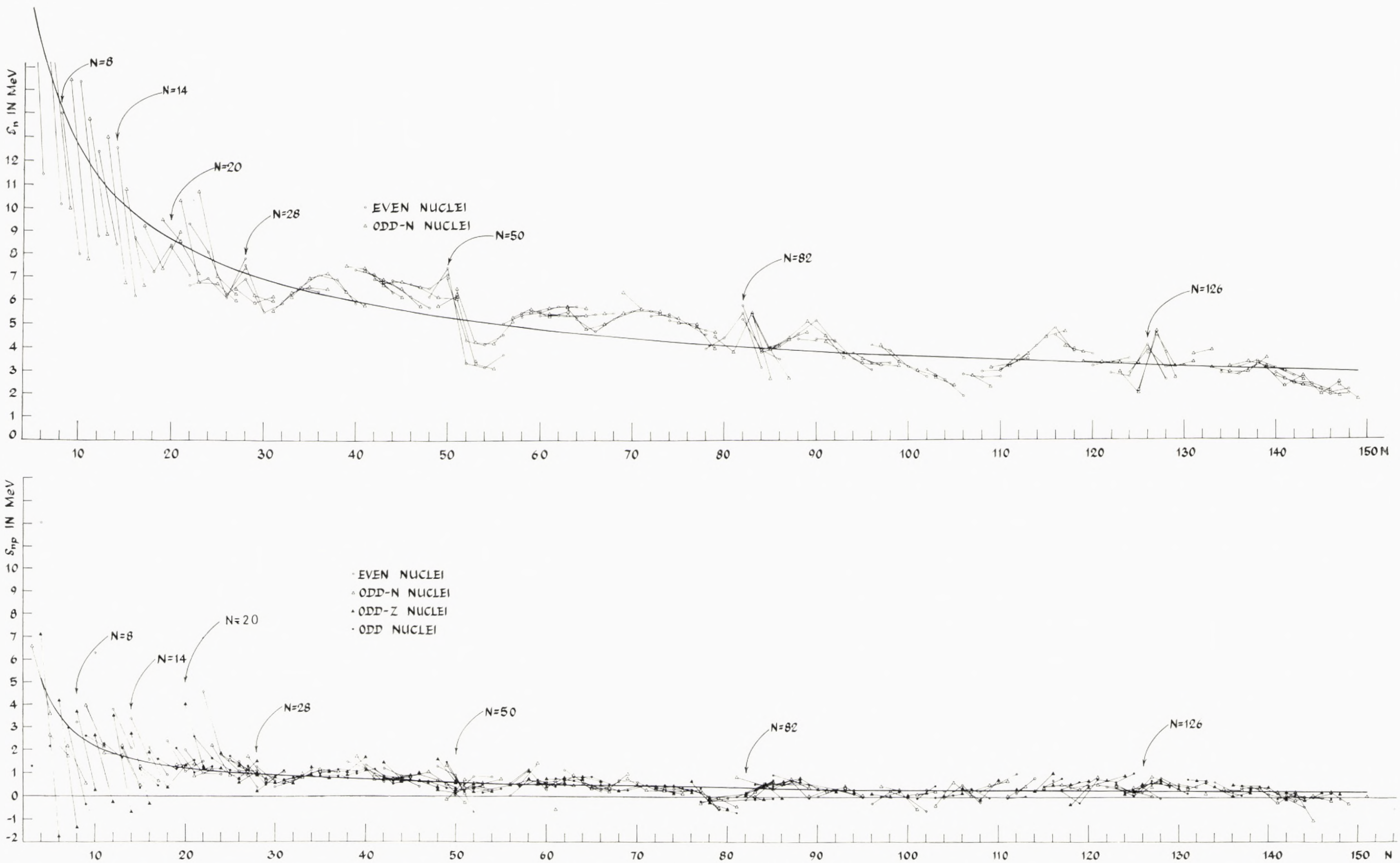


Fig. 6. Upper part. δ_n as function of N. Lower part. δ_{pn} as function of N. Neighbouring isotopes of the same parity type are connected by a line. The monotonously decreasing thick lines in the upper and lower parts represent the best lines (15 a) and (17), respectively, through the experimental points, as explained in sect. 13.

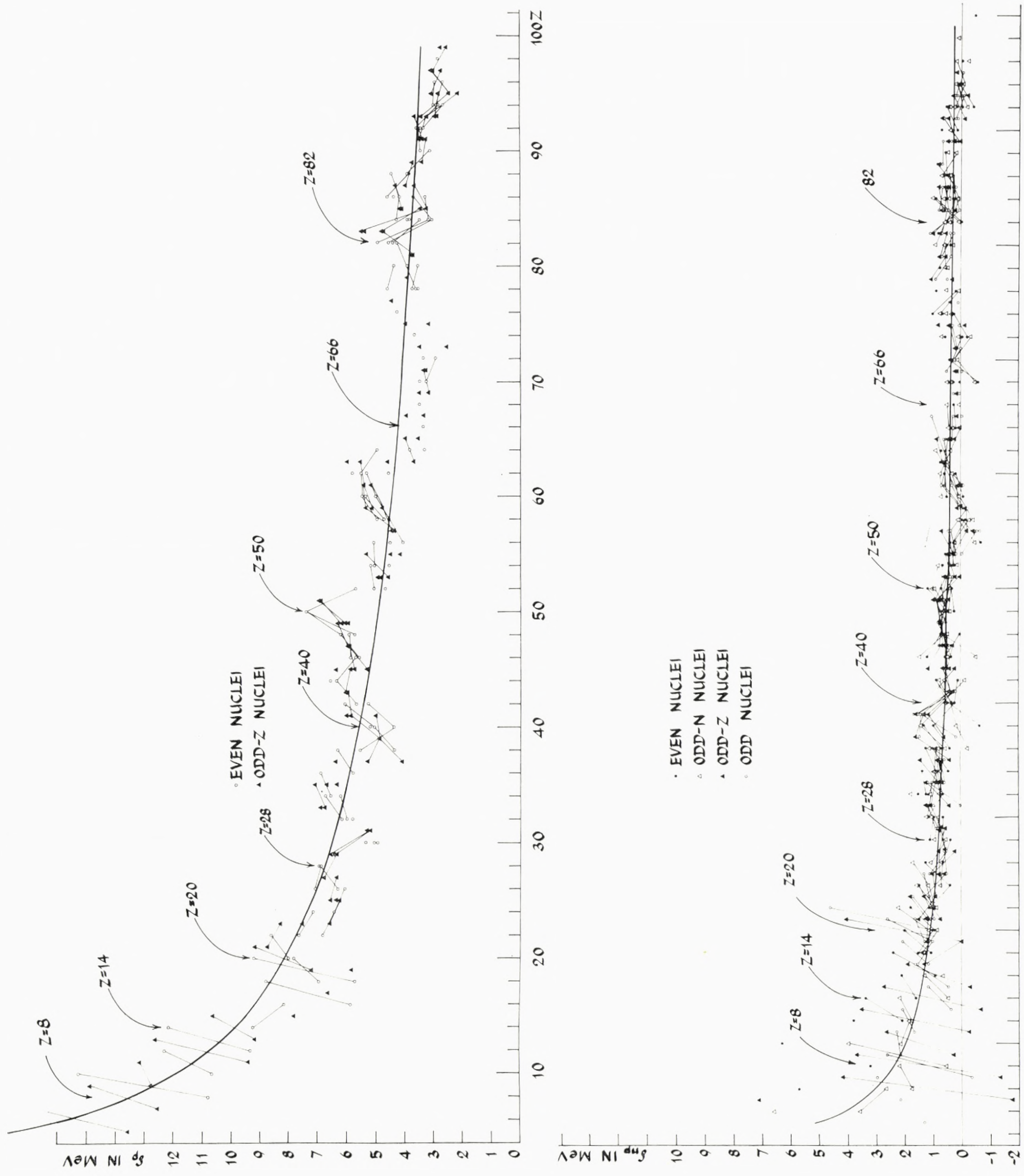


Fig. 7. Upper part. δ_p as function of Z. Lower part. δ_{pn} as function of Z. Neighbouring isotones of the same parity type are connected by a line. The monotonously decreasing thick lines in the upper and lower parts represent the best lines (15 b) and (17), respectively, through the experimental points, as in fig. 6.

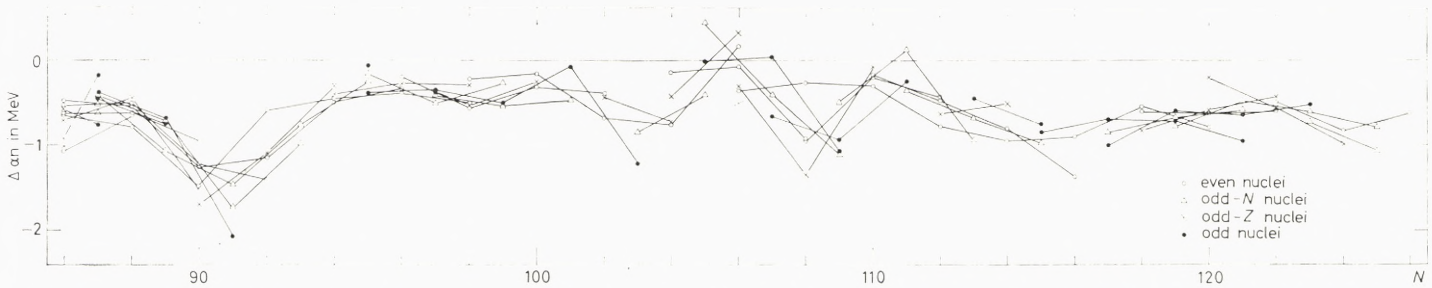


Fig. 8. $\Delta_{\alpha n}$ as function of N in the region $52 \leqslant Z \leqslant 82$, $86 \leqslant N \leqslant 126$. Neighbouring isotopes of the same parity type are connected by a full line. Sometimes immediately-neighbouring isotopes are connected by a dashed line.

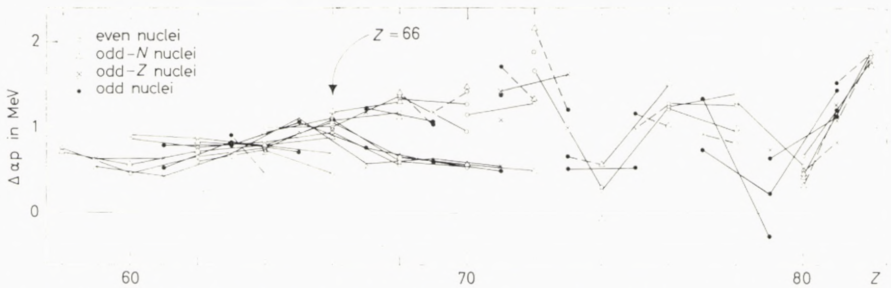


Fig. 9. $\Delta_{\alpha p}$ as function of Z in the region $54 \leqslant Z \leqslant 82$, $84 \leqslant N \leqslant 126$. Neighbouring isotones of the same parity type are connected by a full line. Sometimes, immediately-neighbouring isotones are connected by a dashed line.

as functions of N and Z, respectively (figs. 8 and 9) for nuclei with N between 82 and 126 and Z between 50 and 82. The data for these graphs were taken from a recent table of alpha decay energies, kindly communicated to us by Professor M. NURMIA[21] and from the 1964 mass table. These graphs are intended to supplement the Δ_{nn} and Δ_{pp} graphs in this region. They contain many more points than the Δ_{nn} and Δ_{pp} graphs, since many more Q_α values are known experimentally than S_{2n} and in particular S_{2p} values. On the other hand, since the Δ_{np} are practically not influenced by changes in single-nucleon energies and vary smoothly in this region (see lower parts of figs. 4 and 5 and the discussion in subsect. 6.1 of (I)), any structure in the $\Delta_{\alpha n}$ and $\Delta_{\alpha p}$ graphs reflects a corresponding structure in the behaviour of the quantities Δ_{nn} and Δ_{pp}, which might be overlooked in the Δ_{pp} graph due to the meager number of points.

The general pattern of figs. 4–9 is the same as that of the corresponding figures in (I). However, the scattering of the points in the parts based on the newer data is smaller, indicating that the agreement of the mass formula with the newer masses will be somewhat better than with the older ones. This expectation is indeed borne out by the facts as will be shown in sect. 9 below.

5. Shell, Subshell and Deformation Effects

We now turn to a brief discussion of shell and subshell effects. The large cusps associated with the completion of the major shells at $N = 20(?)$, 28, 50, 82, 126 and at $Z = 20(?)$, 28, 50, 82 exist in the Δ_{nn} and Δ_{pp} graphs (upper parts of figs. 4 and 5, respectively) just as in the corresponding graphs of (I), and similarly the smaller cusps at these nucleon numbers in the δ_n and δ_p graphs (upper parts of figs. 6 and 7, respectively).

We next discuss submagic numbers. The situation with respect to the neutrons remains practically the same, namely that the only well-established submagic neutron number beyond the 1d subshell is $N = 152$, whose existence is best revealed in alpha-decay energy systematics*. No submagic number effects of general validity are revealed in the $-\Delta_{nn}$ graph at $N = 40$ or $N = 56$ or at $N = 64$ or 66. On the contrary, the inexplicable cusp which existed at $N = 40$ on top of the hump in the old δ_n graph completely disappeared from the newer data.

The situation with respect to the protons also remains practically the same, viz. the non-existence of subshell effects of more or less general validity except at $Z = 40$ and $Z = 66$. However, the new data reveal these effects to a lesser extent than the older ones. Thus, some $-\Delta_{pp}$ values in fig. 5 are already higher at $Z = 39$ than at lower Z-values, whereas in the older $-\Delta_{pp}$ graph the $-\Delta_{pp}$ values at $Z = 39$ were still in line with their predecessors. Thus the newer data reveal that, for some N-values ($N = 49$, 51 and 52 distinguish themselves in the figure), there is also an energy gap

* In the $-\Delta_{nn}$ graph, there is only a slight increase in the height of the points beyond $N = 152$ as compared to immediately preceding lower-N values.

above $Z = 38$ after the completion of the $2p_{3/2} + 1f_{5/2}$ proton subshells in Sr. This might also be indicated by the fact that no low-lying $p_{3/2}$ or $f_{5/2}$ levels are known in the even-N isotopes of Y, Nb and Tc, and the only low-lying single-proton levels known experimentally in them are the $2p_{1/2}$ and $1g_{9/2}$ levels[(9)].

Similarly at $Z = 66$; fig. 10 shows the alpha decay energy systematics between $N = 82$ and $N = 126$, based on the same data as figs. 8 and 9. Both the vertical gap above Gd in the neighbourhood of $N = 84$ and the gap above Dy around $N = 94$ are seen, as in the corresponding fig. 10 of (I). However, with the older data the gap above Dy in the heavier deformed nuclei was about twice as large as the gap above Gd in the more spherical, lighter nuclei. On the other hand, in the newer present fig. 10 it is still larger, but to a much lesser extent. This behaviour is also reflected in the similar change in the $-\Delta_{pp}$ graph: The new $-\Delta_{pp}$ values beyond $Z = 66$ are but slightly higher than those below them. In the much denser $\Delta_{\alpha p}$ graph (fig. 9) there is a splitting of the points at $Z = 66$ into two distinct branches, and one observes both a small cusp from $Z = 64$ to $Z = 68$ associated with the submagic character of $Z = 64$ in the lower-N nuclei ($N = 84, 85, 86$; lower branch), and a slight further increase beyond $Z = 66$ associated with the energy gap above $Z = 66$ for higher-N-values ($N \geqslant 94$; upper branch).

However, let us add the following remark: the smaller prominence in the newer data of the $Z = 66$ submagic character is due to the fact that the Dy masses in the 1964 mass table with N between 90 and 100 are on the average 323 keV higher than the older Dy masses used in (I), whereas the corresponding average increase of the Er masses is -2 keV. However, as already mentioned in sect. 3, there are mutual contradictions in the experimental data which were used in the calculation of these masses. With the purely mass spectroscopic values of Demirkhanov *et al.*[(8)] the gap above Dy in fig. 10 would have been about 150 keV higher*. Further investigations of nuclear masses in this region, in order to clarify the situation at $Z = 66$, are very desirable.

We also looked anew for subshell effects in the course of the line of beta-stability (see subsect. 6.2 of (I) and fig. 12), but no new results were found. It follows from the foregoing discussion that for all practical purposes the shell boundaries adopted for the application of the mass equation in (I) should continue to hold with the newer data as well (see table 8 below).

We now turn to deformation effects. In the framework of the shell model these are associated with a strong configuration mixing, and this is revealed in the Δ_{nn} and Δ_{pp} or $\Delta_{\alpha n}$ and $\Delta_{\alpha p}$ graphs and also in the δ_n and δ_p graphs by symmetric oscillations between magic numbers, as discussed in detail in sect. 8 of (I). Here too, as with the shell effects, the situation is practically the same as with the older data. More or less symmetric oscillations are very clearly seen in the $-\Delta_{nn}$ and $\Delta_{\alpha n}$ graphs between $N = 82$ and 126, and the first half of such a symmetric pattern between $N = 126$ and $N = 184$ is seen as well. Similarly, one sees symmetric oscillations

* It was 500 keV higher with the Minnesota values of Bhanot *et al.*[(17)] on which the 1961 mass table is based.

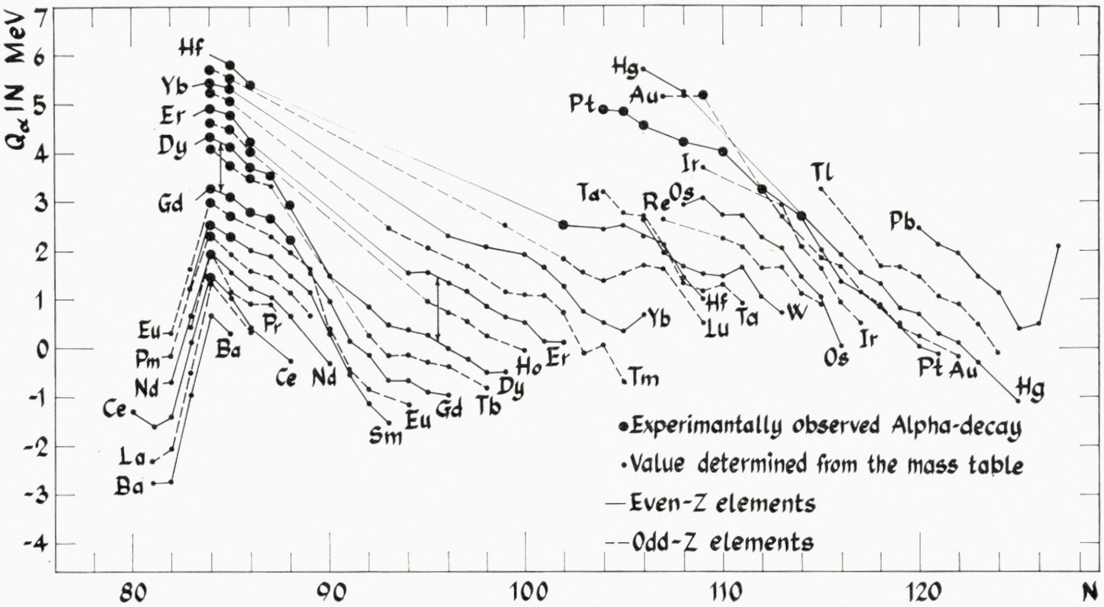


Fig. 10. Alpha decay energy systematics in the region $52 \leqslant Z \leqslant 82$, $84 \leqslant N \leqslant 126$. Isotopes are connected by a line.

between magic numbers in the δ_n graph beyond $N = 28$. In the corresponding proton graphs the behaviour is less symmetric. In the $-\Delta_{pp}$ graph one can see between $Z = 40$ and $Z = 50$ the right half of an oscillation which is symmetric between $Z = 28$ and $Z = 50$. Similarly, between $Z = 66$ and $Z = 82$ one sees in the $\Delta_{\alpha p}$ graph, and perhaps also in the $-\Delta_{pp}$ graph, the right half of an oscillation which is symmetric between $Z = 50$ and $Z = 82$. Thus, it seems that configuration interaction within these major proton shells starts to exert its full influence only after the first half of the shell is already filled. However, once started, all subshells of the shell interact, including those belonging to the lower half, already filled regularly before. On the other hand, proton configuration interaction beyond $Z = 82$ starts to operate from the outset, giving rise in the $-\Delta_{pp}$ graph to the left half of a hump which is symmetric between $Z = 82$ and $Z = 126$, similarly to the $-\Delta_{nn}$ graph beyond $N = 126$.

Let us add that in (I) we suspected that the apparent existence of a symmetric configuration interaction oscillation in the $-\Delta_{pp}$ graph between $Z = 40$ and $Z = 50$, as well as the asymmetric behaviour in the δ_p graph there and between $Z = 50$ and $Z = 82$, were due to erroneous experimental data. However, the newer data confirm this behaviour, and it seems to be genuine.

It might be of interest to compare figs. 4–9 with graphs showing directly the nuclear deformation as a function of N and Z. Such graphs are shown in figs. 11a and b, respectively. The graphs show the quantity β_2 from Coulomb excitation theory, which is a direct measure of the deformation, and are based on Coulomb excitation data analysed by STELSON[(22)]*. One sees clearly the increase of the deformation towards the middle of both neutron and proton major shells, in agreement with what could be expected from the existence of the configuration interaction revealed in figs. 4–9.

6. Variation of the Nuclear Parameters within a Shell Region

We start by rewriting a simplified version of the shell-model binding energy formula (I,10), taking into account configuration interaction but not expressing explicitly the variation of the parameters within a shell region

$$\left.\begin{aligned} B(N,Z) = {} & B_0 + n(c + {}^1/_2\pi) + p(C + {}^1/_2\Pi) + {}^1/_2 n(n-1)d + np\, I^0 + {}^1/_2 p(p-1)D \\ & + \alpha n(\delta - n) + \beta n^2(\delta - n)^2 + \gamma n^3(\delta - n)^3 + \ldots + A p(\Delta - p) + B p^2(\Delta - p)^2 + \Gamma p^3(\Delta - p)^3 + \ldots \\ & + {}^1/_2(1 - (-1)^n)[-{}^1/_2\pi + \bar{\pi} + \bar{\alpha} n(\delta - n) + \bar{\beta} n^2(\delta - n)^2 + \ldots] \\ & + {}^1/_2(1 - (-1)^p)[-{}^1/_2\Pi + \bar{\Pi} + \bar{A} p(\Delta - p) + \bar{B} p^2(\Delta - p)^2 + \ldots] \\ & + {}^1/_4(1 - (-1)^n)(1 - (-1)^p)[I' + \bar{\bar{I}}' + \bar{\bar{\alpha}} n(\delta - n) + \bar{\bar{\beta}} n^2(\delta - n)^2 + \ldots \\ & \qquad + \bar{\bar{A}} p(\Delta - p) + \bar{B} p^2(\Delta - p)^2 + \ldots]. \end{aligned}\right\} \quad (2)$$

The definition of the various parameters is given in sect. 4 of (I). Because of the variation of the nuclear potential well, they might still be slightly varying functions of N and Z. The first line of eq. (2) is the fundamental pure-configuration single-particle approximation binding energy formula (I.1), while the second line represents the extra binding (I.3a and b) due to configuration interaction. The last four lines represent the neutron, proton and so-called neutron-proton pairing energies, supplemented by symmetric configuration interaction terms as in eqs. (I.5) and (I.8).

Disregarding the configuration interaction symmetric terms one is left with the purely quadratic equation (I.1) with constant pairing terms. The mass differences Δ_{nn}, Δ_{np}, Δ_{pp}, δ_n, δ_p and δ_{pn} defined by eqs. (I.11), (I.12) and (I.14) would then, as already stated in (I), be equal to the fundamental interaction parameters

$$\Delta_{nn}(N,Z) = 4d\,, \quad (\text{I.17a})$$

$$\Delta_{np}(N,Z) = 4I^0\,, \quad (\text{I.17b})$$

$$\Delta_{pp}(N,Z) = 4D\,, \quad (\text{I.17c})$$

$$\delta_n(N,Z) = 2\pi\,, \quad (\text{I.18a})$$

$$\delta_p(N,Z) = 2\Pi\,, \quad (\text{I.18b})$$

$$\delta_{pn}(N,Z) = 2I'\,. \quad (\text{I.18c})$$

* We are grateful to Prof. MOTTELSON for informing us of Stelson's results.

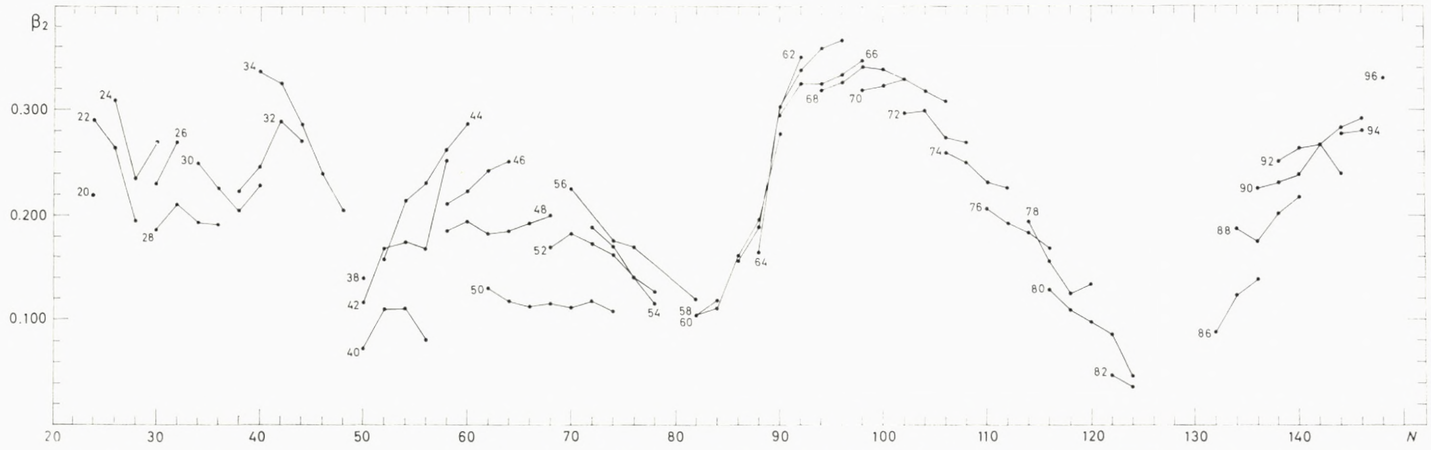


Fig. 11 a. Nuclear deformation parameter β_2 of even nuclei as function of N for $N, Z \geqslant 20$. Isotopes are connected by a line.

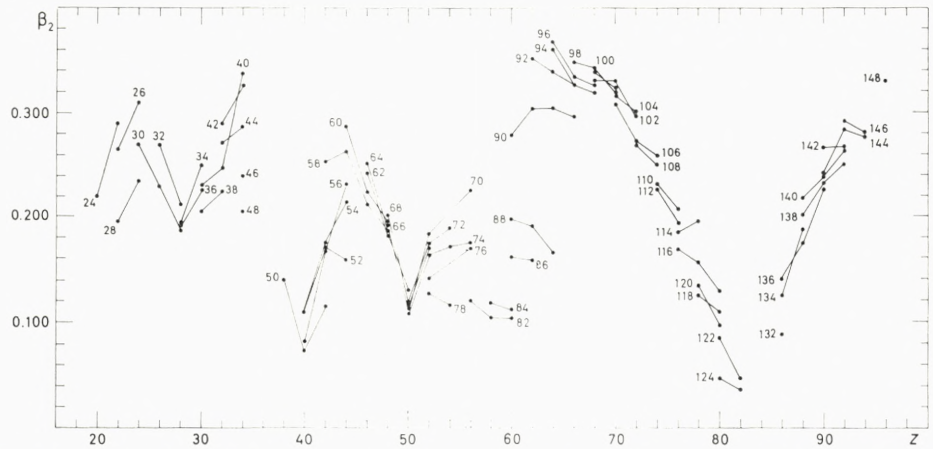


Fig. 11 b. Nuclear deformation parameter β_2 of even nuclei as function of Z for $N, Z \geqslant 20$. Isotones are connected by a line.

Thus, the extent to which these differences are constant within a shell region indicates the extent of the validity in that region of the fundamental formula (I.1), neglecting configuration interaction and variation of the nuclear potential field. In sect. 8 of (I) we have analysed in detail the deviations from constancy within a shell region of the above mentioned differences and found them to be due to two different reasons. On the one hand, there is a monotonous variation with N and Z due to a variation of the nuclear field, which is the prevailing variation in light nuclei. On the other hand, superimposed on the first variation, there are symmetric oscillations between magic numbers, which start only beyond the $1f_{7/2}$ shell. These have already been mentioned in sect. 5 as deformation effects.

In I (eq. (10) there) we restricted ourselves to a linear variation of the fundamental quadratic and pairing parameters from eq. (I.1), whereas the configuration interaction parameters were assumed to be constant. However, a glance at figs. 4–10 shows that one can do better. Let us first examine the variation of the configuration interaction terms. The oscillation in the $-\Delta_{nn}$ graph (fig. 4) is certainly asymmetric between $N = 82$ and $N = 126$. The part from $N = 82$ to $N = 90$ is much steeper than its symmetric counterpart from $N = 118$ to $N = 126$. Besides, a slight increase in absolute value towards the right seems to be superimposed on the oscillation. A similar asymmetric behaviour is seen in the Δ_{an} graph (fig. 8). As for the protons, there is in the region $Z = 50$–82 the basic asymmetry already mentioned of the two parts below and above $Z = 66$, both in the $-\Delta_{pp}$ and the Δ_{ap} graphs. However, considering only the second half of the shell with Z between 66 and 82, there is also a dependence of the proton second differences Δ_{pp} on the neutron number as seen by the two branches of the Δ_{ap} graph beyond $Z = 66$. Such asymmetries can be accounted for by letting the configuration interaction parameters be slightly varying functions of N and Z of the form for the neutrons,

$$(\alpha_0 + \alpha_n n + \alpha_p p)n(\delta - n) + (\beta_0 + \beta_n n + \beta_p p)n^2(\delta - n)^2 + \ldots \tag{3a}$$

and similarly for the protons

$$(A_0 + A_n n + A_p p)p(\Delta - p) + (B_0 + B_n n + B_p p)p^2(\Delta - p)^2 + \ldots \tag{3b}$$

Similarly, in the δ_n graph between $N = 82$ and $N = 126$ there is a slight decrease towards the right superimposed on the symmetric oscillation. This can be reproduced by letting the symmetric pairing parameters be slightly varying functions of N and Z, of the form, for the neutrons,

$$(\bar{\pi}_0 + \bar{\pi}_n n + \bar{\pi}_p p) + (\bar{\alpha}_0 + \bar{\alpha}_n n + \bar{\alpha}_p p)n(\delta - n) + (\bar{\beta}_0 + \bar{\beta}_n n + \bar{\beta}_p p)n^2(\delta - n)^2 + \ldots \tag{4a}$$

and similarly for the protons

$$(\bar{\Pi}_0 + \bar{\Pi}_n n + \bar{\Pi}_p p) + (\bar{A}_0 + \bar{A}_n n + \bar{A}_p p)p(\Delta - p) + (\bar{B}_0 + \bar{B}_n n + \bar{B}_p p)p^2(\Delta - p)^2 + \ldots \tag{4b}$$

These last protonic terms might account for the decrease towards higher Z superimposed on the symmetric oscillation in the δ_p graph between $Z = 28$ and $Z = 50$ and between $Z = 50$ and $Z = 82$.

The asymmetries with respect to the middle of the major shell seen in the magnitude of the configuration interaction terms (3) and (4) are also reflected in the behaviour of the nuclear deformation in figs. 11 a and b. One notices, in particular, the much more abrupt onset of the deformation when entering the major shell between $N = 82$ and $N = 126$ from the lower-N side as compared to the higher-N side.

We now turn to the variation of the parameters in light nuclei with $N,Z \leqslant 28$. As already mentioned in the introduction, the mass equation (I.28), based on linear variation of the fundamental parameters within a shell region, reproduced the masses of light nuclei with a considerably lower accuracy than those of the heavier ones (the mean deviations being 343 keV for $8 \leqslant (N \text{ or } Z) \leqslant 28$ as compared to 197 keV for $N,Z \geqslant 28$). This suggests that the variation of the parameters in these light nuclei cannot be represented by a linear function of N and Z, and a variation, which is at least quadratic should be tried, given by expressions like

$$d = d_0 + d_n n + d_p p + d_{nn} n^2 + d_{np} np + d_{pp} p^2, \tag{5}$$

etc. However, this cannot easily be recognized by the eye from figs. 4–7 themselves, except in the $1f_{7/2}$ region, where the deviations from linearity are obvious.

We finally remention the difference noted in (I) between lighter and heavier nuclei concerning the relative sign of the variations of the parameters with respect to N and Z. In the lighter nuclei up to and including those of the $1f_{7/2}$ shell the variations with respect to N and Z have opposite signs, whereas in heavier regions they have the same sign. As a matter of fact, figs. 4–7 also convey the impression that the absolute magnitudes of the changes of the parameters with respect to N and Z are approximately the same almost everywhere. This will be further discussed in subsect. 8.2 and be made use of in sects. 9 and 10 below.

Part III.
THE SHELL-MODEL SEMI-EMPIRICAL MASS EQUATION

7. The Mass Equation

Following the above discussion we propose to represent nuclear masses in each shell region by a semi-empirical mass equation, which in its most general form contains a part which is common to all nuclei:

$$\left.\begin{aligned}\Delta M(N,Z) = {} & \alpha + \beta_1 n + \beta_2 p + \gamma_1 n^2 + \gamma_2 np + \gamma_3 p^2 \\ & + \delta_1 n^3 + \delta_2 n^2 p + \delta_3 np^2 + \delta_4 p^3 \\ & + {}^1/_2(1-(-1)^n)[\theta_{10} + \theta_{1n} n + \theta_{1p} p] \\ & + {}^1/_2(1-(-1)^p)[\theta_{20} + \theta_{2n} n + \theta_{2p} p] \\ & + {}^1/_4(1-(-1)^n)(1-(-1)^p)[\theta_{30} + \theta_{3n} n + \theta_{3p} p],\end{aligned}\right\} \quad (6a)$$

and a part which differs for light and for heavy nuclei:

$$\left.\begin{aligned} & + \varepsilon_1 n^4 + \varepsilon_2 n^3 p + \varepsilon_3 n^2 p^2 + \varepsilon_4 np^3 + \varepsilon_5 p^4 \\ & + {}^1/_4(1-(-1)^n)[\pi_{nn} n^2 + \pi_{np} np + \pi_{pp} p^2] \\ & + {}^1/_4(1-(-1)^p)[\Pi_{nn} n^2 + \Pi_{np} np + \Pi_{pp} p^2] \\ & + {}^1/_4(1-(-1)^n)(1-(-1)^p)[-\Gamma'_{nn} n^2 - \Gamma'_{np} np - \Gamma'_{pp} p^2] \\ & \text{for } (N \text{ or } Z) \leqslant 28^{*}\end{aligned}\right\} \quad (6b)$$

or

$$\left.\begin{aligned} & + \Sigma_{i \geqslant 2}(\zeta_{i0} + \zeta_{in} n + \zeta_{ip} p) n^i (\delta - n)^i + \Sigma_{j \geqslant 2}(\eta_{j0} + \eta_{jn} n + \eta_{jp} p) p^j (\Delta - p)^j \\ & + {}^1/_2(1-(-1)^n)[\Sigma_{i \geqslant 1}(\varphi_{i0} + \varphi_{in} n + \varphi_{ip} p) n^i (\delta - n)^i] \\ & + {}^1/_2(1-(-1)^p)[\Sigma_{j \geqslant 1}(\chi_{j0} + \chi_{jn} n + \chi_{jp} p) p^j (\Delta - p)^j] \\ & + {}^1/_4(1-(-1)^n)(1-(-1)^p)[\Sigma_{i \geqslant 1}(\psi_{i0} + \psi_{in} n + \psi_{ip} p) n^i (\delta - n)^i + \Sigma_{j \geqslant 1}(\omega_{j0} + \\ & \qquad + \omega_{jn} n + \omega_{jp} p) p^j (\Delta - p)^j] \\ & \text{for } N,Z \geqslant 28^{*}.\end{aligned}\right\} \quad (6c)$$

Here, as in (I), $n = N - N_0$ represents the number of neutrons in the filling major neutron shell and similarly $p = Z - Z_0$ for the protons. The definition of the new coefficients in terms of the parameters given previously in eqs. (I.10) and (3)–(5) of the present paper is as follows**:

$$\alpha = \Delta M(N_0, Z_0) = N_0 \Delta M_n + Z_0 \Delta M_H - B_{00}, \quad (7a)$$

$$\beta_1 = \Delta M_n - c_0 - {}^1/_2 \pi_0 + {}^1/_2 d_0 - \alpha_0 \delta - B_{0n}, \quad (7b)$$

$$\beta_2 = \Delta M_H - C_0 - {}^1/_2 \Pi_0 + {}^1/_2 D_0 - A_0 \Delta - B_{0p}, \quad (7c)$$

$$\gamma_1 = -{}^1/_2 d_0 + \alpha_0 - c_n - {}^1/_2 \pi_n + {}^1/_2 d_n - \alpha_n \delta - B_{0nn}, \quad (7d)$$

$$\gamma_2 = -I_0^0 - c_p - C_n - {}^1/_2 \pi_p - {}^1/_2 \Pi_n + {}^1/_2 d_p + {}^1/_2 D_n - \alpha_p \delta - A_n \Delta - B_{0np}, \quad (7e)$$

* Strictly speaking, eq. (6 b) should hold only when both N and Z are smaller than 28, and eq. (6 c) when both are larger than 28. In the intermediate cases, like region 8 from table 8 with $20 \leqslant Z \leqslant 28$, $28 \leqslant N \leqslant 50$, terms from both equations might appear, like the φ_{10} term in the last line of table 10 a.

** The parameters (7) reduce to the expressions (I.29) in the special case considered in (I) of at-most-linear variation of the fundamental parameters of eq. (2), constant configuration interaction parameters and constant vertical distance between the four mass surfaces. Unfortunately there is a mistake in each of eqs. (I.29) $_{o,p,q}$ and one should add $-\bar{\pi}$, $-\bar{\Pi}$ and $-\bar{\bar{\Gamma}}'$ to the right-hand sides of these equations.

$$\gamma_3 = -{}^1/_2 D_0 + A_0 - C_p - {}^1/_2 \Pi_p + {}^1/_2 D_p - A_p \Delta - B_{0pp}, \tag{7f}$$

$$\delta_1 = -{}^1/_2 d_n + \alpha_n - c_{nn} - {}^1/_2 \pi_{nn} + {}^1/_2 d_{nn}, \tag{7g}$$

$$\delta_2 = -{}^1/_2 d_p - I_n^0 + \alpha_p - c_{np} - {}^1/_2 \pi_{np} - C_{nn} - {}^1/_2 \Pi_{nn} + {}^1/_2 d_{np} + {}^1/_2 D_{nn}, \tag{7h}$$

$$\delta_3 = -{}^1/_2 D_n - I_p^0 + A_n - c_{pp} - {}^1/_2 \pi_{pp} - C_{np} - {}^1/_2 \Pi_{np} + {}^1/_2 d_{pp} + {}^1/_2 D_{np}, \tag{7i}$$

$$\delta_4 = -{}^1/_2 D_p + A_p - C_{pp} - {}^1/_2 \Pi_{pp} + {}^1/_2 D_{pp}, \tag{7j}$$

$$\varepsilon_1 = -{}^1/_2 d_{nn}, \tag{7k}$$

$$\varepsilon_2 = {}^1/_2 d_{np} + I_{nn}^0, \tag{7l}$$

$$\varepsilon_3 = {}^1/_2 d_{pp} + {}^1/_2 D_{nn} + I_{np}^0, \tag{7m}$$

$$\varepsilon_4 = {}^1/_2 D_{np} + I_{pp}^0, \tag{7n}$$

$$\varepsilon_5 = -{}^1/_2 D_{pp}, \tag{7o}$$

$$\left.\begin{aligned} \Sigma_{i\geqslant 2}(\zeta_{i0} + \zeta_{in} n + \zeta_{ip} p) n^i (\delta - n)^i = & -(\beta_0 + \beta_n n + \beta_p p) n^2 (\delta - n)^2 - (\gamma_0 + \gamma_n n + \\ & + \gamma_p p) n^3 (\delta - n)^3 - \ldots, \end{aligned}\right\} \tag{7p}$$

$$\left.\begin{aligned} \Sigma_{j\geqslant 2}(\eta_{j0} + \eta_{jn} n + \eta_{jp} p) p^j (\Delta - p)^j = & -(B_0 + B_n n + B_p p) p^2 (\Delta - p)^2 - (\Gamma_0 + \Gamma_n n + \\ & + \Gamma_p p) p^3 (\Delta - p)^3 - \ldots, \end{aligned}\right\} \tag{7q}$$

$$\theta_{10} = {}^1/_2 \pi_0 - \bar{\pi}_0, \tag{7r}$$

$$\theta_{20} = {}^1/_2 \Pi_0 - \bar{\Pi}_0, \tag{7s}$$

$$\theta_{30} = -I_0' - \bar{\bar{I}}_0', \tag{7t}$$

$$\theta_{1n} = {}^1/_2 \pi_n - \bar{\pi}_n, \tag{7u}$$

$$\theta_{1p} = {}^1/_2 \pi_p - \bar{\pi}_p, \tag{7v}$$

$$\theta_{2n} = {}^1/_2 \Pi_n - \bar{\Pi}_n, \tag{7w}$$

$$\theta_{2p} = {}^1/_2 \Pi_p - \bar{\Pi}_p, \tag{7x}$$

$$\theta_{3n} = -I_n' - \bar{\bar{I}}_n', \tag{7y}$$

$$\theta_{3p} = -I_p' - \bar{\bar{I}}_p', \tag{7z}$$

$$\left.\begin{aligned} \Sigma_{i\geqslant 1}(\varphi_{i0} + \varphi_{in} n + \varphi_{ip} p) n^i (\delta - n)^i = & -(\bar{\alpha}_0 + \bar{\alpha}_n n + \bar{\alpha}_p p) n (\delta - n) - (\bar{\beta}_0 + \bar{\beta}_n n + \\ & + \bar{\beta}_p p) n^2 (\delta - n)^2 - \ldots, \end{aligned}\right\} \tag{7aa}$$

$$\left.\begin{aligned} \Sigma_{j\geqslant 1}(\chi_{j0} + \chi_{jn} n + \chi_{jp} p) p^j (\Delta - p)^j = & -(\bar{A}_0 + \bar{A}_n n + \bar{A}_p p) p (\Delta - p) - (\bar{B}_0 + \bar{B}_n n + \\ & + \bar{B}_p p) p^2 (\Delta - p)^2 - \ldots, \end{aligned}\right\} \tag{7bb}$$

$$\left.\begin{aligned} \Sigma_{i\geqslant 1}(\psi_{i0} + \psi_{in} n + \psi_{ip} p) n^i (\delta - n)^i = & -(\bar{\bar{\alpha}}_0 + \bar{\bar{\alpha}}_n n + \bar{\alpha}_p p) n (\delta - n) - (\bar{\bar{\beta}}_0 + \bar{\bar{\beta}}_n n + \\ & + \bar{\bar{\beta}}_p p) n^2 (\delta - n)^2 - \ldots, \end{aligned}\right\} \tag{7cc}$$

$$\left.\begin{aligned} \Sigma_{j\geqslant 1}(\omega_{j0} + \omega_{jn} n + \omega_{jp} p) p^j (\Delta - p)^j = & -(\bar{\bar{A}}_0 + \bar{\bar{A}}_n n + \bar{\bar{A}}_p p) p (\Delta - p) - (\bar{\bar{B}}_0 + \bar{\bar{B}}_n n + \\ & + \bar{\bar{B}}_p p) p^2 (\Delta - p)^2 - \ldots, \end{aligned}\right\} \tag{7dd}$$

TABLE 8

The shell regions and the definition of n, p, δ and Δ to be used with eq. (6) in the larger regions, where the coefficients of (6) could be determined significantly from the experimental data.

Region	Z	N	n	p	δ	Δ	Numbers of known masses and of unconnected decay energies
1	2–8	2–8					34, 0
2	2–8	8–14					13, 0
3	8–14	8–14	$N-8$	$Z-8$			35, 0
3′............	14–20	8–14					6, 0
4	8–14	14–20					15, 0
5	14–20	14–20	$N-14$	$Z-14$			34, 0
5′............	20–28	14–20					4, 0
6	14–20	20–28					30, 0
7	20–28	20–28	$N-20$	$Z-20$			47, 0
8	20–28	28–50	$N-28$	$Z-20$			46, 0
9	28–40	28–50	$N-28$	$Z-28$	22	22	123, 0
9′............	40–50	28–50					11, 0
10	28–40	50–82					31, 0
11	40–50	50–82	$N-50$	$Z-28$	32	22	130, 1
12	50–66	50–82	$N-50$	$Z-50$	32	32	118, 6
13	50–66	82–126	$N-82$	$Z-50$	44	32	114, 3
14	66–82	82–126	$N-82$	$Z-50$	44	32	177, 18
14″	66–82	126–184					11, 0
15	82–126	82–126					28, 30
16	82–126	126–184	$N-126$	$Z-82$	58	44	178, 14

No n and p are given for region 1 as eq. (6) is unsuccessful there. The two numbers given in the last column are, respectively, the number of experimentally known masses in each region and the number of known decay energies of nuclei whose absolute mass is unknown.

In the common part (6a) the first line is essentially the fundamental quadratic shell-model mass equation (I.1), and the second line consists of cubic terms arising from the linear variations of the coefficients of this quadratic equation. The last three lines represent linearly varying pairing energies. In the light-nuclei-part (6b) the first line consists of quartic terms arising from the quadratic variation of the fundamental coefficients of (I.1), and the last three lines represent the quadratic variation (5) of the pairing energies. Finally, in the heavy-nuclei-part (6c), the first line consists of symmetric expansions of the neutron and proton configuration-interaction contributions to the lowering of the nuclear mass, with coefficients varying linearly with N and Z, and the other lines represent similar expansions augmenting the pairing energies. From the configuration-interaction expansions as many terms should be retained as would improve the goodness of fit of the equation to the experimental masses* **. The coefficients are to be determined for each shell region by a least-squares fit of the equation to the experimental masses. As mentioned in sect. 5, the shell boundaries found in (I) are displayed by the newer data as well. Table 8 summarizes the region boundaries as well as the number of experimentally known masses and unconnected decay energies and the definition of n and p to be used in each region in connection with eq. (6) (see the discussion preceding table 10 in sect. 9 of I).

In this most general form the mass equation looks rather cumbersome. Restrictions which reduce somewhat the number of independent parameters in each shell region will be discussed in sect. 8. In practice, the highest number of independent coefficients which it was found useful to retain in a shell region is 21 for the region $82 \leqslant Z \leqslant 126$, $126 \leqslant N \leqslant 184$ (see table 10b).

8. General Description of the Adjustment Process

The present section is devoted to a general description of problems met with and solutions adopted for them during the process of adjusting the coefficients of the mass equation to the experimental data. Numerical results will be presented in sects. 9–11.

8.1. The Problems of Best Fit and of Extrapolation

One of the main objectives of any mass equation is to supply reliable values of unknown masses. Such equations are usually based on some physical model which is believed to be a more or less good approximation to the exact solution of the nuclear many-body problem. In principle, the mass equation can be completely determined from the model with no adjustable parameters left over to be determined from the nuclear masses themselves. However, the majority of mass equations proposed thus far are semi-empirical, in the sense that only the form of the equation (i.e. its dependence on the nucleon numbers, the nuclear shape and possibly other nuclear parameters) is determined by the model, while some numerical coefficients are left over to be determined by statistically adjusting the equation to the experimental mass values.

In such cases the danger always exists, which was actually thought to be the case first with the famous Weizsäcker mass equation[23], that the parameters determined empirically are not those which would have been obtained by a proper mathematical exploitation of the model. Then, the reliability of the equation is no longer

* In (I) we restricted ourselves, as a first approximation, to a two-term common configuration-interaction expansion and held the pairing terms constant.

** Except in region 13 of table 8, where the set of coefficients given in the second column of table 9 and including neutron configuration-interaction terms up to ζ_{70} can reduce the mean deviation down to 123 keV. However, retaining this high number of ζ terms introduces into the mass surface a discontinuity along the line $Z = 66$ between regions 13 and 14, which amounts to $\Delta M(13) - \Delta M(14) = 143$ MeV for ^{192}Dy. Therefore we restricted ourselves in region 13 to a smaller number of ζ terms, as given in table 10 b.

based on the physical picture which is at the basis of the model, but depends completely on its success in agreeing with experimental data, just as any other purely empirical equation. However, there is a great difference between the application of a successful equation of this type for the purposes of interpolation and of extrapolation. Whereas our recognition of the regular trends of nuclear masses based on a multitude of experimental data* would lead us to accept with confidence interpolated mass values, the prediction of extrapolated masses should be considered more critically, as a given equation can be extrapolated beyond the region of its experimental verification in many ways, all nicely regular.

Actually, the situation with existing semi-empirical mass equations might be not that bad. With present day appreciation of the very complex nature of nuclear forces, hardly any attempts have been made at a numerical evaluation of the coefficients appearing in mass equations. However, while willing to benefit from the doubt and apply a semi-empirical mass equation for purposes of extrapolation, one has to be careful. Obviously it is necessary to impose the consistency condition that the extrapolated masses should not violate the assumptions laid at the basis of the model on which the equation is based. It is likewise desirable that they would not contradict well-established notions about nuclei. We shall illustrate the application of such principles by an example taken from our experiments with eq. (6). In region 13 (see table 8), eq. (6) reproduces the experimental masses with a mean deviation of 107 keV when using the set of parameters given in the first column of table 9. Still, this set of parameters was rejected in favour of the one given in table 10b for the corresponding region, which gives a higher mean deviation of 187 keV. We rejected the better-fitting set, among other reasons, because the absence from this set of the θ_{10} and θ_{20} terms means vanishing of the neutron and proton pairing energies at the beginning of the shell region, whereas the negative θ_{2n} term predicts negative proton pairing energies both for a small number of protons and of proton holes** when neutrons start to fill up the shell. On the other hand, eq. (6) is based on the single-particle approximation which assumes a large positive pairing energy, binding together identical particles into saturated pairs with $J_{12} = 0$. In such regions where the numerical values of the coefficients of eq. (6) are such as to make the local values of the pairing energies negative, the justification for the model breaks down, and one can no longer consistently expect the predictions of a mass equation based on this model to be valid. On the other hand, in table 10b, θ_{2n} and θ_{1p} are held fixed at zero value from the outset, which avoids the pairing energies from vanishing or becoming negative within the region. Truly enough, ignoring thus the experimentally existing variation of the pairing energies with N and Z leads to a worsening of the goodness of fit of the equation to the experimentally known masses. However, within the framework of the single-particle model, this is the only feasible possibility, as the linear variation shown by the experimental pairing energies

* Each of the graphs in part II of the present work illustrates this regularity.

** Since then the positive contribution to the proton pairing energy of the configuration interaction χ_{10} term is small, due to the $p(\Delta - p)$ factor.

TABLE 9

Some well-fitting sets of coefficients for eq. (6), which were rejected for reasons explained in the text.

Region	13	13	16	16
coefficients (keV)				
α	-77008.173 ± 160.000[a])	-76821.430 ± 170.000	-21918.084 ± 62.000	-21905.165 ± 67.000
$10\beta_1$	47473.949 ± 790.000	46641.849 ± 860.000	23078.871 ± 2200.000	30388.554 ± 1600.000
$10\beta_2$	-33471.288 ± 350.000	-34257.950 ± 340.000	25102.626 ± 500.000	23293.925 ± 670.000
$100\gamma_1$	14345.420 ± 2400.000	12776.449 ± 2600.000	82938.457 ± 17000.000	4959.707 ± 340.000
$100\gamma_2$	-37281.605 ± 1000.000	-35264.477 ± 860.000	-34278.633 ± 380.000	-33948.538 ± 400.000
$100\gamma_3$	24343.572 ± 180.000	24928.742 ± 180.000	105465.858 ± 11000.000	21926.017 ± 290.000
$1000\delta_1$	–	–	-17639.807 ± 3900.000	–
$1000\delta_2$	–	1288.321 ± 210.000	2470.149 ± 130.000	2386.263 ± 140.000
$1000\delta_3$	2697.772 ± 390.000	1288.321 ± 210.000[b])	–	–
$1000\delta_4$	–	–	-26302.616 ± 3300.000	–
$10^4\zeta_{20}$	–	–	1852.601 ± 470.000	1522.121 ± 440.000
$10^6\zeta_{30}$	-3208.858 ± 470.000	-3028.683 ± 520.000	-3184.967 ± 500.000	-1195.547 ± 290.000
$10^8\zeta_{40}$	3347.341 ± 450.000	3169.583 ± 490.000	1116.925 ± 170.000	429.156 ± 92.000
$10^{10}\zeta_{50}$	-1446.429 ± 190.000	-1375.160 ± 210.000	-205.102 ± 30.000	-78.638 ± 16.000
$10^{12}\zeta_{60}$	278.269 ± 37.000	265.420 ± 41.000	18.643 ± 2.700	7.083 ± 1.300
$10^{14}\zeta_{70}$	-20.023 ± 2.800	-19.169 ± 3.100	-0.670 ± 0.096	-0.248 ± 0.045
$10^4\eta_{20}$	–	–	-4273.191 ± 470.000	594.021 ± 160.000
$10^6\eta_{30}$	–	–	-248.167 ± 40.000	-358.294 ± 55.000
$10^8\eta_{40}$	–	–	–	51.742 ± 7.000
θ_{10}	–	529.653 ± 81.000	916.146 ± 42.000	904.025 ± 45.000
$10\theta_{1p}$	588.055 ± 82.000	–	–	–
$100\varphi_{10}$	419.969 ± 73.000	440.658 ± 82.000	–	–
$10^4\varphi_{20}$	-100.917 ± 13.000	-84.054 ± 17.000	-6.193 ± 0.970	-6.019 ± 1.000
θ_{20}	–	474.819 ± 210.000	1103.993 ± 54.000	1052.170 ± 42.000
$10\theta_{2n}$	-618.117 ± 69.000	–	–	–
$100\chi_{10}$	664.686 ± 23.000	532.497 ± 120.000	-90.283 ± 17.000	–
$1000\chi_{1n} = 1000\chi_{1p}$	–	-132.104 ± 23.000	–	–
$10^4\chi_{20}$	–	–	–	-20.088 ± 3.400
θ_{30}	1623.075 ± 180.000	–	-568.872 ± 100.000	-325.529 ± 61.000
$100\psi_{10}$	104.352 ± 43.000	-54.816 ± 21.000	51.677 ± 23.000	–
$10^4\psi_{20}$	–	–	–	6.957 ± 1.400
$100\omega_{10}$	-866.935 ± 100.000	–	218.688 ± 80.000	–
$10^4\omega_{20}$	–	–	-41.727 ± 15.000	–
mean deviation (keV)	107	123	107	115

a) The coefficients are given rounded off to 10^{-3} keV, and their errors are rounded off to two significant figures.

b) In this region $\delta_2 = \delta_3$, in accordance with conditions (8 a).

cannot continue to hold throughout the shell region, and there are no experimental data to indicate in what way this variation should be extrapolated.

For purposes of interpolation the parameters from the first column of table 9 are of course superior to those of table 10b, considering the smaller deviations with which they reproduce the experimentally known masses and the regular behaviour of nuclear mass systematics. However, more or less satisfactory interpolation can usually be achieved with the help of graphs like those of Perlman *et al.*[24], Way and Wood[25], and Yamada and Matumoto[26], without using mass equations at all. Therefore the reliability of the mass equation for the purpose of extrapolation should be the decisive factor when considering the retainment or rejection of parameters in eq. (6).

What conditions have to be imposed on the coefficients of eq. (6) in order to make it reliable for extrapolation purposes? We list the following:

a) The neutron, proton and neutron-proton pairing energies should remain positive throughout the shell region. Of these the neutron and proton pairing energies have just been discussed. The positive sign of the so-called neutron-proton pairing energy comes out from the analysis of de-Shalit[27], as already mentioned in (I).

b) The orientation-independent interaction parameters between particles of the same kind d and D should be negative and the corresponding interaction parameter between particles of different kinds I^0 has to be positive throughout the shell region. This requirement is not essential for the validity of the single-particle model of the nucleus, which results from the existence of the pairing energies alone. However, within the framework of this model it is essential for achieving saturation and neutron-proton balance in nuclei[28]. Giving it up might make possible such phenomena as beta decay of nuclei in a direction away from the line of beta stability. We thought it safer to avoid possible predictions of this kind. Similar considerations have already been made by Hillman[29, 30], when he used an interpolation formula to calculate the curvature of isobaric mass parabolas in his mass equation, which thus reproduces the experimentally known masses of $A > 20$ nuclei with a mean deviation of 410 keV, rather than calculating the curvatures directly from the empirical data for each value of A, which would lead to a smaller mean deviation of 255 keV.

Requirements a) and b) which refer to the signs of the interaction parameters have been supplemented by the more qualitative requirement:

c) The variation of the parameters of eq. (2) leading to the cubic and quartic terms and to the linear and quadratic pairing terms of eq. (6) should be such that the local values of the fundamental interaction parameters will look reasonable throughout the shell region as judged by figs. 4–7. In this context, looking reasonable means not exceeding about $1^1/_2$–2 times typical values within the shell region.

Requirements b) and c) are meant to replace the sign conditions $\delta_1, \delta_4 < 0$ and $\delta_2, \delta_3 > 0$ imposed in (I) (rule iii) sect. 9 there). In fact, the negative δ_1 and δ_4 retained in (I) in the translead region (region 16 in table 11 there) are so large in absolute value, as to make d and D positive for high N- and Z-values, respectively.

This is avoided in the present work by rejecting in this region the n^3 and p^3 terms of eq. (6) altogether (see table 10b). The third column in table 9 shows a set of coefficients (6) including n^3 and p^3 terms and reproducing the experimental masses in region 16 with a mean deviation of 107 keV, which was rejected just for the reason of making d and D positive for large N- and Z-values. Similarly, the rejected set of coefficients from the second column of table 9, mentioned already in the last footnote in sect. 7, violates requirement c) by giving rise to $|\Delta_{nn}|$ values much too large compared to typical values in region 13. However, the previous sign conditions (I.iii) were still adhered to as a means of deciding between two otherwise equally probable sets of coefficients. As explained in I, they make the absolute values of d and D decrease with N and Z, respectively, and that of I^0 decrease with both N and Z, which looks a reasonable behaviour.

A statistically significant set of coefficients (6) determined from the experimental masses which did not fulfill requirements a)–c) in a given shell region was rejected, and a new attempt was made, in which the parameters responsible for the violation were held fixed at zero value.

8.2. Symmetry Conditions Imposed on the Shell-Model Parameters

We now mention a second problem arising when fitting mass formulae. As already mentioned in (I), strong correlations exist between the various parameters due to the concentration of known nuclei in a narrow strip in the (N,Z) plane around the line of beta stability. This makes it impossible in general to determine a significant set of coefficients (6), all different from zero in a given shell region. When a least-squares fit is attempted, some of the coefficients usually come out insignificant due to their large statistical errors. Rejecting such a coefficient would not worsen the goodness-of-fit of the equation to the experimental masses. Quite often, however, there are several such coefficients and any of them can be rejected as far as the goodness-of-fit is concerned. Moreover, sometimes a significant coefficient might be left out, with a previously-insignificant coefficient replacing it significantly. When coefficients of different physical origin were involved, the following rules (I, sect. 9) have been adhered to:

(i) When either a fundamental quadratic parameter or a cubic parameter could be eliminated, the quadratic parameter was retained. Similarly, when either a cubic or a quartic parameter could be eliminated, the cubic parameter was retained. Likewise, the fundamental parity terms were given preference over their linear variations which were in turn preferred to the quadratic variations.

(ii) When either configuration interaction terms or cubic terms (or linear parity terms) could be eliminated, configuration interaction terms were eliminated if they were found to be still negligible in the next higher region. On the other hand, the cubic terms were eliminated if they were found to be already negligible in the preceding region.

However, more often a choice had to be made between terms of a similar origin, like the cubic n^2p and np^2 terms. Conditions a)–c) set forth above would sometimes help. Significant although not always unique sets of coefficients could in this way be determined for all shell regions, with some of the δ_i missing, as a rule, like in table 11 of (I) or in the first, third and fourth columns of table 9.

However, the non-appearance of some δ_i terms in these sets of coefficients is only due to the lack of a sufficient number of experimental data. It seems to us that giving up these δ_i must distort the true picture of the nuclear mass surface. Omitting, for example, δ_3 in the translead region (like in the fourth column of table 9) would mean that I^0 there decreases with N but remains constant when Z increases. On the other hand, an almost equally well fitting set of parameters in which δ_2 is replaced by δ_3 would display the opposite behaviour. Neither of the two can possibly be true, and it should be unreliable to extrapolate far with such sets of coefficients.

A possible way out of the difficulty is suggested by looking at the graphs of Δ_{np} as a function of N and of Z (figs. 4 and 5, respectively). As already mentioned in sect. 6, a similar overall decrease towards the right is displayed in both graphs, in the translead as well as in other regions beyond the $1f_{7/2}$ shell. There is likewise a similar decrease towards the right in both Δ_{nn} and Δ_{pp} graphs beyond the $1f_{7/2}$ shell, provided the symmetric configuration-interaction oscillations are disregarded. Thus, one is tempted to generalize and supplement requirements a)–c) from the previous section by an additional requirement:

d) The variations of the fundamental interaction parameters from eq. (2) when neutrons and when protons are added to a given nucleus beyond the $1f_{7/2}$ shell should be the same. Expressed quantitatively in terms of the coefficients of eq. (6) the requirement reads

$$\left.\begin{array}{llll} \delta_1 = \delta_4 , & \delta_2 = \delta_3 , & \zeta_{in} = \zeta_{ip} , & \eta_{in} = \eta_{ip} , \\ \theta_{1n} = \theta_{1p} , & \theta_{2n} = \theta_{2p} , & \theta_{3n} = \theta_{3p} , & \\ \varphi_{in} = \varphi_{ip} , & \chi_{in} = \chi_{ip} , & \psi_{in} = \psi_{ip} , & \omega_{in} = \omega_{ip} \\ & & & \text{for } N,Z \geqslant 28. \end{array}\right\} \quad (8a)$$

On the other hand, this requirement certainly cannot hold for light nuclei. As already mentioned at the end of sect. 6, figs. 4–7 convey the impression that below the $1f_{7/2}$ shell the variations of the fundamental parameters with respect to N and Z are the opposite of each other. However, here both linear and quadratic variations (eq. (5)) of the fundamental parameters occur, and we were finally led to the following condition:

d') The linear variation of the fundamental interaction parameters (2) when neutrons and when protons are added to a given nucleus below the $1f_{7/2}$ shell should usually be of equal magnitude and opposite sign, and the quadratic variations should be equal. Expressed quantitatively,

$$\left.\begin{array}{llll} \delta_1 = -\delta_4 , & \delta_2 = -\delta_3 , & \varepsilon_1 = \varepsilon_5 , & \varepsilon_2 = \varepsilon_4 , \\ \theta_{1n} = -\theta_{1p} , & \theta_{2n} = -\theta_{2p} , & \theta_{3n} = -\theta_{3p} , & \\ \pi_{nn} = \pi_{pp} , & \Pi_{nn} = \Pi_{pp} , & I'_{nn} = I'_{pp} & \\ & & \text{for } (N \text{ or } Z) \leqslant 28. & \end{array}\right\} \quad (8b)$$

It should be remarked, however, that whereas the conditions on the quadratic variations could be strictly adhered to, those on the linear variations were sometimes violated, particularly in the $1f_{7/2}$ region where the transition from conditions (8b) to (8a) must occur. Using conditions (8a and b) the number of independent coefficients in eq. (6) is considerably reduced, and significant sets of parameters, all differing from zero and fulfilling requirements a)–d), could be arrived at in all the large shell regions (tables 10a and b in sect. 9).

8.3. Unification of Small and Large Shell Regions

We shall now discuss some problems arising in connection with the division of the nuclear chart into shell regions. Fig. 12 shows the region boundaries given in table 8 and the distribution in the (N,Z) plane of the nuclei whose masses are known experimentally. It is seen that some regions contain many more nuclei than the number of coefficients in eq. (6), whereas in others the number of nuclei is comparable to or even smaller than the number of these coefficients. In these latter regions one cannot significantly determine a complete set of coefficients (6), but only a partial set like those appearing in Levy's quadratic formula[(31)]. Such was the procedure adopted for these regions whenever possible in (I), table 12. However, the necessity of having the complete eq. (6) in the regions containing many known masses indicates that extrapolating far with Levy's equation into the regions containing but few nuclei might lead to erroneous results. We found a way out of this difficulty by uniting a small region with $N_1 \leqslant N \leqslant N_2$ and $Z_0 \leqslant Z \leqslant Z_1$ or $N_0 \leqslant N \leqslant N_1$, $Z_1 \leqslant Z \leqslant Z_2$ like regions 3 and 4, respectively, in the schematic representation in fig. 13 with its two larger neighbours with $Z_0 \leqslant Z \leqslant Z_1$, $N_0 \leqslant N \leqslant N_1$ and $Z_1 \leqslant Z \leqslant Z_2$, $N_1 \leqslant N \leqslant N_2$ like regions 1 and 2, respectively, in the figure. Then in the combined region we assumed that the pure neutron coefficients like β_1, γ_1, θ_{10} etc. depend only on the neutron number and are therefore the same in the small region 3 as in 2 and in 4 the same as in 1, and similarly the purely protonic parameters like β_2, γ_3 etc. depend only on the proton number and are the same in 3 as in 1 and in 4 the same as in 2. Then only the "mixed" parameters γ_2, δ_2, δ_3, ε_2, ε_3, ε_4, θ_{1p}, θ_{2n}, φ_{ip}, χ_{in} and the parameters related to the neutron-proton pairing interaction have to be determined from the masses belonging to the smaller regions.

To be more specific, when confronted with four such regions as in fig. 13 (e.g. regions 14, 16, 14'' and 15 from table 8. See fig. 12) we combined them into one large region and assumed the following fundamental binding energy equation, derived in the single-particle approximation in the same way as eq. (2):

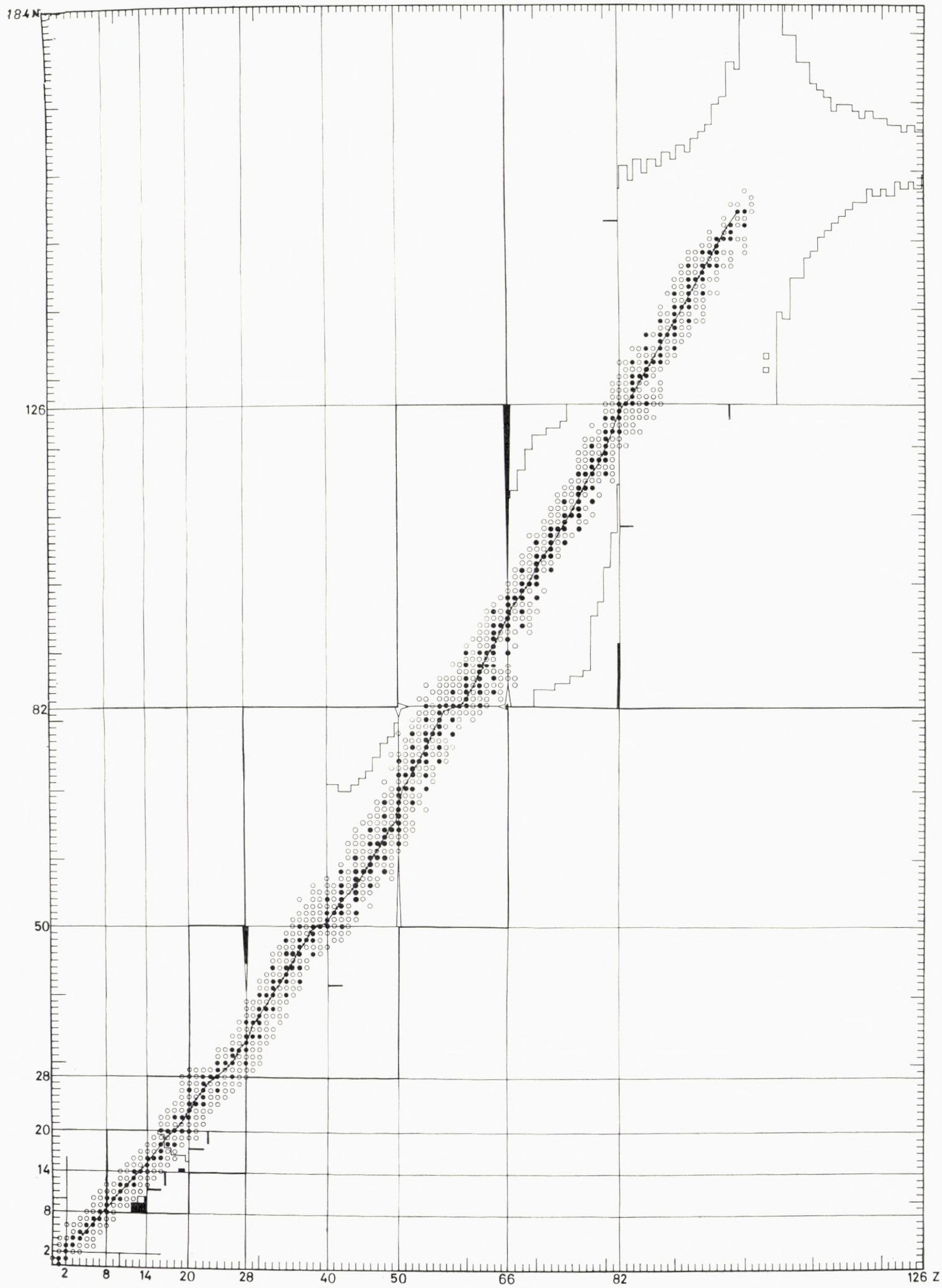


Fig. 12.

$$\left.\begin{aligned}&B(N_0+n_1+n_2,\ Z_0+p_1+p_2)\\&=\ B_0+\sum_r n_r(c^r+{}^1/_2\pi^r)+\sum_s p_s(C^s+{}^1/_2\Pi^s)+\sum_r {}^1/_2 n_r(n_r-1)d^r+\sum_s {}^1/_2 p_s(p_s-1)D^s+\sum_{rs} n_r p_s I^{0rs}\\&+\sum_r(\alpha^r n_r(\delta_r-n_r)+\beta^r n_r^2(\delta_r-n_r)^2+\ldots)+\sum_s(A^s p_s(\Delta_s-p_s)+B^s p_s^2(\Delta_s-p_s)^2+\ldots)\\&+\sum_r {}^1/_2(1-(-1)^{n_r})[-{}^1/_2\pi^r+\bar{\pi}^r+\bar{\alpha}^r n_r(\delta_r-n_r)+\bar{\beta}^r n_r^2(\delta_r-n_r)^2+\ldots]\\&+\sum_s {}^1/_2(1-(-1)^{p_s})[-{}^1/_2\Pi^s+\bar{\Pi}^s+\bar{A}^s p_s(\Delta_s-p_s)+\bar{B}^s p_s^2(\Delta_s-p_s)^2+\ldots]\\&+\sum_{rs} {}^1/_4(1-(-1)^{n_r})(1-(-1)^{p_s})[I'^{rs}+\bar{I}'^{rs}+\bar{\bar{\alpha}}^{rs} n_r(\delta_r-n_r)+\bar{\bar{\beta}}^{rs} n_r^2(\delta_r-n_r)^2+\ldots\\&\qquad\qquad+\bar{\bar{A}}^{rs} p_s(\Delta_s-p_s)+\bar{\bar{B}}^{rs} p_s^2(\Delta_s-p_s)^2+\ldots].\end{aligned}\right\}\quad(9)$$

The structure of eq. (9) is the same as that of eq. (2) with the same parameters appearing in both, except that the nucleon numbers are now indexed below, and the parameters are indexed above, to specify the neutron and proton shells to which they belong, and each of the indices r and s is summed over the values 1 and 2. Allowing the parameters of eq. (9) to vary with N and Z as in eqs. (3)–(5) and simplifying brackets, one is led in the combined region $1+2+3+4$ of fig. 13 to the following semi-empirical mass equation:

$$\left.\begin{aligned}&\Delta M(N_0+n_1+n_2,\ Z_0+p_1+p_2)\\&=\ \alpha+\sum_r\beta_1^r n_r+\sum_s\beta_2^s p_s+\sum_r\gamma_1^r n_r^2+\sum_{rs}\gamma_2^{rs} n_r p_s+\sum_s\gamma_3^s p_s^2\\&+\sum_r\delta_1^r n_r^3+\sum_{rs}\delta_2^{rs} n_r^2 p_s+\sum_{rs}\delta_3^{rs} n_r p_s^2+\sum_s\delta_4^s p_s^3\\&+\sum_{rs} {}^1/_2(1-(-1)^{n_r})[\theta_{10}^r+\theta_{1n}^r n_r+\theta_{1p}^{rs} p_s]\\&+\sum_{rs} {}^1/_2(1-(-1)^{p_s})[\theta_{20}^s+\theta_{2n}^{rs} n_r+\theta_{2p}^s p_s]\\&+\sum_{rs} {}^1/_4(1-(-1)^{n_r})(1-(-1)^{p_s})[\theta_{30}^{rs}+\theta_{3n}^{rs} n_r+\theta_{3p}^{rs} p_s]\end{aligned}\right\}\quad(10a)$$

plus a part which is valid for light nuclei only

Fig. 12. Nuclei with experimentally known masses and the shell boundaries revealed by nuclear mass systematics. Full circles represent beta-stable nuclei. Empty circles represent beta-unstable nuclei. The thin line running among the circles connects the minima of isobaric sections of the mass surface. The polygonal line crossing region 5 separates the masses in table A that were calculated from eq. (10) with the coefficients in the first column of table 12 a from those calculated with the coefficients in the second column. The empty and full wedge-shaped lines along boundaries between large shell regions mark the areas discussed in sect. 11 of discontinuity larger than the 3σ limit in the masses and in the separation energies, respectively. The segments pointing perpendicularly into small shell regions mark the boundaries beyond which separation energies increase when crossing the corresponding magic number. The inner polygonal right-angled boundary inscribed within some of the large shell regions mark the boundary outside of which the masses calculated from eqs. (6) and (10) differ by more than 3σ. The blackened areas between the latter boundaries and the region boundaries represent cases of similar discrepancies between the separation energies. For further details, see sect. 11.

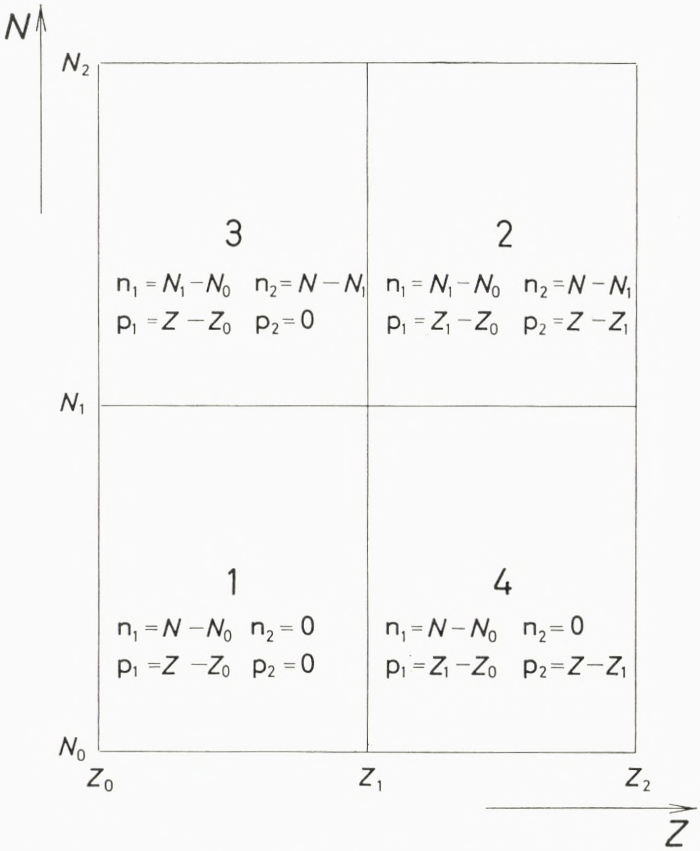


Fig. 13. Schematic representation of the combination of two small regions with their two larger neighbours in order to be able to apply eq. (9) in the combined region.

$$\left.\begin{aligned}
&+\sum_r \varepsilon_1^r n_r^4 + \sum_{rs} \varepsilon_2^{rs} n_r^3 p_s + \sum_{rs} \varepsilon_3^{rs} n_r^2 p_s^2 + \sum_{rs} \varepsilon_4^{rs} n_r p_s^3 + \sum_s \varepsilon_5^s p_s^4 \\
&+\sum_{rs} {}^1/_4 (1-(-1)^{n_r})[\pi^r_{nn} n_r^2 + \pi^{rs}_{np} n_r p_s + \pi^{rs}_{pp} p_s^2] \\
&+\sum_{rs} {}^1/_4 (1-(-1)^{p_s})[\Pi^{rs}_{nn} n_r^2 + \Pi^{rs}_{np} n_r p_s + \Pi^{s}_{pp} p_s^2] \\
&+\sum_{rs} {}^1/_4 (1-(-1)^{n_r})(1-(-1)^{p_s})[-I'^{rs}_{nn} n_r^2 - I'^{rs}_{np} n_r p_s - I'^{rs}_{pp} p_s^2] \\
&\qquad\qquad\qquad\qquad \text{for } (N \text{ or } Z) \leqslant 28^{*}
\end{aligned}\right\} \quad (10\text{b})$$

and a part valid for heavy nuclei only

* A similar remark applies here as made in connection with the N and Z boundaries of eqs. (6 b) and (c).

$$\left.\begin{aligned}
&\sum_{rs}\sum_{i\geqslant 2}(\zeta_{i0}^{r}+\zeta_{in}^{r}n_r+\zeta_{ip}^{rs}p_s)n_r^i(\delta_r-n_r)^i+\sum_{rs}\sum_{j\geqslant 2}(\eta_{j0}^{s}+\eta_{jn}^{rs}n_r+\eta_{jp}^{s}p_s)p_s^j(\varDelta_s-p_s)^j\\
&+\sum_{rs}{}^1/_2(1-(-1)^{n_r})[\sum_{i\geqslant 1}(\varphi_{i0}^{r}+\varphi_{in}^{r}n_r+\varphi_{ip}^{rs}p_s)n_r^i(\delta_r-n_r)^i]\\
&+\sum_{rs}{}^1/_2(1-(-1)^{p_s})[\sum_{j\geqslant 1}(\chi_{j0}^{s}+\chi_{jn}^{rs}n_r+\chi_{jp}^{s}p_s)p_s^j(\varDelta_s-p_s)^j]\\
+\sum_{rs}{}^1/_4(1-(-1)^{n_r})(1-(-1)^{p_s})&[\sum_{i\geqslant 1}(\psi_{i0}^{rs}+\psi_{in}^{rs}n_r+\psi_{ip}^{rs}p_s)n_r^i(\delta_r-n_r)^i+\sum_{j\geqslant 1}(\omega_{j0}^{rs}+\omega_{jn}^{rs}n_r+\omega_{jp}^{rs}p_s)p_s^j(\varDelta_s-p_s)^j]\\
&\qquad\text{for } N,Z\geqslant 28^{*}.
\end{aligned}\right\}\quad(10\text{c})$$

The structure of eq. (10) is the same as that of eq. (6) with the additional necessary single or double indexing as in (9), and the definition of the parameters of (10) in terms of those of (9) is the same as the definition of the parameters of (6) in terms of those of (2) (eqs. (7)) and will not be written down. It might also be noted that the sums over r and s appearing in the configuration-interaction expansion terms, as well as in the parity terms, actually reduce to a single expression in each shell region with the other summands vanishing because of the $n_r(\delta_r-n_r)$, the $(1-(-1)^{n_r})$ and the similar proton factors appearing in them.

Still, the number of mixed parameters appearing in eq. (10) is too large to be determined significantly from the scanty experimental data. In order to arrive at a significant set of mixed parameters differing from zero in the small regions, it was found necessary to reduce this number further. This was done by assuming that

e) The mixed parameters in the smaller regions should in a way be symmetrical with respect to the line of beta stability, which runs approximately along the principal diagonal of the larger regions 1 and 2 in fig. 13. This, combined with the sign conditions (8a and b), led in most cases to the following quantitative conditions:

$$\left.\begin{aligned}
\gamma_2^{rs} &= \gamma_2^{sr},\\
\delta_2^{rs} &= \delta_2^{sr} = \delta_3^{rs} = \delta_3^{sr},\\
\theta_{30}^{rs} &= \theta_{30}^{sr},\\
&\text{for } r\neq s,\quad N,Z\geqslant 28,
\end{aligned}\right\}\quad(11\text{a})$$

$$\left.\begin{aligned}
\gamma_2^{rs} &= \gamma_2^{sr},\\
\theta_{30}^{rs} &= \theta_{30}^{sr},\\
&\text{for } r\neq s,\ (N\text{ or }Z)\leqslant 28.
\end{aligned}\right\}\quad(11\text{b})$$

We do not write down any conditions on the mixed parameters δ_i and ε_i in the light nuclei with N or Z less than 28, as they turned out to be insignificant whatever "plausible" conditions were tried with them. The bearing of this fact on the reliability of extrapolated masses in the small regions will be discussed in sect. 11. Sometimes even conditions (11) did not suffice and it was found necessary to impose further restrictions, like the following:

* A similar remark applies here as made in connection with the N and Z boundaries of eqs. (6 b) and (c).

$$\delta_2^{rs} = \delta_2^{sr} = {}^1/_2(\delta_2^{rr} + \delta_2^{ss}) \qquad (12\,\mathrm{a})$$

$$\theta_{1p}^{r1} = \theta_{1p}^{r2}, \quad \theta_{2n}^{1s} = \theta_{2n}^{2s} \qquad (12\,\mathrm{b})$$

in order to get significant mixed parameters. The exact conditions imposed on the mixed parameters in each case will be stated explicitly with tables 12a and b, which give the adjusted values of the coefficients of eqs. (10a)–(10c).

8.4. Accuracy of the Data, Significance of the Parameters and Errors of the Calculated Masses

We finally add some comments concerning the uncertainties in the data which were used to determine the coefficients of the mass equations (6) and (10) and in the resulting coefficients and calculated masses. First the data; in order to obtain reliable parameters we used in (I), in each region, only masses known with an accuracy better than a maximum tolerated limit, which was arbitrarily chosen so as not to reject more than about one fifth of the data belonging to the region. In the present work we have chosen as a natural limit in each region a value lower than the accuracy with which the mass equation represents the masses in the region. The remaining masses have then all been treated on equal footing with unit weight*. The numbers of masses left and the maximum tolerated errors are shown in the last two columns of tables 10a and b, and in the last two rows of tables 12a and b in the following two sections.

It has sometimes(32, 33) been argued that, since the experimentally poorly known masses are usually situated far from the line of beta stability, it should be important for the application of the mass equation to extrapolation that they should be included in the process of adjusting the coefficients. Indeed, when coefficients in an approximate equation are needed for extrapolation over a wide range, it is certainly desirable to have them been determined from data extending over the widest possible range, as in this way the chances are best to reduce to minimum the influence on the final coefficient values of local trends not taken into account by the equation. However, even small errors in the values of high order semi-empirical polynomial coefficients which might be caused by wrong experimental data will usually lead to very large errors in calculated masses of nuclei far removed from the line of beta stability and corresponding to high nucleon numbers. Therefore, one should avoid using data with too large experimental uncertainties. On the other hand, in order to improve the reliability of the mass equation for extrapolation purposes, we incorporated in the adjustment process experimentally well-established(10, 11, 21) alpha-decay and beta-decay energies of nuclei far from stability, whose absolute masses are unknown**. The number of such unconnected data in each region is also given in the last but one column of tables 10a and b and the last but one row of tables 12a and b.

* See the discussion of this point following Kümmel's talk (32) at the Vienna Conference on Nuclidic Masses.

** It was the consideration of such Q_α values around $N = 84$ that first led us to introduce variable configuration-interaction coefficients (3) into the mass equation in region 14. No such variation was found necessary when known absolute masses alone were used.

Secondly, we mention the significance criteria used during the adjustment. We usually rejected as insignificant a coefficient having a statistical error larger than about one third to two fifths of its value. This corresponds to a level of significance better than 1 $^0/_0$ for a normal distribution or for the t-distributions with the appropriate numbers of degrees of freedom applying more exactly to the case of the coefficients. Similarly, we considered the reduction of χ^2 by the addition of a coefficient as insignificant when the appropriate variance ratio(34) was lower than the 1 $^0/_0$ level.

However, all these tests are based on the assumption of a homogeneous normal distribution around mean value zero for the deviations of the experimental values from the calculated ones. This basic assumption cannot be true, as it disregards the non-random nature of the higher-order approximations to the nuclear binding energy, which are not taken into account by eqs. (6) and (10). The possibility, mentioned in subsect. 8.1, of improving the agreement of the equation with experiment by adding coefficients which were purposely omitted from the final results as physically unreasonable, likewise indicates the non-random nature of the deviations of the experimental masses from eq. (6). Thus, while the application of the standard statistical criteria is certainly practicable, the exact meaning of the errors assigned to the final values of the coefficients is somewhat doubtful.

A final remark concerns the statistical errors of mass values calculated from eqs. (6) and (10) with the coefficients of tables 10 and 12, respectively. Given the correlation matrix of the coefficients, one can use the law of propagation of errors to calculate the statistical error of any calculated mass. For nuclei situated far away from the region of experimentally known nuclei which were used to determine the coefficients of the mass equation, the result will usually come out considerably larger than the standard deviation achieved in the region when the equation was fitted to the experimental data there(34). This is an obvious consequence of the explicit quadratic expression which gives the error of the masses in terms of the errors and the covariances of the coefficients from which the masses have been calculated*. However, as in the case of the significance tests mentioned above, the exact meaning of these standard errors is rather doubtful.

Over and above this, of course, there exists the fundamental uncertainty mentioned in subsect. 8.1, which is inherent in all semi-empirical formulae when extrapolated beyond the region of their experimentally verified validity. This uncertainty can be completely removed only by experimental studies.

Further remarks pertaining to the reliability of the mass equation will be made in sect. 11.

* We cannot be more definite, as we have only calculated the diagonal elements of the correlation matrix of the coefficients (see also remark b) to tables 3 a and 6 a). From these we can only set upper limits to the standard errors of extrapolated masses, and these amount typically to several tens of MeV for nuclei situated at the remote boundaries of the large shell regions.

If, instead of the physical coefficients appearing in eqs. (6) and (10), we had been using linear combinations of them which are mutually orthogonal in each shell region, their covariances would vanish and their standard errors would be considerably smaller than those of the present non-orthogonal coefficients given in tables 10 and 12. Then the standard error of a calculated mass could be calculated directly from the errors of the coefficients. This point was emphasized by Professor Racah in several stimulating discussions we had with him on the subject.

TABL

The adjusted coefficients of eqs. (6 a) and (6 b) an

Region	Z	N	Coefficients in keV				
			α	β_1	β_2	γ_1	γ_2
3	8–14	8–14	– 4 874.164	1 209.168	2 535.781	454.302	– 4 686.936
			± 180.000[a]	± 190.000	± 260.000	± 51.000	± 140.000
5	14–20	14–20	– 21 609.104	– 2 925.197	1 186.761	909.480	– 2 430.909
			± 98.000	± 85.000	± 110.000	± 37.000	± 64.000
7	20–28	20–28	– 35 004.152	– 2 051.849	3 081.847	114.507	– 2 128.505
			± 150.000	± 86.000	± 280.000	± 10.000	± 99.000
8	20–28	28–50	– 44 274.504	1 295.758	– 4 200.096	449.801	– 776.417
			± 60.000	± 50.000	± 39.000	± 26.000	± 32.000

Region	Z	N	Coefficients in keV				
			θ_{10}	$\theta_{1n} = -\theta_{1p}$	φ_{10}	θ_{20}	$\theta_{2n} = -\theta_{2p}$
3	8–14	8–14	3 197.961	– 564.325		3 093.363	– 332.414
			± 120.000	± 72.000		± 120.000	± 73.000
5	14–20	14–20	2 136.119	– 201.060		2 091.919	– 300.669
			± 66.000	± 40.000		± 66.000	± 41.000
7	20–28	20–28	2 171.541	– 137.518		2 437.801	– 97.625[d]
			± 120.000	± 34.000		± 210.000	± 32.000
8	20–28	28–50	1 264.389		3.059[e]	1 577.204	
			± 59.000		± 0.820	± 40.000	

a) The error is given in ordinary numerals below each coefficient. It is rounded off to two significant figures.
b) In this region $\delta_1 = -\delta_4$, in accordance with conditions (8 b).
c) In this region $\delta_2 = -\delta_3$, in accordance with conditions (8 b).

9. Numerical Results of Adjusting the Mass Equation Separately in Each Shell Region

Table 10 a shows the results of fitting eq. (6) in the regions with (N or Z) $\leqslant$ 28 which include a sufficient number of experimental data to make possible a significant determination of the coefficients. Table 10 b shows the results for the regions with $N,Z \geqslant 28$. The values of n and p to be used with these coefficients in each shell region are given in table 8, as already mentioned in sect. 7. The tables are constructed similarly to table 11 of (I). As already mentioned in subsect. 8.4, the last but one column contains two numbers—the first of which is the number of masses, and the second the number of decay energies of nuclei whose absolute masses are unknown—which were used in the calculation.

One notices the omission of the $1p$ shell from table 10 a. Here we could not

a
: mean deviations in the lighter shell regions.

			Coefficients in keV				
γ_3	δ_1	δ_2	δ_3	δ_4	$\varepsilon_1 = \varepsilon_5$	$\varepsilon_2 = \varepsilon_4$	ε_3
04.715		*671.931*	*− 281.269*	*310.583*	*− 13.133*		*− 22.859*
86.000		± 32.000	± 62.000	± 26.000	± 1.200		± 5.200
94.064	*− 85.275*	*328.330*	*− 196.393*	*85.275*b)		*− 6.178*	
36.000	± 7.600	± 20.000	± 24.000	± 7.600		± 0.950	
48.992		*298.447*	*− 218.181*	*148.560*		*− 18.985*	*25.606*
20.000		± 29.000	± 61.000	± 22.000		± 2.900	± 6.300
32.765	*− 5.215*	*− 17.419*	*17.419*c)	*5.215*b)			
10.000	± 0.860	± 4.100	± 4.100	± 0.860			

	Coefficients in keV			Mean deviation (keV)	Number of masses	Maximal exp. error tolerated (keV)
θ_{30}	$\theta_{3n} = -\theta_{3p}$	$-I'_{nn} = -I'_{pp}$	$-I'_{np}$			
272.098	*905.046*	*− 346.318*	*699.969*	206	35	90
220.000	± 130.000	± 56.000	± 110.000			
712.690	*169.163*			117	32	50
100.000	± 69.000					
252.896	*154.259*			189	46	150
170.000	± 46.000					
294.390				86	41	50
: 57.000						

d) In this region $\theta_{2p} = 0$, not in accordance with conditions (8 b). The value given is that of θ_{2n}.
e) See footnote after eqs. (6 b) and (6 c).

reduce the mean deviation below about 800 keV, which is considerably worse than in the other regions. In the other regions the mean deviations are of comparable magnitudes, displaying a slight decrease in heavier nuclei. The overall mean deviation is 163 keV, compared to 228 keV in (I). Beyond the $1f_{7/2}$ shell the deviations are but slightly lower (the total mean deviation being 164 keV compared to 197 keV in I), the reduction being due mainly to the inclusion in the present work of the variable parity terms from the last four lines of eq. (6), and also to the inclusion of additional configuration interaction terms and, as already mentioned at the end of sect. 4, to the use of newer experimental data. On the other hand, in the light nuclei up to and including the $1f_{7/2}$ shell, the mean deviations in table 10 a are considerably lower than in (I) (mean deviation 156 keV compared to 343 keV in I), and this is mainly due to the allowance in the present work for the quadratic variation (5) in light nuclei, whereas only linear variations were assumed in (I).

Tab

The adjusted coefficients of eqs. (6a) and (6c) a

Region	Z	N	Coefficients in keV: α	$10\beta_1$	$10\beta_2$	$100\gamma_1$	$100\gamma_2$	$100\gamma_3$	$1000\delta_1 = 100$
9	28–40	28–50	*– 53 885.815*	*– 37 400.616*	*34 096.029*	*28 696.007*	*– 64 796.546*	*41 926.803*	*– 3 522.0*
			± 110.000a)	± 440.000	± 760.000	± 530.000	± 1 100.000	± 680.000	± 170.0
11	40–50	50–82	*– 61 636.866*	*47 903.988*	*– 60 024.120*	*13 658.274*	*– 42 928.709*	*30 755.677*	*– 1 190.8*
			± 1 800.000	± 1 300.000	± 2 300.000	± 290.000	± 1 300.000	± 830.000	± 97.0
12	50–66	50–82	*– 55 870.138*	*– 44 416.253*	*80 515.459*	*15 813.963*	*– 46 471.564*	*17 248.250*	*– 1 219.2*
			± 1 000.000	± 1 600.000	± 1 700.000	± 790.000	± 1 200.000	± 830.000	± 120.0
13	50–66	82–126	*– 77 209.464*	*41 389.237*	*– 33 454.242*	*9 796.691*	*– 34 560.113*	*24 602.080*	
			± 220.000	± 950.000	± 450.000	± 660.000	± 1 200.000	± 250.000	
14	66–82	82–126	*– 105 105.422*	*41 499.785*	*– 50 956.330*	*10 157.700*	*– 28 243.723*	*33 999.014*	
			± 4 600.000	± 1 400.000	± 2 000.000	± 260.000	± 550.000	± 770.000	
16	82–126	126–184	*– 21 965.458*	*35 567.941*	*24 097.595*	*4 940.069 6*	*– 34 108.557 5*	*20 074.192 2*	
			± 77.000	± 530.000	± 720.000	± 190.000 0	± 480.000 0	± 370.000 0	

Region	Z	N	Coefficients in keV: $10^5\eta_{2n} = 10^5\eta_{2p}$	$10^6\eta_{30}$	$10^8\eta_{40}$	θ_{10}	$10\theta_{1n} = 10\theta_{1p}$	$100\varphi_{10}$	$10^4\varphi_2$
9	28–40	28–50				*1 376.989*		*259.817*	
						± 94.000		± 97.000	
11	40–50	50–82		*3 506.614*		*891.924*		*194.053*	
				± 600.000		± 69.000		± 33.000	
12	50–66	50–82		*288.833*		*968.599*		*156.863*	
				± 51.000		± 66.000		± 33.000	
13	50–66	82–126				*947.673*			
						± 37.000			
14	66–82	82–126	*– 1 109.375*	*– 1 733.027*		*952.068*	*– 97.695*	*431.699*	*– 85.9*
			± 120.000	± 180.000		± 230.000	± 26.000	± 100.000	± 17.0
16	82–126	126–184		*– 267.118 5*	*39.505 42*	*868.348*			*– 5.0*
				± 52.000 0	± 6.200 00	± 51.000			± 1.2

a) The same as for table 10 a.

10. Numerical Results with Combined Regions

The definition of n_1, n_2, p_1, p_2, δ_1, δ_2, Δ_1 and Δ_2 to be used in connection with eq. (10) in each of the four combined regions 3 + 4 + 5 + 3', 5 + 6 + 7 + 5', 9 + 10 + 11 + 9' and 14 + 15 + 16 + 14'' (see table 8) follows from comparing their relative positions in the (N,Z) plane (fig. 12) with the schematic fig. 13, and is given explicitly in table 11. Tables 12 a and b show the numerical results of fitting eq. (10) in these combined regions, and are constructed similarly to tables 10 a and b.

mean deviations in the heavier shell regions.

)$\delta_2 = 1000\delta_3$	$10^4\zeta_{20}$	$10^6\zeta_{30}$	$10^8\zeta_{40}$	$10^9\zeta_{4n} = 10^9\zeta_{4p}$	$10^{10}\zeta_{50}$	$10^{12}\zeta_{60}$	$10^{14}\zeta_{70}$	$10^4\eta_{20}$
		Coefficients in keV						
4.414								
0.000								
5.264								*− 2 398.566*
0.000								± 850.000
8.912								
0.000								
6.377	*519.198*	*− 228.347*						
0.000	± 83.000	± 20.000						
9.663		*− 404.131*	*269.605*	*1.625*	*− 64.924*	*4.990*		*11 408.558*
5.000		± 140.000	± 86.000	± 0.220	± 19.000	± 1.500		± 1 100.000
5.707 53		*− 249.546 8*	*137.384 08*		*− 31.612 745*	*3.270 516*	*− 0.125 553 9*	*474.304*
0.000 00		± 53.000 0	± 28.000 00		± 6.100 000	± 0.610 000	± 0.023 000 0	± 150.000

θ_{20}	$100\chi_{10}$	$1000\chi_{1n} = 1000\chi_{1p}$	$10^4\chi_{20}$	θ_{30}	$10^4\psi_{20}$	Mean deviation (keV)	Number of masses and number of unconnected decay energies used in the adjustment	Maximal exp. error tolerated (keV)
		Coefficients in keV						
8.838	*1 172.781*	*− 239.730*		*− 396.706*		189	113,0	100
0.000	± 290.000	± 86.000		± 72.000				
3.019				*− 230.066*		131	113,1	100
6.000				± 51.000				
8.546				*− 159.204*		151	107,7	122
0.000				± 59.000				
7.008		*− 60.872*				187	103,3	110
6.000		± 19.000						
3.162						185	161,17	120
9.000								
8.584			*− 20.021*	*− 333.193*	*6.777*	133	170,12	100
8.000			± 3.800	± 70.000	± 1.600			

In the third row from the bottom in tables 12, the number within brackets after the mean deviation gives the mean deviation of eq. (6) from the experimental masses in the two large out of the four subregions in each combined region, when these two subregions are viewed as one combined region. One sees that the goodness-of-fit of eq. (10) in the combined regions is more or less the same as that of eq. (6) in the separate regions.

Fig. 14 shows the deviations of the masses calculated from eqs. (6) and (10) and given in table A from the experimental values. The total mean deviation of these masses from the experimental values is 168 keV.

TABLE 11

The definition of n_1, n_2, p_1, p_2, δ_1, δ_2, Δ_1 and Δ_2 to be used with eq. (10) in the combined regions.

Combination	Region	n_1	n_2	p_1	p_2	δ_1	δ_2	Δ_1	Δ_2
3 + 4 + 5 + 3'........	3	$N-8$	0	$Z-8$	0				
	4	6	$N-14$	$Z-8$	0				
	5	6	$N-14$	6	$Z-14$				
	3'	$N-8$	0	6	$Z-14$				
5 + 6 + 7 + 5'........	5	$N-14$	0	$Z-14$	0				
	6	6	$N-20$	$Z-14$	0				
	7	6	$N-20$	6	$Z-20$				
	5'	$N-14$	0	6	$Z-20$				
9 + 10 + 11 + 9'......	9	$N-28$	0	$Z-28$	0	22	32	22	22
	10	22	$N-50$	$Z-28$	0				
	11[a])	22	$N-50$	12	$Z-40$				
	9'[a])	$N-28$	0	12	$Z-40$				
14 + 15 + 16 + 14'' ...	14	$N-82$	0	$Z-50$	0	44	58	32	44
	15	$N-82$	0	32	$Z-82$				
	16	44	$N-126$	32	$Z-82$				
	14''	44	$N-126$	$Z-50$	0				

a) In regions 9' and 11 the proton symmetry terms in eq. (10) should be modified from $p_2 j\ (\Delta_2 - p_2) j$ to $(p_2+12) j\ (10-p_2) j$, since we want them to be symmetric between $Z = 28$ and $Z = 50$ and vanish at these limits, whereas p_2 starts from $Z = 40$. With eq. (6) we simply shifted the origin of p in region 11 to $Z = 28$, and retained the original form of the equation (see table 8). However, this cannot be done in a combined region for a subregion corresponding to position 2 in the schematic fig. 13. On the other hand, it can be done in a subregion corresponding to position 1, and this possibility has indeed been made use of in regions 14 and 14'', where the origin of p_2 was shifted to the major shell boundary at $Z = 50$. Such a shift of the origin does, of course, alter the definition of the coefficients of the mass equation (eqs. (7)) in terms of the physical interaction parameters.

TABLE 12a

The adjusted coefficients of eqs. (10a and b) and the mean deviations in the lighter shell regions.

	Combined region	$3+4+5+3'$	$5+6+7+5'$
Coefficients in keV	α	$-4\,806.836 \pm 180.000$[a])	$-21\,561.098 \pm 140.000$
	$\beta^1{}_1$	616.443 ± 190.000	$-3\,020.105 \pm 110.000$
	$\beta^2{}_1$	$3\,511.811 \pm 380.000$	$3\,332.622 \pm 110.000$
	$\beta^1{}_2$	$2\,136.256 \pm 270.000$	$1\,188.135 \pm 150.000$
	$\beta^2{}_2$	$1\,156.217 \pm 190.000$	$8\,568.732 \pm 240.000$
	$\gamma^1{}_1$	979.377 ± 72.000	895.330 ± 47.000
	$\gamma^2{}_1$	902.317 ± 59.000	117.302 ± 7.000
	$\gamma^{11}{}_2$	$-4\,781.117 \pm 140.000$	$-2\,349.727 \pm 82.000$
	$\gamma^{22}{}_2$	$-2\,409.485 \pm 110.000$	$-2\,143.007 \pm 77.000$

TABLE 12a (continued).

Coefficients in keV

Combined region	3 + 4 + 5 + 3′	5 + 6 + 7 + 5′
$\gamma^{21}{}_2$	− 1 073.057 ± 74.000	− 902.604 ± 23.000
$\gamma^{12}{}_2$		− 902.604 ± 23.000 [c]
$\gamma^{1}{}_3$	1 180.795 ± 89.000	1 089.000 ± 50.000
$\gamma^{2}{}_3$	1 100.238 ± 63.000	535.957 ± 110.000
$\delta^{1}{}_1 = -\delta^{1}{}_4$	− 148.840 ± 12.000	− 75.728 ± 9.400
$\delta^{2}{}_1$	− 84.314 ± 12.000	
$\delta^{11}{}_2$	674.264 ± 31.000	292.979 ± 23.000
$\delta^{22}{}_2$	324.365 ± 31.000	299.281 ± 24.000
$\delta^{11}{}_3$	− 223.746 ± 58.000	− 176.472 ± 32.000
$\delta^{22}{}_3$	− 195.922 ± 41.000	− 214.568 ± 53.000
$\delta^{2}{}_4$	84.314 ± 12.000 [b]	148.674 ± 19.000
$\varepsilon^{11}{}_2 = \varepsilon^{11}{}_4$		− 5.573 ± 1.200
$\varepsilon^{22}{}_2 = \varepsilon^{22}{}_4$	− 6.106 ± 1.700	− 18.965 ± 2.400
$\varepsilon^{11}{}_3$	− 27.955 ± 4.800	
$\varepsilon^{22}{}_3$		25.300 ± 5.500
$\theta^{1}{}_{10}$	3 221.467 ± 110.000	2 143.554 ± 86.000
$\theta^{2}{}_{10}$	1 086.329 ± 270.000	1 503.538 ± 91.000
$\theta^{1}{}_{1n} = -\theta^{11}{}_{1p} = -\theta^{12}{}_{1p}$	− 514.816 ± 63.000	− 166.771 ± 45.000
$\theta^{2}{}_{1n} = -\theta^{22}{}_{1p} = -\theta^{21}{}_{1p}$	− 163.048 ± 54.000	− 103.437 ± 24.000
$\theta^{1}{}_{20}$	3 147.579 ± 120.000	2 122.061 ± 87.000
$\theta^{2}{}_{20}$	3 440.309 ± 400.000	3 029.457 ± 290.000
$\theta^{11}{}_{2n} = -\theta^{1}{}_{2p} = \theta^{21}{}_{2n}$	− 286.308 ± 60.000	− 246.706 ± 47.000 [d]
$\theta^{22}{}_{2n} = -\theta^{2}{}_{2p} = \theta^{12}{}_{2n}$	− 239.276 ± 58.000	− 96.203 ± 24.000 [e]
$\theta^{11}{}_{30}$	− 1 293.515 ± 220.000	− 737.934 ± 120.000
$\theta^{22}{}_{30}$	− 527.588 ± 140.000	− 1 239.259 ± 130.000
$\theta^{21}{}_{30} = \theta^{12}{}_{30}$		− 558.569 ± 110.000
$\theta^{11}{}_{3n} = -\theta^{11}{}_{3p}$	807.393 ± 110.000	131.728 ± 35.000
$\theta^{22}{}_{3n} = -\theta^{22}{}_{3p}$		131.728 ± 35.000 [f]
$-I'^{11}{}_{nn} = -I'^{11}{}_{pp}$	− 332.057 ± 55.000	
$-I'^{11}{}_{np}$	677.447 ± 110.000	
Mean deviation (keV)	206(168)	167(167)
Number of masses	71	91
Maximal exp. error tolerated (keV)	90	150

a) The errors of the coefficients are rounded off to two significant figures.

b) In this combined region $\delta^{2}{}_4 = -\delta^{2}{}_1$, in accordance with the analogue for combined regions of conditions (8b).

c) In this combined region $\gamma^{12}{}_2 = \gamma^{21}{}_2$, in accordance with conditions (11 b).

d) In this combined region $\theta^{21}{}_{2n} = 0$, not in accordance with conditions (12 b). The value given is that of $\theta^{11}{}_{2n} = -\theta^{1}{}_{2p}$.

e) In this combined region $\theta^{2}{}_{2p} = 0$, not in accordance with the analogue for combined regions of conditions (8 b). See also remark d to table 10 a. The value given is that of $\theta^{22}{}_{2n} = \theta^{12}{}_{2n}$.

f) In this combined region the additional condition $\theta^{11}{}_{3n} = -\theta^{11}{}_{3p} = -\theta^{22}{}_{3p} = \theta^{22}{}_{3n}$ holds.

Table 12b

The adjusted coefficients of eqs. (10a and c), and the mean deviations in the heavier shell regions.

Combined region (Coefficients in keV)	9 + 10 + 11 + 9′	14 + 15 + 16 + 14″
α	– 53 892.133 ± 100.000[a)]	– 102 490.650 ± 4 000.000
$10\beta^1_1$	– 37 271.774 ± 400.000	39 873.643 ± 1 300.000
$10\beta^2_1$	54 062.484 ± 1 100.000	100 276.876 ± 1 600.000
$10\beta^1_2$	33 723.811 ± 680.000	– 46 511.056 ± 1 500.000
$10\beta^2_2$	81 483.503 ± 9 600.000	110 613.272 ± 1 700.000
$100\gamma^1_1$	28 472.843 ± 480.000	9 961.616 ± 210.000
$100\gamma^2_1$	12 722.401 ± 320.000	3 813.356 8 ± 380.000 0
$100\gamma^{11}_2$	– 64 325.111 ± 940.000	– 28 441.640 ± 440.000
$100\gamma^{22}_2$	– 42 708.646 ± 840.000	– 33 927.665 ± 470.000
$100\gamma^{21}_2$	– 49 152.107 ± 1 100.000	– 21 506.737 ± 560.000
$100\gamma^{12}_2$	– 38 343.775 ± 4 400.000	– 21 506.737 ± 560.000 [b)]
$100\gamma^1_3$	42 417.833 ± 600.000	32 099.052 ± 590.000
$100\gamma^2_3$	23 372.203 ± 1 400.000	18 702.554 ± 660.000
$1000\delta^1_1 = 1000\delta^1_4$	– 3 405.979 ± 150.000	
$1000\delta^2_1 = 1000\delta^2_4$	– 1 379.615 ± 120.000	
$1000\delta^{11}_2 = 1000\delta^{11}_3$	2 183.960 ± 230.000	– 626.978 ± 47.000
$1000\delta^{22}_2 = 1000\delta^{22}_3$	1 345.708 ± 250.000	1 394.176 ± 110.000
$1000\delta^{21}_2 = 1000\delta^{21}_3 = 1000\delta^{12}_2 = 1000\delta^{12}_3$	1 764.834[c)]	383.599[c)]
$10^6\,\zeta^2_{30}$		– 229.233 7 ± 62.000 0
$10^8\,\zeta^1_{40}$		17.873 ± 8.400
$10^8\,\zeta^2_{40}$		126.892 ± 33.000
$10^9\,\zeta^1_{4n} = 10^9\,\zeta^{11}_{4p}$		1.883 ± 0.190
$10^{10}\,\zeta^1_{50}$		– 9.640 ± 3.400
$10^{10}\,\zeta^2_{50}$		– 29.555 093 ± 7.300 000
$10^{12}\,\zeta^1_{60}$		0.809 994 ± 0.360 000
$10^{12}\,\zeta^2_{60}$		3.089 785 ± 0.730 000
$10^{14}\,\zeta^2_{70}$		– 0.119 617 4 ± 0.028 000 0
$10^4\,\eta^1_{20}$		9 744.977 ± 960.000
$10^4\,\eta^2_{20}$	– 3 334.555 ± 1 200.000	561.617 ± 140.000
$10^5\,\eta^{11}_{2n} = 10^5\,\eta^1_{2p}$		– 969.721 ± 100.000
$10^6\,\eta^1_{30}$		– 1 480.412 ± 150.000
$10^6\,\eta^2_{30}$	2 950.770 ± 960.000	– 292.816 ± 50.000
$10^8\,\eta^2_{40}$		41.467 41 ± 6.200 00
θ^1_{10}	1 391.605 ± 77.000	971.158 ± 190.000
θ^2_{10}	875.216 ± 74.000	843.082 ± 60.000
$10\theta^1_{1n} = 10\theta^{11}_{1p}$		– 84.243 ± 23.000
$100\varphi^1_{10}$	229.919 ± 82.000	384.790 ± 68.000
$100\varphi^2_{10}$	192.583 ± 38.000	
$10^4\,\varphi^1_{20}$		– 79.433 ± 12.000
$10^4\,\varphi^2_{20}$		– 4.585 ± 1.400
θ^1_{20}	966.670 ± 96.000	835.327 ± 26.000

TABLE 12b (continued).

	Combined region	9 + 10 + 11 + 9′		14 + 15 + 16 + 14″	
Coefficients in keV	$\theta^{2}{}_{20}$	*1 405.030* ±	45.000	*935.269* ±	47.000
	$100\chi^{1}{}_{10}$	*1 240.324* ±	250.000		
	$1000\chi^{11}{}_{1n} = 1000\chi^{1}{}_{1p}$	– *272.440* ±	69.000		
	$10^4\,\chi^{2}{}_{20}$			– *12.181* ±	4.200
	$\theta^{11}{}_{30}$	– *361.845* ±	64.000		
	$\theta^{22}{}_{30}$	– *191.742* ±	65.000	– *252.491* ±	76.000
	$\theta^{21}{}_{30}$	– *382.846* ±	100.000	– *252.491* ±	76.000d)
	$\theta^{12}{}_{30}$	– *382.846* ±	100.000e)		d)
	$10^4\,\psi^{22}{}_{20}$			*5.307* ±	1.800
	$10^4\,\psi^{21}{}_{20}$			*5.307* ±	1.800f)
	Mean deviation (keV)	174(162)		165(161)	
	Numbers of masses and of unconnected decay energies	243,1		348,59	
	Maximal exp. error tolerated (keV)	100		120	

a) The same as for table 12 a.
b) In this combined region $\gamma^{12}{}_2 = \gamma^{21}{}_2$, in accordance with conditions (11 a).
c) In this combined region $\delta^{12}{}_2 = \delta^{21}{}_2 = {}^1/_2(\delta^{11}{}_2 + \delta^{22}{}_2)$, in accordance with conditions (12 a).
d) In this combined region $\theta^{21}{}_{30} = \theta^{22}{}_{30} \neq \theta^{12}{}_{30}$, not in accordance with conditions (11 a).
e) In this combined region $\theta^{12}{}_{30} = \theta^{21}{}_{30}$, in accordance with conditions (11 a).
f) In this combined region the additional condition $\psi^{21}{}_{20} = \psi^{22}{}_{20}$ holds.

11. A Calculated Mass Table. Discontinuities of the Mass Surface Across Shell Boundaries

Table A published as an appendix gives the calculated values of some 4 500 masses, as well as some of their frequently needed mass differences. For the combined regions, eq. (10) with the parameters from tables 12 was used in the calculation. In region 5, which occurs in both of the two combined regions of table 12a, a line in the (N,Z) plane was chosen, running approximately along the non-principal diagonal, for which the calculated masses were about the same when calculated with either of the two sets of parameters from table 12a. The masses of region 5 lying to the left of and below this line were then calculated from the parameters of the first column of table 12a, and those lying to the right of and above this line were calculated from the parameters of the second column. The dividing line is shown in fig. 12. The masses in the other mass regions, namely regions 8, 12 and 13, were calculated from eq. (6) with the parameters of tables 10a and b.

For the boundary lines between regions, masses and separation energies along the boundary calculated from the coefficients of the lighter region are given in the main body of the table. Boundary masses and separation energies along the boundary calculated from the coefficients of the heavier region are given separately at the end of the table. When computing a mass difference involving a boundary nuclide, that mass of the

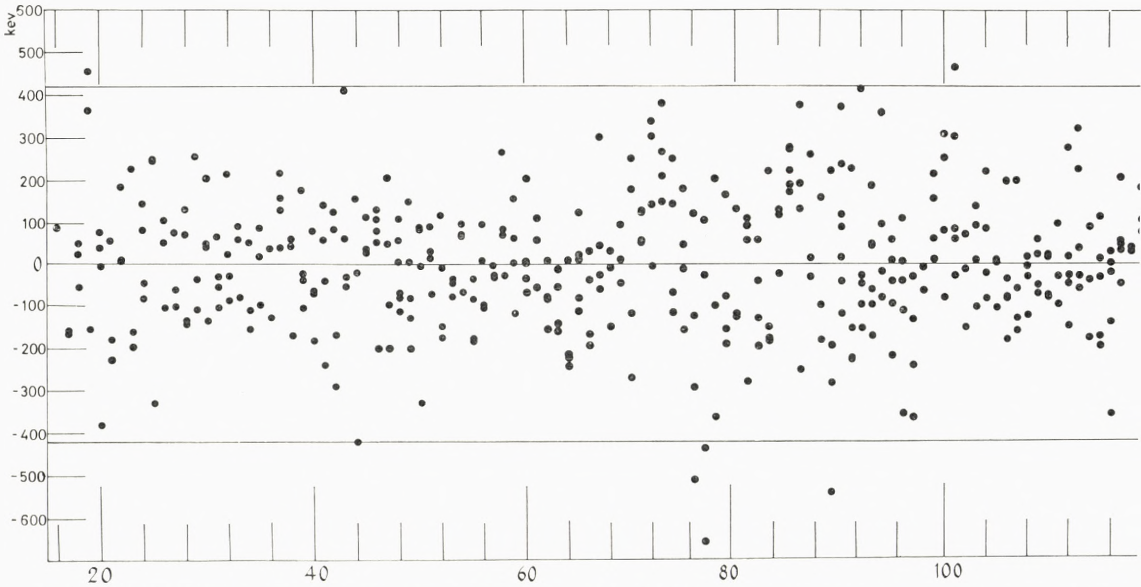


Fig. 14. Experimental masses minus masses calculated from eqs. (6) and (10) and given in table A. The two

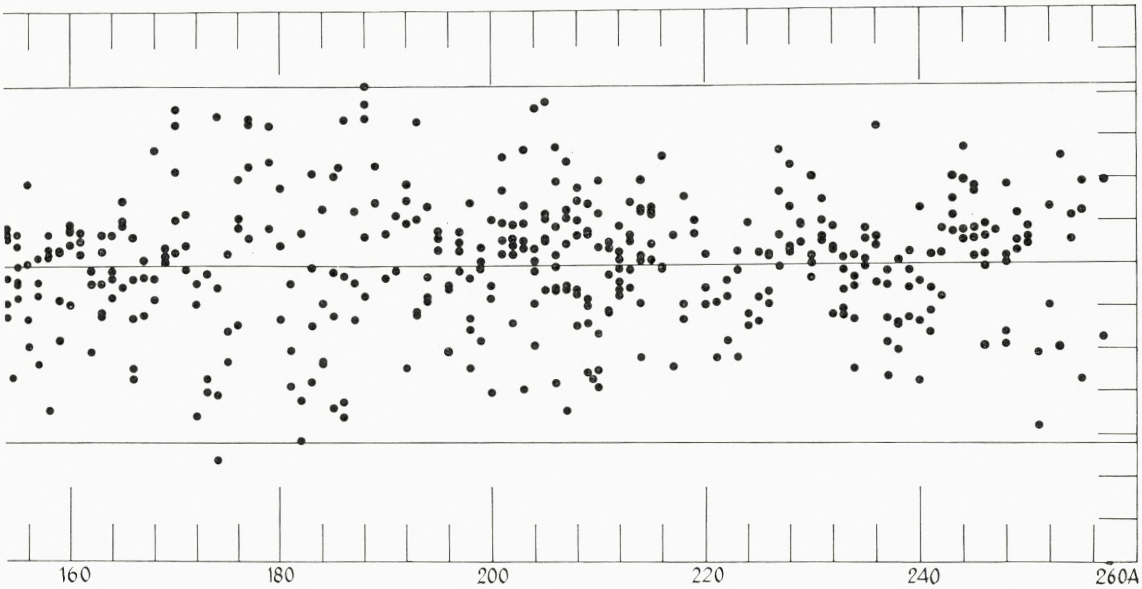
boundary nuclide was used which was calculated from the coefficients of the same region as the nuclide with which it forms the computed mass difference. This was done in order to achieve maximum continuity of mass differences across shell boundaries. However, such a procedure cannot be applied to alpha decay energies connecting non-boundary nuclei from different regions. Their values given in the table are meaningless.

In sect. 8 we imposed conditions on the coefficients of eqs. (6) and (10) in order to make them consistent with the basic assumptions of the single-particle model from which these mass equations have been derived and with generally accepted ideas about nuclei. We shall now describe the results of some a posteriori tests of a similar nature performed on the mass table given in the appendix.

One of the basic notions involved in our concept of the nuclear mass surface is that of continuity*. This requirement of having a continuous surface provides a stringent test for any mass equation with coefficients determined separately for separate shell regions. Thus, the tin ($Z = 50$) isotopes with $50 \leqslant N \leqslant 82$, which form the boundary between regions 11 and 12 (fig. 12), should have approximately the same masses when calculated from eq. (6) either with the coefficients of region 11 or with those of region 12 (second or third line, respectively, of table 10b).

Table 13 shows the differences between the values of the boundary masses calculated with the coefficients of both adjoining regions along the five boundary lines for the pairs of regions (7,8), (8,9), (11,12), (12,13) and (13,14) in the (N,Z)

* Disregarding the finer quadruple splitting according to parity type.



correspond to $2^1/_2$ times the total mean deviation. More than $99^0/_0$ of the points should lie within these lines.

plane. The table also shows the differences between the slopes of the mass surface parallel to the boundary* on both sides of the boundary lines. It is seen that in all cases, except that of the boundary between regions 7 and 8, the mass differences at the "unpopulated" remote ends of the boundaries exceed considerably three times the mean deviations σ achieved by the mass equation in the corresponding regions as given in tables 10 and 12. This violates the continuity requirement mentioned above, and indicates that the calculated masses in the neighbourhood of these remote ends of the boundaries must be wrong by at least this amount of discontinuity in one or in both of the adjoining regions.

The differences between the separation energies are considerably smaller. However, at the ends of some of the boundaries their differences too exceed the above mentioned 3σ limits. As with the masses, the calculated values of the separation energies in such places must be wrong by at least the amount of the discontinuity. The same probably applies to the other calculated mass differences which are given by sums and differences of the separation energies.

In fig. 12 we marked by an empty wedge-shaped line that part of the boundary between two neighbouring large shell regions, along which the discontinuity of the mass surface is larger than the 3σ limit of the regions. The inscribed full wedge-shaped line marks that part of the boundary where the separation energies display discontinuities of this magnitude. The distances along a boundary line from the sharp ends of the empty and full wedges to the nearest experimentally known mass might indi-

* Actually, the differences between the corresponding separation energies are given in the table.

TABLE 13

Differences along boundary lines between masses and also between separation energies calculated with the coefficients of the mass equation in the two adjoining regions.

Regions 7, 8

Z	ΔM_8–ΔM_7 in keV	S_{p8}–S_{p7} in keV
20	– 132	–
21	12	– 144
22	206	– 193
23	75	131
24	92	– 17
25	– 115	207
26	– 76	– 40
27	– 160	85
28	101	– 262

Regions 8, 9

N	ΔM_9–ΔM_8 in keV	S_{n9}–S_{n8} in keV
28	16	–
29	177	– 161
30	75	102
31	138	– 63
32	14	123
33	30	– 15
34	– 77	108
35	– 61	– 16
36	– 115	54
37	– 48	– 67
38	– 11	– 37
39	157	– 167
40	322	– 165
41	639	– 318
42	970	– 330
43	1486	– 516
44	2019	– 533
45	2785	– 766
46	3559	– 774
47	4623	– 1064
48	5673	– 1051
49	7085	– 1412
50	8451	– 1365

Regions 11, 12

N	ΔM_{12}–ΔM_{11} in keV	S_{n12}–S_{n11} in keV
50	1484	–
51	1496	– 11
52	1336	159
53	1315	20
54	1165	150
55	1120	46
56	980	139
57	916	65
58	789	127
59	712	76
60	598	114
61	516	82
62	416	100
63	336	80
64	251	85
65	179	72
66	110	69
67	52	57
68	0	52
69	– 35	35
70	– 70	35
71	– 77	7
72	– 93	16
73	– 65	– 28
74	– 60	– 4
75	9	– 70
76	34	– 25
77	153	– 119
78	199	– 47
79	373	– 174
80	442	– 70
81	677	– 236
82	771	– 94

Regions 12, 13

Z	ΔM_{13}–ΔM_{12} in keV	S_{p13}–S_{p12} in kev
50	– 1189	–
51	– 655	– 534
52	– 351	– 304
53	– 8	– 344
54	106	– 112
55	218	– 113
56	172	46
57	107	66
58	– 1	108
59	– 141	140
60	– 182	41
61	– 272	89

Table 13 (continued).

62	– 116	– 155	100	– 460	217
63	– 32	– 84	101	– 1248	788
64	430	– 463	102	– 1756	509
65	787	– 356	103	– 2992	1236
66	1633	– 846	104	– 3883	892
			105	– 5584	1701
			106	– 6916	1333
Regions 13, 14			107	– 9063	2146
N	ΔM_{14}–ΔM_{13} in keV	S_{n14}–S_{n13} in keV	108	– 10857	1795
82	1879	–	109	– 13392	2535
83	1558	322	110	– 15626	2234
84	1052	505	111	– 18460	2835
85	779	275	112	– 21069	2609
86	128	651	113	– 24088	3022
87	87	41	114	– 26970	2883
88	– 427	515	115	– 30054	3083
89	– 238	– 189	116	– 33073	3021
90	– 534	296	117	– 36093	3019
91	– 217	– 316	118	– 39090	2997
92	– 319	103	119	– 41936	2847
93	– 10	– 310	120	– 44744	2809
94	9	– 18	121	– 47367	2622
95	187	– 178	122	– 49867	2501
96	234	– 46	123	– 52343	2478
97	174	61	124	– 54542	2199
98	144	31	125	– 57174	2633
99	– 244	388	126	– 59280	2105

cate the distances along the boundary in the two adjoining regions, over which one might safely use the extrapolated masses and mass differences, respectively, from table A without erring by more than three times the mean deviations of the mass equation in the corresponding regions.

We now turn to discuss extrapolation into the small shell regions. As mentioned in subsect. 8.3, only a small number of data was used to adjust the mass equation in each of the small off-diagonal regions. This is particularly so for regions 3', 5', 9' and 14'' (cf. table 8). Indeed, in regions 3' and 4, and also in 5' and 6, the data were so scanty that significant cubic and quartic coefficients could not be determined at all for the two combined regions of table 12a even when using conditions like (12a). There are here still the pure δ_1 and δ_4 terms which allow for the variation of the neutron-interaction coefficients with N and for the variation of the proton-interaction coefficients with Z. However, possible variations of the neutron coefficients with respect to Z, of the proton coefficients with respect to N and of the neutron-proton interaction coefficients with respect to both Z and N are not taken into account. On the other hand, the results presented in table 10a show considerable variations of this kind in the neighbouring regions 3, 5 and 7. Therefore they should probably exist in the small regions 3', 4, 5' and 6 as well. Furthermore, in the larger small regions 9' and 10, and also in 14'' and 15, we somewhat arbitrarily adopted conditions (12a) in order to obtain significant mixed cubic coefficients in these small subregions. Other similar conditions could probably reproduce the experimentally known masses with the same goodness of fit. However, on extrapolation they would yield considerably different masses. Therefore, the extrapolation with the coefficients of tables 12 far into the small shell regions is probably less reliable than in the larger regions.

We thought it might be reasonable to require that S_n values of consecutive isotopes belonging to the same parity type should always decrease when crossing a neutron magic number towards higher N values, and similarly that S_p should decrease when crossing a proton magic number. In order to investigate to what extent the extrapolated masses fulfill this requirement we plotted graphs of all S_n and S_p values given in table A, similar to figs. 1 and 3 of ref. [28], and looked for possible violations of the rule. It was found that the S_n requirement is violated along the boundary between regions 3' and 5 for $Z \geqslant 17$, along the boundary between regions 5' and 7 for $Z \geqslant 23$, and along the boundary between regions 15 and 16 for $Z \geqslant 98$. Similarly, the S_p requirement is violated along the boundary between regions 3 and 3' for $N \leqslant 11$, along the boundary between regions 5 and 5' for $N \leqslant 17$, along the boundary between regions 9 and 9' for $N \leqslant 41$, along the boundary between regions 14 and 15 for $N \leqslant 108$, and along the boundary between regions 14'' and 16 for $N \geqslant 153$.

In fig. 12 we marked by segments pointing perpendicularly into the smaller regions the above mentioned points on the boundary lines between large and small regions, beyond which the separation energy increases when crossing a magic number. It might be reasonable in the smaller regions not to use the extrapolated masses and mass differences beyond these limits.

Finally, in these larger regions where both eqs. (6) and (10) were adjusted (namely regions 3, 5, 7, 9, 11, 14 and 16), we compared the masses and the separation energies obtained in both adjustments. In regions 3, 11, 14 and 16 the mass differences amount to 2–4 MeV at the remote corners of the shell regions. However, except for a few nuclei in region 3, ^{33}K in region 5 and ^{164}Pb–^{173}Pb in region 14, the separation energies from the two calculations always agree to better than the 3σ limit of the corresponding region.

In fig. 12 the right-angled polygonal line within the region boundary in the above mentioned large regions shows the boundary outside of which the masses from the two calculations differ by more than 3σ. It might be unadvisable to use the extrapolated masses from table A outside this line when unwilling to risk an error larger than 3σ. The black rectangular area between this boundary and the region boundary in each of regions 3, 5 and 14 shows the above mentioned nuclei for which the separation energies from the two different calculations disagreed by more than 3σ as well.

Part IV.
SOME REMARKS CONCERNING THE LIQUID-DROP MASS EQUATION

12. Non-Parabolic Isobaric Sections

In this section we comment on the famous assumption(35, 36) of parabolic isobaric sections of the nuclear mass surface. The considerably greater accuracy to which nuclear masses are reproduced by eq. (6) as compared to a purely quadratic equation demonstrates that an arbitrary section of the nuclear mass surface cannot in general be represented by a parabolic curve to this accuracy. Still, a section in some particular direction might be more parabolic-like than in others.

In order to examine the situation more closely in relation to isobaric and iso-diaspheric sections of the mass surface, it is convenient to transform orthogonally from n and p to $a = (n+p)2^{-1/2}$ and $i = (n-p)2^{-1/2}$ the cubic part of eq. (6) which is due to the variation of the nuclear field. One obtains for it the expression

$$\delta_1' a^3 + \delta_2' a^2 i + \delta_3' a i^2 + \delta_4' i^3, \tag{13}$$

with the primed coefficients given by

$$\left.\begin{aligned} \delta_1' &= (\delta_1 + \delta_2 + \delta_3 + \delta_4)2^{-3/2}, \\ \delta_2' &= (3\delta_1 + \delta_2 - \delta_3 - 3\delta_4)2^{-3/2}, \\ \delta_3' &= (3\delta_1 - \delta_2 - \delta_3 + 3\delta_4)2^{-3/2}, \\ \delta_4' &= (\delta_1 - \delta_2 + \delta_3 - \delta_4)2^{-3/2}. \end{aligned}\right\} \tag{14}$$

In order to have a parabolic isobaric section of the nuclear mass surface in a given shell region, the cubic coefficient δ_4' should vanish in this region.

Taking the signs of the coefficients from table 10a one sees that, in light nuclei up to and including the $1f_{7/2}$ shell, δ_4' is the sum of four negative terms and is thus definitely different from zero. On the other hand, in the heavier nuclei with the sign rules (8a) δ_4' does vanish. However, from region 11 onwards, particularly in regions 13 to 16 where the large deformations occur, one has to add to expression (13) the higher-order configuration-interaction symmetric terms from the first line of eq. (6c), and it again becomes impossible to represent isobaric masses by a quadratic function of i.

Thus, to the accuracy achieved by eq. (6), the isobaric parabolic approximation is valid only in a limited central part of the nuclear chart, consisting of regions 8–10 from table 8.

13. Dependence of the Pairing Energies on Nucleon Numbers

Having calculated the local values of the pairing energy terms δ_n, δ_p and δ_{pn} for the purpose of drawing figs. 6 and 7, we also tried to represent them best by equations of the form

$$\delta_n(N) = \alpha N^{-\beta}, \tag{15a}$$

$$\delta_p(Z) = \gamma Z^{-\delta}, \tag{15b}$$

$$\delta_n(A) \quad \text{or} \quad \delta_p(A) = \varepsilon A^{-\eta}, \tag{16}$$

$$\delta_{pn}(A) = \varrho A^{-\sigma}. \tag{17}$$

Table 14 shows the best values of the coefficients and the mean deviation in each case obtained by a least-squares fit of the equations to the experimental local values of the pairing energies*. The values of the coefficients are in qualitative agreement

TABLE 14

Coefficients giving the dependence of the pairing energies expressed in keV on nucleon numbers, eqs. (15)–(17).

Eq.	Coefficient	Number of data	Mean deviation[a)]
(15 a)	$\log_{10} \alpha = 4.643 \pm 0.027$ $\beta = 0.543 \pm 0.015$	332	0.090
(15 b)	$\log_{10} \gamma = 4.627 \pm 0.026$ $\delta = 0.550 \pm 0.016$	253	0.076
(16)	$\log_{10} \varepsilon = 4.780 \pm 0.023$ $\eta = 0.538 \pm 0.011$	585	0.088
(17)	$\log_{10} \varrho = 4.445 \pm 0.094$ $\sigma = 0.866 \pm 0.046$	474	0.317

a) This is the mean deviation from the experimental values, when the energies are expressed in keV, of the logarithms to the base 10 of the pairing terms, calculated from eqs. (15)–(17) with the coefficients of table 14.

with the $A^{-1/2}$ dependence[33, 37–39] of the δ-term and the A^{-1} dependence[33, 40] of the δ_{pn} term in some empirical and semi-empirical mass equations. The δ_n and δ_p coefficients are also essentially in quantitative agreement with the results of KRAVTSOV[41] and of NEIMROVSKY and ADAMCHUK[42].

The monotonously decreasing heavy solid lines in figs. 6 and 7 show** the best lines (15a, b) and (17) as functions of N and Z.

* Actually the logarithms of the pairing energies were fitted, a procedure which assigns a somewhat smaller weight to lighter nuclei, whose pairing energies are somewhat higher. Negative values of δ_{pn} were disregarded in the adjustment process.

** In the lower parts of figs. 6 and 7, the δ_{pn} value drawn at each N- or Z-value, respectively, corresponds to the A-value at which the corresponding group of isotones or isotopes crosses the line of beta stability.

14. Non-Additivity of the Corrections to the Liquid-Drop Mass Equation with Respect to *N* and *Z*

We finally discuss the assumption made sometimes(37, 39, 43, 45) that the deviations of experimental masses from a smooth liquid-drop-type mass formula can be represented as an additive function of N and Z. Let us view eq. (6) which we consider to be a more or less satisfactory representation of the nuclear mass surface as a poly-

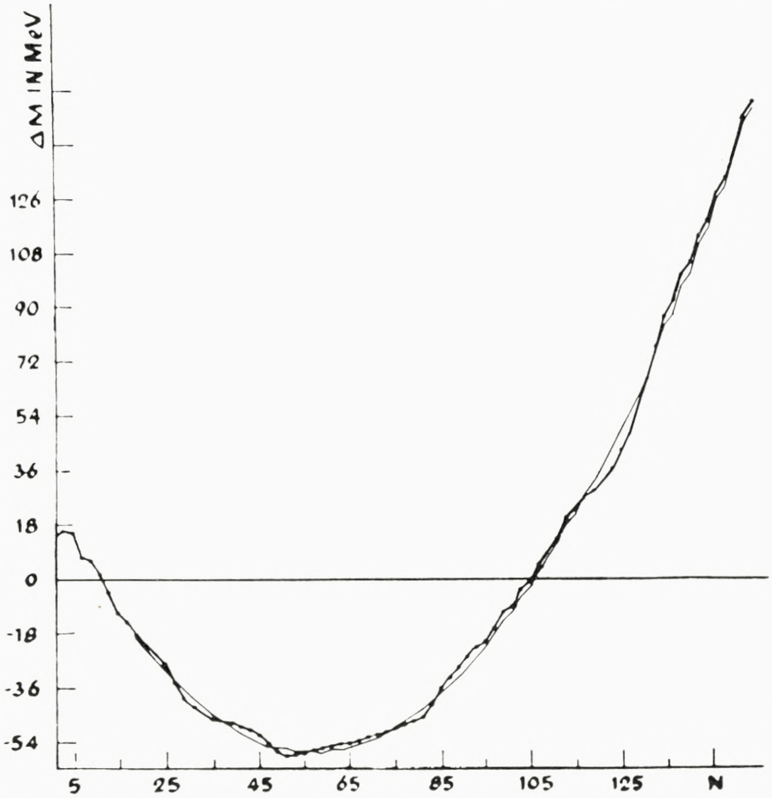


Fig. 15. The liquid-drop model part of Cameron's 1957 mass formula (thin line) running smoothly through the empirical mass defects of odd nuclei (thick line) from which this smooth part was determined (taken from ref. (47)).

nomial expansion in N and Z in a given shell region and apply a similar expansion to the liquid-drop mass equation within the same region. The difference between the two expansions will give us the correction terms.

Fig. 15 shows the relation of the liquid drop part of Cameron's 1957 mass equation(43, 44) to the actual masses along the line of beta stability. From the figure it is obvious that the constant and the linear parts of the expansion will usually differ for the liquid-drop equation and for the actual mass surface. In order to test the quadratic terms, we calculated the second differences Δ_{nn}, Δ_{np} and Δ_{pp} for the liquid-drop part of Cameron's 1957 mass equation and plotted them on the graphs of these experimental second mass differences (solid monotonously decreasing lines in figs. 4 and 5). From the figures it is obvious that the liquid-drop-model Δ_{nn} and Δ_{pp} differ considerably from the experimental values, and this shows that correction terms including n^2 and p^2 will be needed. Smaller differences also exist between the Δ_{np} values, and this indicates that a mixed *np* quadratic correction term will be needed as well. Further examination of the figures will convince one that, in fact, the complete expression (6) is needed if one wants to achieve agreement of the same quality as achieved by eq. (6) between the corrected liquid-drop equation and the experimental masses.

The purely neutronic and protonic parts of eq. (6), which are responsible for the trends observed in the Δ_{nn} and Δ_{pp} graphs, respectively, can be represented by an additive function of N and Z. However, the mixed terms γ_2, δ_2, δ_3, ε_2, ε_3 and ε_4 which appear in the Δ_{np} graph cannot be written in such a form. Similarly, the neutron-proton pairing interaction is not of this nature. However, its contribution to the nuclear mass is much smaller than that of the mixed cubic and quartic terms.

Let us examine in more detail the nature of the disagreement with experiment, which should still remain after correcting the liquid-drop mass equation by the addition of an additive function of N and Z. Subtracting from the polynomial expansion of the corrected liquid-drop (*cld*) equation our expression (6) which represents the experimental masses (*ex*), one obtains for a given parity type of nuclei the mixed expression

$$\Delta M^{cld} - \Delta M^{ex} = (\gamma_2^{cld} - \gamma_2^{exp})np + (\delta_2^{cld} - \delta_2^{ex})n^2p + (\delta_3^{cld} - \delta_3^{ex})np^2 + \dots \qquad (18)$$

Thus, for constant p the deviations will vary approximately quadratically with n, and *vice versa*. Superimposed on this, the deviations of odd and of even nuclei will be somewhat higher than those of odd-mass nuclei due to the neglect of the negative θ_3 term in the additive-function correction.

Fig. 16 shows such isotopic parabolic deviations between Cameron's 1965 masses[45, 46] and the 1964 mass table. For the lighter Ni and Cu nuclei, Cameron's δ_2 is higher than the experimental values in that region (see lower part* of fig. 4), and the parabolas are curved upwards. In the heavier Ra and Ac region the situation is the opposite, and the parabolas curve downwards. One also notices that the parabolas connecting the odd Cu and Ac nuclei are on the whole somewhat higher than the corresponding odd-Z parabolas, and the even Ni and Ra parabolas are above those of the corresponding odd-N isotopes due to the neglect of the mixed θ_3 correction.

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* Actually, as mentioned above, the thick line in the figure was drawn from Cameron's 1957 mass table. However, the statements in this and the following sentence of the text are valid for Cameron's 1965 masses as well.

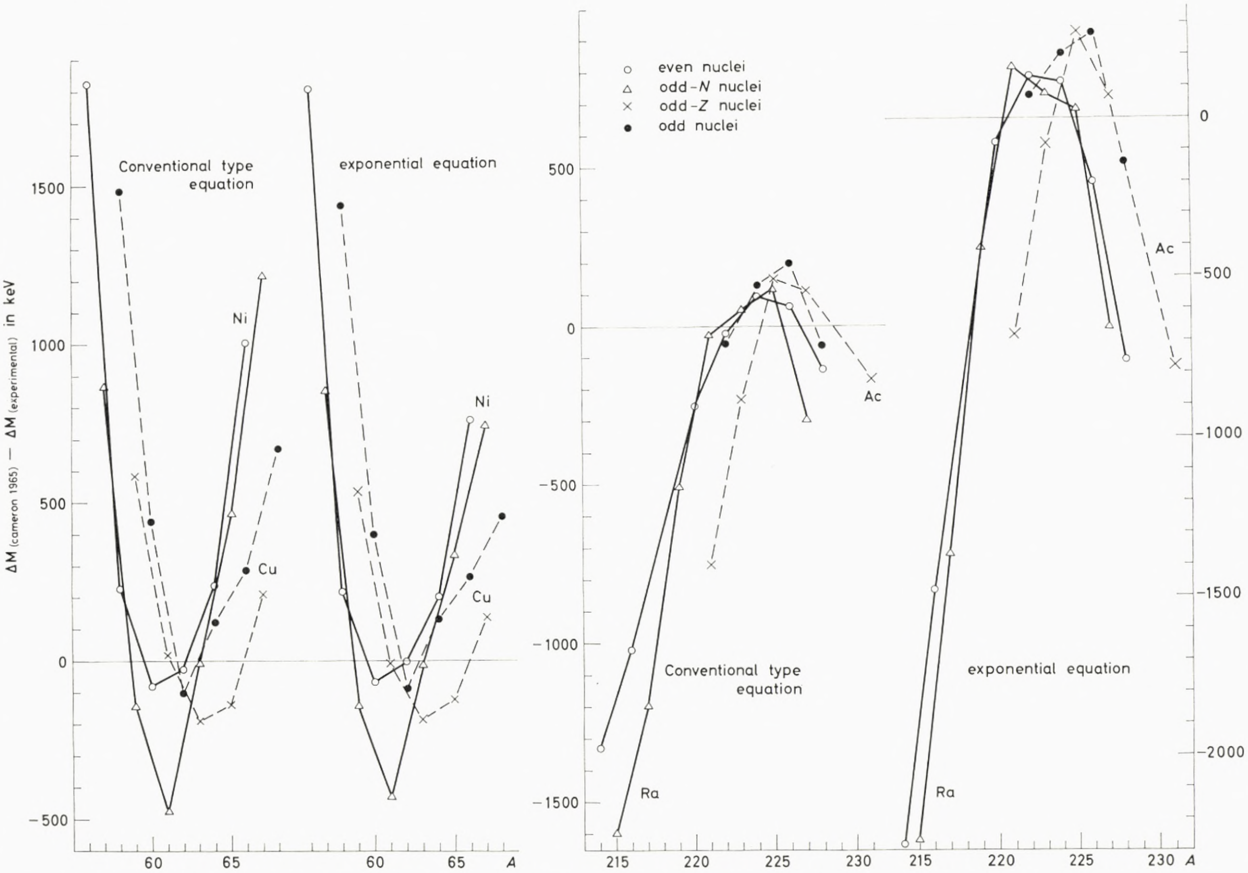

Fig. 16. Left part. The differences between the masses of the Ni and Cu nuclei taken from Cameron's 1965 mass table and the experimental masses. Isotopes of the same parity type are connected by a line. The differences are plotted for both Cameron's conventional type and exponential type equations. Right part. The same for the Ra and Ac nuclei.

carried out on the Philco 2000 electronic digital computer at Ramath-Gan and on the IBM 7040 of the Hebrew University at Jerusalem. We are thankful to Professor Racah for lending us his least-squares code and for some stimulating discussions and to Mr. J. Stein of the Theoretical Physics Department for programming the calculation of the appended mass table. One of us (N. Z.) gratefully acknowledges his indebtedness to Professor A. Bohr and to other members of The Niels Bohr Institute and of NORDITA for the hospitality extended to him at Copenhagen, where the final version of the manuscript of the present work was written, and to the Danish Rask-Ørsted Foundation for a financial support which made his stay in Copenhagen possible.

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APPENDIX:
A TABLE OF CALCULATED MASSES* +

TABLE A

Nuclear masses and their differences calculated for regions 8, 12, and 13 from eq. (6) with the parameters of tables 10, and for the other regions from eq. (10) with the parameters of tables 12.

* As already mentioned in the introduction, this calculation was programmed by Mr. J. STEIN of the Theoretical Physics Department of the Hebrew University.

\+ Boundary masses and separation energies along the boundary in the main body of the table are calculated from the coefficients of the lighter mass region. Values of the same, calculated from the coefficients of the heavier region, are given separately at the end of the table. Mass differences along the boundaries of the shell regions are calculated from the masses as explained in sect. 11.

Z	N		A	ΔM	S_n	S_p	Q_α	Q_{β^-}	Q_{β^+}
8	8	O	16	-4.807					
8	9	O	17	-0.653	3.918			-2.746	
8	10	O	18	-0.847	8.265			-1.684	
8	11	O	19	3.515	3.709			5.460	
8	12	O	20	3.803	7.783			3.897	
8	13	O	21	4.802	7.072			4.923	
8	14	O	22	2.000	10.874			3.392	
8	15	O	23	7.253	2.818			6.833	
8	16	O	24	11.958	3.366			7.482	
8	17	O	25	18.977	1.053			11.317	
8	18	O	26	25.088	1.960			11.606	
8	19	O	27	31.849	1.311			13.778	
8	20	O	28	37.342	2.578			13.708	
9	8	F	17	2.093		0.389			2.746
9	9	F	18	0.836	9.328	5.799		-4.543	1.684
9	10	F	19	-1.944	10.852	8.386		-3.287	-5.460
9	11	F	20	-0.094	6.221	10.898		6.534	-3.897
9	12	F	21	-0.121	8.098	11.213		5.389	-4.923
9	13	F	22	-1.391	9.342	13.483		6.660	-3.392
9	14	F	23	0.420	6.260	8.869		5.770	-6.833
9	15	F	24	4.477	4.015	10.065		10.512	-7.482
9	16	F	25	7.660	4.889	11.588		10.262	-11.317
9	17	F	26	13.482	2.249	12.784		13.851	-11.606
9	18	F	27	18.071	3.483	14.307		13.241	-13.778
9	19	F	28	23.635	2.507	15.503		15.167	-13.708
9	20	F	29	27.606	4.100	17.025		14.197	
10	8	NE	18	5.380		4.002			4.543
10	9	NE	19	1.342	12.109	6.783		-18.912	3.287
10	10	NE	20	-6.628	16.042	11.973	-4.246	-13.512	-6.534
10	11	NE	21	-5.510	6.953	12.705	-7.282	-3.522	-5.389
10	12	NE	22	-8.052	10.613	15.220	-9.629	-3.010	-6.660
10	13	NE	23	-5.350	5.370	11.248	-11.290	4.020	-5.770
10	14	NE	24	-6.035	8.757	13.744	-12.263	2.301	-10.512
10	15	NE	25	-2.602	4.638	14.368	-9.829	6.434	-10.262
10	16	NE	26	-0.369	5.838	15.318	-4.794	6.430	-13.851
10	17	NE	27	4.829	2.873	15.941	-4.849	10.918	-13.241
10	18	NE	28	8.468	4.432	16.891	-5.915	10.555	-15.167
10	19	NE	29	13.409	3.131	17.515	-7.993	13.379	-14.197
10	20	NE	30	16.430	5.050	18.465	-11.083	12.656	
11	8	NA	19	20.254		-7.586			18.912
11	9	NA	20	6.884	21.442	1.748		-25.273	13.512
11	10	NA	21	-1.988	16.943	2.649	-6.506	-19.903	3.522
11	11	NA	22	-5.042	11.126	6.821	-8.303	-4.749	3.010
11	12	NA	23	-9.370	12.399	8.607	-9.850	-4.043	-4.020
11	13	NA	24	-8.336	7.038	10.275	-10.667	5.718	-2.301
11	14	NA	25	-9.036	8.771	10.290	-11.340	4.417	-6.434
11	15	NA	26	-6.799	5.835	11.486	-7.833	9.472	-6.430
11	16	NA	27	-6.089	7.361	13.008	-8.933	8.569	-10.918
11	17	NA	28	-2.086	4.069	14.205	-8.988	12.811	-10.555
11	18	NA	29	0.030	5.955	15.727	-10.054	11.549	-13.379
11	19	NA	30	3.774	4.327	16.923	-12.132	14.126	-12.656
11	20	NA	31	5.273	6.572	18.446	-15.222	12.505	
12	8	MG	20	32.157		-4.613			25.273
12	9	MG	21	17.915	22.313	-3.742		-40.663	19.903
12	10	MG	22	-0.293	26.280	5.594	-8.098	-28.717	4.749
12	11	MG	23	-5.327	13.105	7.574	-9.094	-18.984	4.043

Z	N		A	ΔM	S_n	S_p	Q_α	Q_{β^-}	Q_{β^+}
12	12	MG	24	-14.054	16.799	11.973	-9.851	-14.188	-5.718
12	13	MG	25	-13.453	7.470	12.406	-10.367	-4.258	-4.417
12	14	MG	26	-16.271	10.890	14.524	-10.644	-3.956	-9.472
12	15	MG	27	-14.658	6.458	15.148	-11.733	2.462	-8.569
12	16	MG	28	-14.897	8.311	16.097	-11.286	1.806	-12.811
12	17	MG	29	-11.519	4.693	16.721	-11.341	6.946	-11.549
12	18	MG	30	-10.352	6.905	17.671	-12.407	5.931	-14.126
12	19	MG	31	-7.231	4.951	18.295	-14.485	9.407	-12.505
12	20	MG	32	-6.682	7.522	19.244	-17.575	8.032	
13	8	AL	21	58.578		-19.133			40.663
13	9	AL	22	28.424	38.226	-3.220		-54.245	28.717
13	10	AL	23	13.657	22.838	-6.661	-9.022	-42.552	18.984
13	11	AL	24	0.133	21.595	1.828	-9.175	-25.169	14.188
13	12	AL	25	-9.195	17.399	2.429	-9.631	-20.402	4.258
13	13	AL	26	-12.315	11.192	6.152	-9.698	-5.255	3.956
13	14	AL	27	-17.120	12.876	8.138	-10.175	-4.759	-2.462
13	15	AL	28	-16.703	7.655	9.334	-10.792	4.859	-1.806
13	16	AL	29	-18.465	9.833	10.857	-11.854	3.305	-6.946
13	17	AL	30	-16.283	5.889	12.053	-11.908	8.198	-5.931
13	18	AL	31	-16.638	8.427	13.575	-12.974	6.284	-9.407
13	19	AL	32	-14.714	6.147	14.772	-15.052	9.514	-8.032
13	20	AL	33	-15.687	9.045	16.294	-18.142	7.240	
14	8	SI	22	82.669		-16.801			54.245
14	9	SI	23	56.209	34.531	-20.496		-32.480	42.552
14	10	SI	24	25.302	38.978	-4.356	-9.279	-37.203	25.169
14	11	SI	25	11.208	22.166	-3.785	-9.132	-19.636	20.402
14	12	SI	26	-7.060	26.339	5.155	-9.192	-24.085	5.255
14	13	SI	27	-12.361	13.372	7.335	-9.459	-10.364	4.759
14	14	SI	28	-21.562	17.273	11.731	-9.933	-14.540	-4.859
14	15	SI	29	-21.769	8.278	12.355	-10.742	-4.792	-3.305
14	16	SI	30	-24.481	10.783	13.305	-10.635	-4.399	-8.198
14	17	SI	31	-22.922	6.513	13.929	-10.689	1.427	-6.284
14	18	SI	32	-24.228	9.377	14.878	-11.755	0.272	-9.514
14	19	SI	33	-22.927	6.771	15.502	-13.833	3.320	-7.240
14	20	SI	34	-24.850	9.994	16.452	-16.923	0.765	
14	21	SI	35	-18.957	2.178		-14.151	8.055	
14	22	SI	36	-16.673	5.787		-12.415	6.248	
14	23	SI	37	-11.560	2.959			9.523	
14	24	SI	38	-8.600	5.111			8.729	
14	25	SI	39	-3.225	2.697			11.591	
14	26	SI	40	0.411	4.435			11.210	
14	27	SI	41	6.049	2.434			13.658	
14	28	SI	42	10.361	3.759			13.692	
15	12	P	27	-1.997	27.094	2.226	-18.078	-21.622	10.364
15	13	P	28	-7.022	13.097	1.950	-9.580	-7.350	14.540
15	14	P	29	-16.978	18.027	2.704	-10.208	-13.034	4.792
15	15	P	30	-20.082	11.175	5.601	-10.191	-5.907	4.399
15	16	P	31	-24.349	12.339	7.157	-9.654	-5.279	-1.427
15	17	P	32	-24.500	8.222	8.867	-10.222	1.399	-0.272
15	18	P	33	-26.247	9.818	9.308	-10.207	0.407	-3.320
15	19	P	34	-25.615	7.439	9.977	-11.757	4.233	-0.765
15	20	P	35	-27.012	9.468	9.451	-12.798	1.767	-8.055
15	21	P	36	-22.921	3.980	11.252	-10.631	7.561	-6.248
15	22	P	37	-21.084	6.234	11.700	-7.821	6.146	-9.523
15	23	P	38	-17.329	4.317	13.058		9.628	-8.729
15	24	P	39	-14.816	5.558	13.505		8.627	-11.591
15	25	P	40	-10.799	4.054	14.863		11.696	-11.210
15	26	P	41	-7.610	4.882	15.310		11.109	-13.658

Z	N		A	ΔM	S_n	S_p	Q_α	Q_{β^-}	Q_{β^+}
15	27	P	42	-3.331	3.792	16.668		13.764	-13.692
15	28	P	43	0.535	4.206	17.116		13.590	
16	12	S	28	0.328	27.369	4.964	-27.399	-31.512	7.350
16	13	S	29	-3.944	12.343	4.210	-17.576	-15.732	13.034
16	14	S	30	-14.175	18.302	4.486	-9.539	-21.967	5.907
16	15	S	31	-19.070	12.967	6.278	-9.134	-15.878	5.279
16	16	S	32	-25.899	14.900	8.839	-6.761	-14.019	-1.399
16	17	S	33	-26.654	8.827	9.443	-7.309	-5.497	-0.407
16	18	S	34	-29.848	11.265	10.890	-7.792	-5.332	-4.233
16	19	S	35	-28.779	7.003	10.453	-8.281	0.257	-1.767
16	20	S	36	-30.481	9.774	10.759	-8.679	-1.056	-7.561
16	21	S	37	-27.230	4.820	11.598	-6.727	4.482	-6.146
16	22	S	38	-26.957	7.799	13.163	-4.532	2.860	-9.628
16	23	S	39	-23.443	4.557	13.403	-6.911	6.550	-8.627
16	24	S	40	-22.495	7.123	14.968	-8.247	5.342	-11.696
16	25	S	41	-18.719	4.295	15.209	-9.583	8.617	-11.109
16	26	S	42	-17.094	6.447	16.773	-10.919	7.823	-13.764
16	27	S	43	-13.055	4.033	17.014	-12.255	10.685	-13.590
16	28	S	44	-10.755	5.771	18.578	-13.591	10.304	
17	14	CL	31	-3.193	19.057	-3.693	-3.620	-20.516	15.878
17	15	CL	32	-11.879	16.758	0.098	-7.282	-17.942	14.019
17	16	CL	33	-21.157	17.349	2.547	-6.604	-15.774	5.497
17	17	CL	34	-24.515	11.430	5.150	-6.858	-6.327	5.332
17	18	CL	35	-29.036	12.592	6.477	-7.112	-5.969	-0.257
17	19	CL	36	-29.426	8.461	7.936	-7.351	0.706	1.056
17	20	CL	37	-31.712	10.357	8.519	-7.890	-0.583	-4.482
17	21	CL	38	-29.818	6.177	9.877	-6.628	5.067	-2.860
17	22	CL	39	-29.993	8.247	10.325	-5.406	3.238	-6.550
17	23	CL	40	-27.837	5.915	11.682	-7.341	7.134	-5.342
17	24	CL	41	-27.336	7.570	12.130	-8.677	5.719	-8.617
17	25	CL	42	-24.917	5.653	13.487	-10.013	9.202	-7.823
17	26	CL	43	-23.740	6.894	13.935	-11.349	8.201	-10.685
17	27	CL	44	-21.059	5.390	15.293	-12.685	11.269	-10.304
17	28	CL	45	-19.206	6.218	15.740	-14.021	10.682	
18	14	AR	32	6.062	19.332	-1.966	3.310	-31.417	17.942
18	15	AR	33	-5.383	19.517	0.793	-3.864	-30.848	15.774
18	16	AR	34	-18.188	20.877	4.320	-6.439	-27.377	6.327
18	17	AR	35	-23.067	12.950	5.840	-6.421	-15.960	5.969
18	18	AR	36	-30.132	15.137	8.385	-6.658	-14.108	-0.706
18	19	AR	37	-31.128	9.068	8.992	-6.899	-6.193	0.583
18	20	AR	38	-34.884	11.827	10.462	-7.462	-6.154	-5.067
18	21	AR	39	-33.231	6.418	10.702	-6.877	0.493	-3.238
18	22	AR	40	-34.971	9.811	12.267	-6.914	-1.542	-7.134
18	23	AR	41	-33.055	6.156	12.507	-8.250	2.561	-5.719
18	24	AR	42	-34.119	9.135	14.072	-9.586	0.939	-9.202
18	25	AR	43	-31.941	5.893	14.313	-10.922	4.628	-8.201
18	26	AR	44	-32.328	8.459	15.877	-12.258	3.421	-11.269
18	27	AR	45	-29.888	5.631	16.118	-13.594	6.696	-10.682
18	28	AR	46	-29.599	7.783	17.682	-14.930	5.902	
19	14	K	33	25.465	20.086	-12.114	11.252	-30.021	30.848
19	15	K	34	9.189	24.347	-7.283	-1.028	-34.006	27.377
19	16	K	35	-7.106	24.367	-3.793	-6.338	-30.154	15.960
19	17	K	36	-16.025	16.990	0.247	-6.570	-17.543	14.108
19	18	K	37	-24.935	16.982	2.092	-6.203	-15.614	6.193
19	19	K	38	-28.731	11.867	4.891	-6.640	-6.624	6.154
19	20	K	39	-33.724	13.065	6.129	-7.113	-6.473	-0.493
19	21	K	40	-33.429	7.776	7.487	-6.428	1.557	1.542

Z	N		A	ΔM	S_n	S_p	Q_α	Q_{β^-}	Q_{β^+}
19	22	K	41	-35.616	10.259	7.934	-6.329	-0.685	-2.561
19	23	K	42	-35.058	7.513	9.292	-7.665	3.625	-0.939
19	24	K	43	-36.569	9.583	9.739	-9.001	1.796	-4.628
19	25	K	44	-35.749	7.251	11.097	-10.337	5.692	-3.421
19	26	K	45	-36.584	8.906	11.545	-11.673	4.278	-6.696
19	27	K	46	-35.501	6.989	12.902	-13.009	7.760	-5.902
19	28	K	47	-35.660	8.230	13.350	-14.345	6.759	
20	14	CA	34	43.195	20.362	-10.441	20.206		34.006
20	15	CA	35	23.047	28.219	-6.569	3.300	-30.365	30.154
20	16	CA	36	1.518	29.601	-1.335	-6.969	-31.349	17.543
20	17	CA	37	-9.321	18.911	0.586	-6.363	-21.125	15.614
20	18	CA	38	-22.107	20.857	4.460	-6.343	-21.680	6.624
20	19	CA	39	-27.252	13.216	5.810	-6.610	-13.433	6.473
20	20	CA	40	-34.986	15.806	8.551	-7.279	-14.631	-1.557
20	21	CA	41	-34.931	8.016	8.791	-6.227	-6.235	0.685
20	22	CA	42	-38.683	11.823	10.356	-6.223	-6.739	-3.625
20	23	CA	43	-38.366	7.754	10.596	-7.559	-2.174	-1.796
20	24	CA	44	-41.441	11.147	12.161	-8.895	-3.484	-5.692
20	25	CA	45	-40.862	7.492	12.402	-10.231	0.201	-4.278
20	26	CA	46	-43.261	10.471	13.966	-11.567	-1.461	-7.760
20	27	CA	47	-42.419	7.229	14.207	-12.903	1.800	-6.759
20	28	CA	48	-44.143	9.795	15.771	-14.239	0.242	
20	29	CA	49	-41.206	5.003		-13.742	5.353	
20	30	CA	50	-39.926	6.791		-12.751	4.636	
20	31	CA	51	-35.041	3.187			8.757	
20	32	CA	52	-32.228	5.259			7.826	
20	33	CA	53	-25.678	1.521			12.150	
20	34	CA	54	-21.434	3.827			11.054	
20	35	CA	55	-13.367	0.005			15.532	
21	18	SC	39	-13.819	21.464	-0.999	-9.138	-19.887	13.433
21	19	SC	40	-20.355	14.607	0.392	-6.755	-11.498	14.631
21	20	SC	41	-28.696	16.413	0.999	-6.185	-13.222	6.235
21	21	SC	42	-31.944	11.319	4.302	-5.638	-6.597	6.739
21	22	SC	43	-36.192	12.319	4.798	-4.892	-6.473	2.174
21	23	SC	44	-37.957	9.837	6.880	-6.953	-0.817	3.484
21	24	SC	45	-41.063	11.177	6.910	-7.871	-1.929	-0.201
21	25	SC	46	-41.800	8.809	8.228	-9.167	2.417	1.461
21	26	SC	47	-44.219	10.490	8.247	-10.075	0.523	-1.800
21	27	SC	48	-44.384	8.237	9.254	-11.060	4.015	-0.242
21	28	SC	49	-46.572	10.259	9.718	-12.413	1.795	-5.353
21	29	SC	50	-44.561	6.073	10.645	-11.485	6.741	-4.636
21	30	SC	51	-43.798	7.308	11.162	-10.563	5.953	-8.757
21	31	SC	52	-40.054	4.327	12.302		10.004	-7.826
21	32	SC	53	-37.828	5.845	12.889		9.003	-12.150
21	33	SC	54	-32.488	2.731	14.099		13.258	-11.054
21	34	SC	55	-28.900	4.483	14.755		12.093	-15.532
21	35	SC	56	-22.113	1.285	16.035		16.501	-14.322
21	36	SC	57	-17.263	3.222	16.761		15.221	-18.905
22	18	TI	40	-8.857	22.996	2.327	-12.800	-28.639	11.498
22	19	TI	41	-15.474	14.688	2.408	-8.577	-19.724	13.222
22	20	TI	42	-25.347	17.944	3.940	-5.664	-21.590	6.597
22	21	TI	43	-29.719	12.444	5.064	-4.892	-15.482	6.473
22	22	TI	44	-37.140	15.492	8.237	-4.579	-13.866	0.817
22	23	TI	45	-39.133	10.065	8.466	-6.627	-7.310	1.929
22	24	TI	46	-44.217	13.155	10.443	-7.959	-7.361	-2.417
22	25	TI	47	-44.743	8.597	10.231	-8.802	-2.544	-0.523
22	26	TI	48	-48.399	11.728	11.469	-9.383	-3.806	-4.015
22	27	TI	49	-48.367	8.039	11.271	-9.930	-0.275	-1.795

Z	N		A	ΔM	S_n	S_p	Q_α	Q_{β^-}	Q_{β^+}
22	28	TI	50	-51.507	11.212	12.224	-10.671	-2.293	-6.741
22	29	TI	51	-49.751	6.520	12.479	-9.756	2.411	-5.953
22	30	TI	52	-50.059	8.379	13.549	-8.210	1.553	-10.004
22	31	TI	53	-46.831	4.844	14.066	-8.051	5.535	-9.003
22	32	TI	54	-45.746	6.986	15.207	-8.245	4.465	-13.258
22	33	TI	55	-40.992	3.318	15.793	-8.376	8.650	-12.093
22	34	TI	56	-38.614	5.693	17.004	-8.810	7.415	-16.501
22	35	TI	57	-32.484	1.941	17.660	-9.230	11.753	-15.221
22	36	TI	58	-28.914	4.501	18.940	-9.905	10.403	-19.734
22	37	TI	59	-21.556	0.714	19.665	-10.614	14.847	-18.387
23	20	V	43	-14.237	18.551	-3.821	-2.842	-21.965	15.482
23	21	V	44	-23.274	17.109	0.844	-5.344	-18.991	13.866
23	22	V	45	-31.823	16.621	1.972	-5.552	-16.316	7.310
23	23	V	46	-36.857	13.105	5.012	-7.337	-8.240	7.361
23	24	V	47	-42.198	13.413	5.270	-8.431	-7.662	2.544
23	25	V	48	-44.593	10.466	7.139	-9.061	-1.755	3.806
23	26	V	49	-48.092	11.571	6.982	-9.454	-2.818	0.275
23	27	V	50	-49.214	9.194	8.136	-9.839	1.374	2.293
23	28	V	51	-52.236	11.094	8.018	-10.442	-0.876	-2.411
23	29	V	52	-51.612	7.521	9.150	-9.652	3.805	-1.553
23	30	V	53	-52.367	8.826	9.597	-8.233	2.878	-5.535
23	31	V	54	-50.211	5.915	10.668	-8.074	6.790	-4.465
23	32	V	55	-49.642	7.503	11.185	-8.269	5.650	-8.650
23	33	V	56	-46.029	4.458	12.325	-8.399	9.765	-7.415
23	34	V	57	-44.237	6.280	12.912	-8.834	8.460	-11.753
23	35	V	58	-39.317	3.151	14.122	-9.254	12.729	-10.403
23	36	V	59	-36.403	5.158	14.778	-9.928	11.309	-14.847
23	37	V	60	-30.325	1.994	16.058	-10.637	15.683	-13.430
23	38	V	61	-26.390	4.136	16.784	-11.552	14.197	-17.930
24	20	CR	44	-4.283	20.083	-2.665	2.149	-32.117	18.991
24	21	CR	45	-15.507	19.295	-0.478	-2.458	-30.722	16.316
24	22	CR	46	-28.617	21.181	4.083	-5.695	-26.126	8.240
24	23	CR	47	-34.536	13.991	4.969	-7.242	-16.719	7.662
24	24	CR	48	-42.838	16.373	7.929	-8.123	-14.650	1.755
24	25	CR	49	-45.274	10.507	7.970	-8.565	-7.843	2.818
24	26	CR	50	-50.588	13.386	9.785	-8.796	-7.845	-1.374
24	27	CR	51	-51.361	8.844	9.436	-9.043	-3.182	0.876
24	28	CR	52	-55.509	12.219	10.561	-9.534	-4.800	-3.805
24	29	CR	53	-55.245	7.899	10.921	-9.303	-0.518	-2.878
24	30	CR	54	-57.001	9.827	11.923	-8.124	-1.515	-6.790
24	31	CR	55	-55.291	6.362	12.370	-7.965	2.328	-5.650
24	32	CR	56	-55.793	8.573	13.441	-8.160	1.118	-9.765
24	33	CR	57	-52.697	4.975	13.957	-8.291	5.163	-8.460
24	34	CR	58	-52.046	7.420	15.098	-8.725	3.789	-12.729
24	35	CR	59	-47.712	3.738	15.684	-9.145	7.989	-11.309
24	36	CR	60	-46.009	6.368	16.895	-9.819	6.499	-15.683
24	37	CR	61	-40.587	2.650	17.551	-10.528	10.803	-14.197
24	38	CR	62	-37.932	5.416	18.831	-11.443	9.248	-18.627
24	39	CR	63	-31.572	1.712	19.557	-12.441	13.608	-17.124
25	20	MN	45	15.215	20.690	-12.209	8.540	-34.276	30.722
25	21	MN	46	-2.491	25.777	-5.727	-1.159	-37.832	26.126
25	22	MN	47	-17.817	23.397	-3.511	-6.005	-31.747	16.719
25	23	MN	48	-28.188	18.443	0.941	-7.339	-20.390	14.650
25	24	MN	49	-37.431	17.314	1.882	-8.032	-17.262	7.843
25	25	MN	50	-42.744	13.384	4.759	-8.312	-8.934	7.845
25	26	MN	51	-48.179	13.506	4.879	-8.405	-8.308	3.182
25	27	MN	52	-50.709	10.601	6.637	-8.540	-2.555	4.800
25	28	MN	53	-54.612	11.975	6.392	-8.944	-3.974	0.518

Z	N		A	ΔM	S_n	S_p	Q_α	Q_{β^-}	Q_{β^+}
25	29	MN	54	-55.486	8.830	7.530	-8.696	0.883	1.515
25	30	MN	55	-57.619	10.205	7.908	-7.882	-0.183	-2.328
25	31	MN	56	-56.911	7.363	8.909	-7.724	3.590	-1.118
25	32	MN	57	-57.861	9.021	9.356	-7.919	2.310	-5.163
25	33	MN	58	-55.835	6.046	10.427	-8.049	6.286	-3.789
25	34	MN	59	-55.701	7.937	10.944	-8.484	4.842	-7.989
25	35	MN	60	-52.508	4.878	12.084	-8.904	8.971	-6.499
25	36	MN	61	-51.391	6.954	12.671	-9.578	7.412	-10.803
25	37	MN	62	-47.179	3.860	13.881	-10.287	11.647	-9.248
25	38	MN	63	-45.180	6.072	14.537	-11.202	10.021	-13.608
25	39	MN	64	-40.100	2.992	15.817	-12.199	14.312	-12.035
25	40	MN	65	-37.319	5.291	16.543	-13.354	12.669	-16.402
25	41	MN	66	-31.520	2.273	17.892	-14.641	16.967	-14.861
26	20	FE	46	35.341	22.222	-12.837	17.099	-46.212	37.832
26	21	FE	47	13.930	29.482	-9.132	3.777	-52.865	31.747
26	22	FE	48	-7.798	29.800	-2.730	-5.940	-44.429	20.390
26	23	FE	49	-20.169	20.442	-0.730	-7.087	-31.312	17.262
26	24	FE	50	-33.809	21.712	3.667	-7.617	-26.262	8.934
26	25	FE	51	-39.871	14.133	4.416	-7.759	-16.604	8.308
26	26	FE	52	-48.154	16.354	7.264	-7.740	-14.486	2.555
26	27	FE	53	-50.637	10.555	7.218	-7.788	-7.833	3.974
26	28	FE	54	-56.294	13.728	8.971	-8.130	-8.191	-0.883
26	29	FE	55	-57.436	9.138	9.239	-8.500	-3.432	0.183
26	30	FE	56	-60.501	11.136	10.171	-7.509	-4.569	-3.590
26	31	FE	57	-60.170	7.741	10.548	-7.351	-0.865	-2.310
26	32	FE	58	-62.121	10.022	11.549	-7.545	-2.215	-6.286
26	33	FE	59	-60.543	6.493	11.996	-7.676	1.691	-4.842
26	34	FE	60	-61.479	9.008	13.067	-8.110	0.178	-8.971
26	35	FE	61	-58.803	5.395	13.584	-8.530	4.238	-7.412
26	36	FE	62	-58.826	8.095	14.725	-9.205	2.609	-11.647
26	37	FE	63	-55.201	4.447	15.311	-9.914	6.774	-10.021
26	38	FE	64	-54.412	7.282	16.521	-10.828	5.079	-14.312
26	39	FE	65	-49.989	3.648	17.177	-11.826	9.300	-12.669
26	40	FE	66	-48.488	6.570	18.457	-12.981	7.587	-16.967
26	41	FE	67	-43.415	2.999	19.183	-14.267	11.815	-15.356
26	42	FE	68	-41.303	5.959	20.533	-15.662	10.134	-19.612
27	20	CO	47	66.795	22.829	-24.165	27.058	-50.155	52.865
27	21	CO	48	36.630	38.236	-15.411	6.372	-64.031	44.429
27	22	CO	49	11.143	33.559	-11.652	-6.497	-53.676	31.312
27	23	CO	50	-7.547	26.761	-5.333	-7.481	-38.179	26.262
27	24	CO	51	-23.266	23.791	-3.254	-7.874	-31.641	16.604
27	25	CO	52	-33.668	18.473	1.086	-7.904	-20.032	14.486
27	26	CO	53	-42.804	17.208	1.940	-7.798	-16.856	7.833
27	27	CO	54	-48.103	13.370	4.755	-7.784	-8.682	8.191
27	28	CO	55	-53.844	13.812	4.839	-8.090	-8.411	3.432
27	29	CO	56	-55.932	9.999	5.785	-7.649	-2.028	4.569
27	30	CO	57	-59.305	11.444	6.093	-7.003	-3.230	0.865
27	31	CO	58	-59.906	8.672	7.025	-6.845	0.403	2.215
27	32	CO	59	-62.234	10.399	7.402	-7.039	-1.016	-1.691
27	33	CO	60	-61.657	7.494	8.403	-7.170	2.821	-0.178
27	34	CO	61	-63.041	9.455	8.851	-7.605	1.237	-4.238
27	35	CO	62	-61.435	6.466	9.921	-8.025	5.228	-2.609
27	36	CO	63	-61.975	8.612	10.438	-8.699	3.529	-6.774
27	37	CO	64	-59.491	5.587	11.579	-9.408	7.625	-5.079
27	38	CO	65	-59.288	7.869	12.165	-10.323	5.860	-9.300
27	39	CO	66	-56.075	4.858	13.375	-11.320	10.011	-7.587
27	40	CO	67	-55.230	7.227	14.032	-12.475	8.229	-11.815
27	41	CO	68	-51.437	4.278	15.311	-13.762	12.387	-10.134
27	42	CO	69	-50.051	6.685	16.037	-15.156	10.637	-14.321

Z	N		A	ΔM	S_n	S_p	Q_α	Q_{β^-}	Q_{β^+}
27	43	CO	70	-45.828	3.848	17.387	-16.732	14.753	-12.720
28	20	NI	48	100.661	24.361	-26.577	39.186		64.031
28	21	NI	49	64.819	43.914	-20.900	12.903		53.676
28	22	NI	50	30.631	42.259	-12.200	-7.134		38.179
28	23	NI	51	8.374	30.329	-8.632	-7.981		31.641
28	24	NI	52	-13.635	30.081	-2.342	-8.262		20.032
28	25	NI	53	-25.949	20.385	-0.430	-8.204		16.856
28	26	NI	54	-39.421	21.544	3.906	-8.037		8.682
28	27	NI	55	-45.432	14.082	4.618	-7.986		8.411
28	28	NI	56	-54.009	16.648	7.455	-8.280		2.028
28	29	NI	57	-56.075	10.242	7.432	-7.862	-7.020	3.230
28	30	NI	58	-60.310	12.306	8.293	-6.366	-8.345	-0.403
28	31	NI	59	-61.218	8.980	8.601	-6.207	-4.575	1.016
28	32	NI	60	-64.478	11.331	9.533	-6.402	-6.115	-2.821
28	33	NI	61	-64.278	7.872	9.910	-6.532	-2.248	-1.237
28	34	NI	62	-66.663	10.456	10.911	-6.967	-3.966	-5.228
28	35	NI	63	-65.505	6.913	11.359	-7.387	-0.038	-3.529
28	36	NI	64	-67.116	9.682	12.429	-8.061	-1.897	-7.625
28	37	NI	65	-65.148	6.104	12.946	-8.770	2.055	-5.860
28	38	NI	66	-66.086	9.009	14.087	-9.685	0.091	-10.011
28	39	NI	67	-63.459	5.444	14.673	-10.683	4.030	-8.229
28	40	NI	68	-63.825	8.437	15.883	-11.837	1.997	-12.387
28	41	NI	69	-60.688	4.935	16.540	-13.124	5.886	-10.637
28	42	NI	70	-60.581	7.965	17.819	-14.519	3.823	-14.753
28	43	NI	71	-57.084	4.574	18.545	-16.094	7.626	-13.083
28	44	NI	72	-56.607	7.594	19.895	-17.729	5.569	-17.109
29	28	CU	57	-48.878		2.275	-8.498		7.020
29	29	CU	58	-51.890	11.084	3.281	-6.212	-6.412	8.345
29	30	CU	59	-56.505	12.687	3.559	-5.086	-7.748	4.575
29	31	CU	60	-58.348	9.915	4.557	-4.841	-3.990	6.115
29	32	CU	61	-62.001	11.724	4.827	-5.120	-5.541	2.248
29	33	CU	62	-62.775	8.846	5.815	-5.294	-1.685	3.966
29	34	CU	63	-65.528	10.825	6.076	-5.719	-3.414	0.038
29	35	CU	64	-65.334	7.877	7.057	-6.101	0.502	1.897
29	36	CU	65	-67.251	9.989	7.309	-6.635	-1.369	-2.055
29	37	CU	66	-66.188	7.008	8.281	-7.177	2.572	-0.091
29	38	CU	67	-67.332	9.216	8.524	-7.781	0.596	-4.030
29	39	CU	68	-65.500	6.240	9.487	-8.434	4.524	-1.997
29	40	CU	69	-65.935	8.507	9.721	-9.072	2.480	-5.886
29	41	CU	70	-63.435	5.571	10.675	-9.785	6.358	-3.823
29	42	CU	71	-63.224	7.861	10.901	-10.419	4.283	-7.626
29	43	CU	72	-60.156	5.003	11.847	-11.143	8.074	-5.569
29	44	CU	73	-59.362	7.278	12.064	-11.736	6.005	-9.248
29	45	CU	74	-55.826	4.535	13.001	-12.422	9.674	-7.233
29	46	CU	75	-54.513	6.759	13.209	-12.937	7.647	-10.753
30	28	ZN	58	-45.478		3.889	-8.481		6.412
30	29	ZN	59	-48.757	11.351	4.156	-5.750	-10.335	7.748
30	30	ZN	60	-54.359	13.673	5.143	-2.892	-11.649	3.990
30	31	ZN	61	-56.460	10.173	5.401	-2.987	-7.870	5.541
30	32	ZN	62	-61.090	12.701	6.378	-3.280	-9.400	1.685
30	33	ZN	63	-62.114	9.095	6.628	-3.459	-5.523	3.414
30	34	ZN	64	-65.836	11.793	7.597	-3.798	-7.231	-0.502
30	35	ZN	65	-65.882	8.118	7.837	-4.058	-3.293	1.369
30	36	ZN	66	-68.759	10.949	8.797	-4.443	-5.143	-2.572
30	37	ZN	67	-67.928	7.240	9.029	-4.787	-1.181	-0.596
30	38	ZN	68	-70.024	10.167	9.981	-5.218	-3.136	-4.524
30	39	ZN	69	-68.415	6.463	10.204	-5.644	0.813	-2.480
30	40	ZN	70	-69.793	9.449	11.147	-6.121	-1.209	-6.358

Z	N		A	ΔM	S_n	S_p	Q_α	Q_{β^-}	Q_{β^+}
30	41	ZN	71	-67.507	5.786	11.361	-6.630	2.690	-4.283
30	42	ZN	72	-68.230	8.794	12.295	-7.152	0.636	-8.074
30	43	ZN	73	-65.368	5.209	12.501	-7.744	4.449	-6.005
30	44	ZN	74	-65.499	8.203	13.426	-8.312	2.401	-9.674
30	45	ZN	75	-62.160	4.732	13.623	-8.987	6.091	-7.647
30	46	ZN	76	-61.763	7.675	14.539	-9.601	4.085	-11.155
30	47	ZN	77	-58.047	4.355	14.728	-10.358	7.615	-9.207
30	48	ZN	78	-57.186	7.211	15.635	-11.018	5.688	-12.519
31	28	GA	59	-38.422		0.233			10.335
31	29	GA	60	-42.709	12.358	1.241		-8.875	11.649
31	30	GA	61	-48.590	13.952	1.520	-2.137	-10.221	7.870
31	31	GA	62	-51.690	11.172	2.519	-2.225	-6.473	9.400
31	32	GA	63	-56.591	12.972	2.790	-2.511	-8.033	5.523
31	33	GA	64	-58.605	10.085	3.780	-2.681	-4.188	7.231
31	34	GA	65	-62.589	12.055	4.042	-3.013	-5.927	3.293
31	35	GA	66	-63.616	9.099	5.023	-3.266	-2.020	5.143
31	36	GA	67	-66.747	11.202	5.276	-3.643	-3.901	1.181
31	37	GA	68	-66.888	8.213	6.249	-3.979	0.030	3.136
31	38	GA	69	-69.228	10.412	6.494	-4.402	-1.956	-0.813
31	39	GA	70	-68.584	7.427	7.457	-4.821	1.962	1.209
31	40	GA	71	-70.197	9.685	7.693	-5.290	-0.091	-2.690
31	41	GA	72	-68.867	6.741	8.648	-5.791	3.777	-0.636
31	42	GA	73	-69.817	9.022	8.875	-6.306	1.692	-4.449
31	43	GA	74	-67.900	6.155	9.822	-6.890	5.474	-2.401
31	44	GA	75	-68.250	8.421	10.040	-7.451	3.395	-6.091
31	45	GA	76	-65.848	5.669	10.978	-8.117	7.053	-4.085
31	46	GA	77	-65.662	7.885	11.187	-8.724	5.017	-7.615
31	47	GA	78	-62.874	5.284	12.116	-9.473	8.515	-5.688
31	48	GA	79	-62.214	7.411	12.317	-10.126	6.558	-9.021
31	49	GA	80	-59.141	4.999	13.237	-10.958	9.859	-7.210
31	50	GA	81	-58.071	7.001	13.429	-11.656	8.018	-11.635
31	51	GA	82	-53.440	3.441	14.293	-11.198	12.459	-10.882
32	28	GE	60	-33.834		2.700			8.875
32	29	GE	61	-38.369	12.607	2.949		-13.423	10.221
32	30	GE	62	-45.218	14.920	3.917	-2.164	-14.730	6.473
32	31	GE	63	-48.558	11.411	4.156	-2.225	-10.943	8.033
32	32	GE	64	-54.417	13.931	5.115	-2.483	-12.465	4.188
32	33	GE	65	-56.662	10.316	5.346	-2.627	-8.580	5.927
32	34	GE	66	-61.596	13.006	6.296	-2.931	-10.280	2.020
32	35	GE	67	-62.846	9.321	6.519	-3.157	-6.335	3.901
32	36	GE	68	-66.918	12.143	7.460	-3.507	-8.177	-0.030
32	37	GE	69	-67.273	8.426	7.674	-3.815	-4.208	1.956
32	38	GE	70	-70.546	11.344	8.606	-4.211	-6.155	-1.962
32	39	GE	71	-70.106	7.632	8.811	-4.603	-2.198	0.091
32	40	GE	72	-72.643	10.609	9.735	-5.044	-4.213	-3.777
32	41	GE	73	-71.509	6.937	9.931	-5.518	-0.306	-1.692
32	42	GE	74	-73.374	9.937	10.846	-6.006	-2.352	-5.474
32	43	GE	75	-71.645	6.342	11.034	-6.563	1.468	-3.395
32	44	GE	76	-72.902	9.328	11.940	-7.096	-0.572	-7.053
32	45	GE	77	-70.678	5.848	12.119	-7.735	3.125	-5.017
32	46	GE	78	-71.389	8.783	13.017	-8.315	1.127	-8.515
32	47	GE	79	-68.772	5.454	13.186	-9.037	4.664	-6.558
32	48	GE	80	-69.001	8.300	14.076	-9.662	2.745	-9.859
32	49	GE	81	-66.089	5.160	14.237	-10.467	6.086	-8.018
32	50	GE	82	-65.899	7.882	15.117	-11.138	4.283	-12.459
32	51	GE	83	-61.363	3.535	15.212	-10.595	8.820	-11.706
32	52	GE	84	-58.436	5.145	16.068	-8.930	8.068	-14.023
32	53	GE	85	-53.280	2.915	16.156	-9.268	10.385	-13.031

Z	N		A	ΔM	S_n	S_p	Q_α	Q_{β^-}	Q_{β^+}
33	28	AS	61	-24.946		-1.598			13.423
33	29	AS	62	-30.488	13.613	-0.592		-11.365	14.730
33	30	AS	63	-37.615	15.198	-0.314	-1.617	-12.718	10.943
33	31	AS	64	-41.953	12.409	0.684	-1.668	-8.977	12.465
33	32	AS	65	-48.082	14.201	0.954	-1.917	-10.546	8.580
33	33	AS	66	-51.316	11.305	1.943	-2.050	-6.708	10.280
33	34	AS	67	-56.511	13.266	2.204	-2.344	-8.454	6.335
33	35	AS	68	-58.741	10.301	3.184	-2.561	-4.555	8.177
33	36	AS	69	-63.065	12.395	3.436	-2.901	-6.444	4.208
33	37	AS	70	-64.391	9.398	4.407	-3.199	-2.521	6.155
33	38	AS	71	-67.907	11.588	4.651	-3.586	-4.514	2.198
33	39	AS	72	-68.430	8.594	5.613	-3.967	-0.604	4.213
33	40	AS	73	-71.202	10.844	5.848	-4.399	-2.665	0.306
33	41	AS	74	-71.022	7.891	6.802	-4.863	1.196	2.352
33	42	AS	75	-73.113	10.163	7.028	-5.341	-0.897	-1.468
33	43	AS	76	-72.329	7.288	7.973	-5.888	2.877	0.572
33	44	AS	77	-73.803	9.545	8.191	-6.411	0.791	-3.125
33	45	AS	78	-72.516	6.785	9.127	-7.041	4.442	-1.127
33	46	AS	79	-73.436	8.991	9.336	-7.610	2.397	-4.664
33	47	AS	80	-71.746	6.382	10.263	-8.322	5.888	-2.745
33	48	AS	81	-72.175	8.500	10.463	-8.938	3.923	-6.086
33	49	AS	82	-70.182	6.079	11.382	-9.733	7.217	-4.283
33	50	AS	83	-70.183	8.073	11.573	-10.394	5.368	-8.820
33	51	AS	84	-66.504	4.392	12.430	-9.787	9.913	-8.068
33	52	AS	85	-63.665	5.232	12.517	-8.018	9.160	-10.385
33	53	AS	86	-59.358	3.765	13.367	-8.342	11.477	-9.393
33	54	AS	87	-56.124	4.837	13.447	-8.892	10.485	-11.886
33	55	AS	88	-51.238	3.186	14.290	-9.250	12.979	-10.686
34	28	SE	62	-19.123		1.466			11.365
34	29	SE	63	-24.897	13.845	1.698		-16.297	12.718
34	30	SE	64	-32.975	16.150	2.649	-1.566	-17.598	8.977
34	31	SE	65	-37.536	12.632	2.872	-1.592	-13.806	10.546
34	32	SE	66	-44.608	15.143	3.815	-1.815	-15.322	6.708
34	33	SE	67	-48.056	11.520	4.030	-1.924	-11.432	8.454
34	34	SE	68	-54.185	14.200	4.964	-2.193	-13.127	4.555
34	35	SE	69	-56.621	10.507	5.169	-2.384	-9.177	6.444
34	36	SE	70	-61.870	13.321	6.095	-2.699	-11.013	2.521
34	37	SE	71	-63.394	9.595	6.292	-2.972	-7.038	4.514
34	38	SE	72	-67.826	12.504	7.208	-3.333	-8.980	0.604
34	39	SE	73	-68.538	8.783	7.396	-3.690	-5.018	2.665
34	40	SE	74	-72.218	11.751	8.304	-4.097	-7.027	-1.196
34	41	SE	75	-72.217	8.070	8.484	-4.536	-3.115	0.897
34	42	SE	76	-75.207	11.062	9.383	-4.988	-5.155	-2.877
34	43	SE	77	-74.594	7.459	9.554	-5.510	-1.330	-0.791
34	44	SE	78	-76.958	10.435	10.444	-6.009	-3.364	-4.442
34	45	SE	79	-75.833	6.947	10.606	-6.613	0.338	-2.397
34	46	SE	80	-77.634	9.873	11.487	-7.157	-1.654	-5.888
34	47	SE	81	-76.098	6.535	11.641	-7.844	1.888	-3.923
34	48	SE	82	-77.399	9.373	12.514	-8.435	-0.025	-7.217
34	49	SE	83	-75.551	6.223	12.658	-9.204	3.321	-5.368
34	50	SE	84	-76.417	8.937	13.522	-9.841	1.523	-9.913
34	51	SE	85	-72.825	4.479	13.610	-9.160	6.168	-9.160
34	52	SE	86	-70.835	6.082	14.459	-7.361	5.415	-11.477
34	53	SE	87	-66.609	3.845	14.540	-7.671	7.733	-10.485
34	54	SE	88	-64.217	5.680	15.382	-8.206	6.741	-12.979
34	55	SE	89	-59.405	3.259	15.456	-8.550	9.234	-11.778
34	56	SE	90	-56.629	5.296	16.291	-9.089	8.034	-14.418
34	57	SE	91	-51.280	2.722	16.358	-9.468	10.673	-13.040
35	28	BR	63	-8.600		-3.234			16.297

Z	N		A	ΔM	S_n	S_p	Q_α	Q_{β^-}	Q_{β^+}
35	29	BR	64	-15.377	14.848	-2.231		-13.868	17.598
35	30	BR	65	-23.730	16.425	-1.956	-1.209	-15.226	13.806
35	31	BR	66	-29.286	13.627	-0.961	-1.222	-11.491	15.322
35	32	BR	67	-36.624	15.410	-0.695	-1.434	-13.065	11.432
35	33	BR	68	-41.058	12.505	0.291	-1.530	-9.232	13.127
35	34	BR	69	-47.444	14.458	0.548	-1.787	-10.984	9.177
35	35	BR	70	-50.857	11.484	1.525	-1.966	-7.091	11.013
35	36	BR	71	-56.355	13.570	1.774	-2.269	-8.984	7.038
35	37	BR	72	-58.847	10.563	2.742	-2.531	-5.067	8.980
35	38	BR	73	-63.520	12.744	2.982	-2.880	-7.065	5.018
35	39	BR	74	-65.190	9.742	3.942	-3.224	-3.161	7.027
35	40	BR	75	-69.102	11.983	4.173	-3.619	-5.227	3.115
35	41	BR	76	-70.052	9.021	5.124	-4.046	-1.372	5.155
35	42	BR	77	-73.264	11.284	5.347	-4.487	-3.470	1.330
35	43	BR	78	-73.593	8.400	6.289	-4.996	0.299	3.364
35	44	BR	79	-76.171	10.649	6.502	-5.483	-1.794	-0.338
35	45	BR	80	-75.980	7.880	7.436	-6.075	1.852	1.654
35	46	BR	81	-77.986	10.078	7.641	-6.608	-0.198	-1.888
35	47	BR	82	-77.374	7.459	8.565	-7.283	3.288	0.025
35	48	BR	83	-78.872	9.569	8.762	-7.861	1.317	-3.321
35	49	BR	84	-77.940	7.139	9.678	-8.619	4.606	-1.523
35	50	BR	85	-78.993	9.124	9.865	-9.243	2.751	-6.168
35	51	BR	86	-76.251	5.329	10.715	-8.493	7.396	-5.415
35	52	BR	87	-74.341	6.162	10.795	-6.583	6.643	-7.733
35	53	BR	88	-70.958	4.688	11.638	-6.879	8.960	-6.741
35	54	BR	89	-68.640	5.753	11.711	-7.400	7.968	-9.234
35	55	BR	90	-64.663	4.095	12.547	-7.730	10.462	-8.034
35	56	BR	91	-61.954	5.362	12.613	-8.255	9.262	-10.673
35	57	BR	92	-57.433	3.551	13.442	-8.619	11.901	-9.295
35	58	BR	93	-54.350	4.988	13.501	-9.147	10.523	-12.050
35	59	BR	94	-49.333	3.055	14.322	-9.546	13.278	-10.525
35	60	BR	95	-45.894	4.632	14.375	-10.078	11.753	-13.364
36	28	KR	64	-1.510		0.198			13.868
36	29	KR	65	-8.504	15.066	0.416		-18.970	15.226
36	30	KR	66	-17.795	17.362	1.353	-1.096	-20.268	11.491
36	31	KR	67	-23.559	13.836	1.562	-1.087	-16.472	13.065
36	32	KR	68	-31.826	16.338	2.491	-1.276	-17.986	9.232
36	33	KR	69	-36.460	12.706	2.691	-1.349	-14.093	10.984
36	34	KR	70	-43.766	15.378	3.611	-1.583	-15.784	7.091
36	35	KR	71	-47.371	11.676	3.803	-1.739	-11.830	8.984
36	36	KR	72	-53.780	14.480	4.714	-2.019	-13.664	5.067
36	37	KR	73	-56.454	10.746	4.897	-2.258	-9.686	7.065
36	38	KR	74	-62.030	13.647	5.799	-2.584	-11.624	3.161
36	39	KR	75	-63.874	9.916	5.973	-2.906	-7.658	5.227
36	40	KR	76	-68.679	12.876	6.866	-3.277	-9.664	1.372
36	41	KR	77	-69.794	9.187	7.032	-3.682	-5.749	3.470
36	42	KR	78	-73.892	12.169	7.917	-4.099	-7.786	-0.299
36	43	KR	79	-74.378	8.557	8.073	-4.586	-3.957	1.794
36	44	KR	80	-77.832	11.525	8.949	-5.050	-5.989	-1.852
36	45	KR	81	-77.788	8.028	9.097	-5.619	-2.283	0.198
36	46	KR	82	-80.662	10.945	9.965	-6.129	-4.272	-3.288
36	47	KR	83	-80.189	7.599	10.104	-6.781	-0.726	-1.317
36	48	KR	84	-82.546	10.428	10.962	-7.336	-2.636	-4.606
36	49	KR	85	-81.744	7.270	11.093	-8.071	0.713	-2.751
36	50	KR	86	-83.647	9.974	11.943	-8.672	-1.081	-7.396
36	51	KR	87	-80.985	5.410	12.023	-7.858	3.666	-6.643
36	52	KR	88	-79.918	7.005	12.866	-5.926	2.913	-8.960
36	53	KR	89	-76.608	4.761	12.939	-6.208	5.230	-7.968
36	54	KR	90	-75.125	6.589	13.775	-6.715	4.238	-10.462
36	55	KR	91	-71.215	4.161	13.841	-7.031	6.732	-9.262

Z	N		A	ΔM	S_n	S_p	Q_α	Q_{β^-}	Q_{β^+}
36	56	KR	92	-69.334	6.190	14.670	-7.542	5.531	-11.901
36	57	KR	93	-64.873	3.610	14.729	-7.892	8.171	-10.523
36	58	KR	94	-62.611	5.810	15.550	-8.406	6.792	-13.278
36	59	KR	95	-57.646	3.107	15.602	-8.791	9.547	-11.753
36	60	KR	96	-55.022	5.447	16.417	-9.309	8.022	-14.592
36	61	KR	97	-49.603	2.653	16.462	-9.728	10.861	-12.950
36	62	KR	98	-46.633	5.101	17.269	-10.249	9.220	-15.843
37	28	RB	65	10.466		-4.686			18.970
37	29	RB	66	2.473	16.064	-3.689		-16.370	20.268
37	30	RB	67	-7.087	17.632	-3.419	-0.911	-17.732	16.472
37	31	RB	68	-13.840	14.825	-2.430	-0.888	-14.000	17.986
37	32	RB	69	-22.368	16.599	-2.169	-1.062	-15.577	14.093
37	33	RB	70	-27.982	13.686	-1.189	-1.121	-11.748	15.784
37	34	RB	71	-35.541	15.630	-0.937	-1.341	-13.503	11.830
37	35	RB	72	-40.116	12.647	0.035	-1.483	-9.613	13.664
37	36	RB	73	-46.769	14.724	0.278	-1.749	-11.510	9.686
37	37	RB	74	-50.406	11.709	1.241	-1.974	-7.596	11.624
37	38	RB	75	-56.216	13.881	1.475	-2.285	-9.598	7.658
37	39	RB	76	-59.015	10.870	2.429	-2.593	-5.696	9.664
37	40	RB	77	-64.045	13.102	2.655	-2.950	-7.766	5.749
37	41	RB	78	-66.106	10.132	3.600	-3.340	-3.914	7.786
37	42	RB	79	-70.421	12.386	3.818	-3.744	-6.015	3.957
37	43	RB	80	-71.843	9.494	4.754	-4.216	-2.250	5.989
37	44	RB	81	-75.505	11.734	4.963	-4.666	-4.345	2.283
37	45	RB	82	-76.390	8.956	5.890	-5.221	-0.703	4.272
37	46	RB	83	-79.463	11.145	6.090	-5.716	-2.756	0.726
37	47	RB	84	-79.909	8.518	7.009	-6.354	0.726	2.636
37	48	RB	85	-82.457	10.619	7.200	-6.895	-1.248	-0.713
37	49	RB	86	-82.565	8.180	8.110	-7.616	2.038	1.081
37	50	RB	87	-84.650	10.156	8.293	-8.203	0.180	-3.666
37	51	RB	88	-82.831	6.252	9.135	-7.316	4.922	-2.913
37	52	RB	89	-81.838	7.078	9.209	-5.270	4.169	-5.230
37	53	RB	90	-79.363	5.597	10.044	-5.537	6.486	-4.238
37	54	RB	91	-77.947	6.655	10.110	-6.030	5.494	-6.732
37	55	RB	92	-74.865	4.990	10.939	-6.332	7.988	-5.531
37	56	RB	93	-73.043	6.250	10.998	-6.829	6.787	-8.171
37	57	RB	94	-69.403	4.431	11.820	-7.165	9.427	-6.792
37	58	RB	95	-67.194	5.862	11.872	-7.665	8.049	-9.547
37	59	RB	96	-63.044	3.921	12.686	-8.036	10.803	-8.022
37	60	RB	97	-60.464	5.492	12.731	-8.539	9.278	-10.861
37	61	RB	98	-55.853	3.460	13.539	-8.944	12.117	-9.220
37	62	RB	99	-52.921	5.139	13.577	-9.451	10.476	-12.112
37	63	RB	100	-47.896	3.047	14.377	-9.891	13.368	-10.386
37	64	RB	101	-44.630	4.805	14.408	-10.402	11.642	-13.301
38	28	SR	66	18.844		-1.089			16.370
38	29	SR	67	10.645	16.270	-0.883		-21.456	17.732
38	30	SR	68	0.160	18.557	0.042	-0.755	-22.753	14.000
38	31	SR	69	-6.791	15.022	0.239	-0.711	-18.956	15.577
38	32	SR	70	-16.235	17.515	1.156	-0.864	-20.468	11.748
38	33	SR	71	-22.037	13.874	1.344	-0.903	-16.574	13.503
38	34	SR	72	-30.503	16.537	2.252	-1.102	-18.265	9.613
38	35	SR	73	-35.259	12.827	2.432	-1.223	-14.310	11.510
38	36	SR	74	-42.810	15.623	3.330	-1.469	-16.142	7.596
38	37	SR	75	-46.618	11.880	3.501	-1.672	-12.163	9.598
38	38	SR	76	-53.319	14.772	4.392	-1.963	-14.100	5.696
38	39	SR	77	-56.280	11.032	4.554	-2.250	-10.133	7.766
38	40	SR	78	-62.192	13.984	5.435	-2.587	-12.138	3.914
38	41	SR	79	-64.406	10.285	5.589	-2.956	-8.222	6.015
38	42	SR	80	-69.593	13.259	6.461	-3.339	-10.258	2.250

Z	N		A	ΔM	S_n	S_p	Q_α	Q_{β^-}	Q_{β^+}
38	43	SR	81	-71.160	9.638	6.606	-3.791	-6.428	4.345
38	44	SR	82	-75.687	12.598	7.470	-4.219	-8.458	0.703
38	45	SR	83	-76.707	9.092	7.606	-4.754	-4.751	2.756
38	46	SR	84	-80.635	12.000	8.461	-5.228	-6.739	-0.726
38	47	SR	85	-81.209	8.645	8.589	-5.845	-3.192	1.248
38	48	SR	86	-84.603	11.465	9.435	-6.366	-5.101	-2.038
38	49	SR	87	-84.830	8.298	9.554	-7.066	-1.751	-0.180
38	50	SR	88	-87.753	10.994	10.392	-7.632	-3.544	-4.922
38	51	SR	89	-86.007	6.326	10.465	-6.688	1.299	-4.169
38	52	SR	90	-85.849	7.914	11.300	-4.627	0.546	-6.486
38	53	SR	91	-83.441	5.663	11.367	-4.881	2.863	-5.494
38	54	SR	92	-82.853	7.484	12.195	-5.360	1.871	-7.988
38	55	SR	93	-79.831	5.049	12.255	-5.647	4.365	-6.787
38	56	SR	94	-78.830	7.071	13.076	-6.130	3.165	-9.427
38	57	SR	95	-75.242	4.484	13.128	-6.452	5.804	-8.049
38	58	SR	96	-73.847	6.676	13.943	-6.938	4.426	-10.803
38	59	SR	97	-69.742	3.967	13.988	-7.295	7.181	-9.278
38	60	SR	98	-67.970	6.299	14.795	-7.784	5.656	-12.117
38	61	SR	99	-63.397	3.498	14.833	-8.175	8.495	-10.476
38	62	SR	100	-61.265	5.940	15.633	-8.668	6.853	-13.368
38	63	SR	101	-56.272	3.078	15.664	-9.093	9.746	-11.642
38	64	SR	102	-53.798	5.598	16.457	-9.590	8.019	-14.557
38	65	SR	103	-48.434	2.707	16.481	-10.050	10.934	-12.776
38	66	SR	104	-45.636	5.274	17.268	-10.550	9.153	-15.683
39	28	Y	67	32.101		-5.969			21.456
39	29	Y	68	22.913	17.260	-4.979		-18.860	22.753
39	30	Y	69	12.166	18.819	-4.717	-0.725	-20.223	18.956
39	31	Y	70	4.234	16.003	-3.735	-0.664	-16.492	20.468
39	32	Y	71	-5.463	17.769	-3.482	-0.801	-18.070	16.574
39	33	Y	72	-12.239	14.847	-2.510	-0.823	-14.242	18.265
39	34	Y	73	-20.949	16.782	-2.265	-1.006	-15.998	14.310
39	35	Y	74	-26.669	13.791	-1.301	-1.111	-12.109	16.142
39	36	Y	75	-34.456	15.859	-1.066	-1.340	-14.007	12.163
39	37	Y	76	-39.219	12.835	-0.110	-1.527	-10.094	14.100
39	38	Y	77	-46.146	14.999	0.117	-1.802	-12.097	10.133
39	39	Y	78	-50.053	11.979	1.063	-2.072	-8.197	12.138
39	40	Y	79	-56.184	14.202	1.281	-2.393	-10.267	8.222
39	41	Y	80	-59.335	11.223	2.219	-2.745	-6.417	10.258
39	42	Y	81	-64.733	13.469	2.428	-3.112	-8.519	6.428
39	43	Y	82	-67.228	10.567	3.357	-3.547	-4.755	8.458
39	44	Y	83	-71.956	12.799	3.558	-3.960	-6.851	4.751
39	45	Y	84	-73.896	10.012	4.478	-4.478	-3.210	6.739
39	46	Y	85	-78.017	12.192	4.670	-4.936	-5.264	3.192
39	47	Y	86	-79.501	9.556	5.582	-5.537	-1.783	5.101
39	48	Y	87	-83.079	11.649	5.765	-6.041	-3.758	1.751
39	49	Y	88	-84.209	9.201	6.668	-6.724	-0.474	3.544
39	50	Y	89	-87.306	11.169	6.842	-7.274	-2.333	-1.299
39	51	Y	90	-86.396	7.161	7.678	-6.255	2.503	-0.546
39	52	Y	91	-86.304	7.980	7.744	-4.079	1.750	-2.863
39	53	Y	92	-84.724	6.491	8.572	-4.318	4.067	-1.871
39	54	Y	93	-84.196	7.543	8.632	-4.783	3.075	-4.365
39	55	Y	94	-81.995	5.870	9.453	-5.056	5.569	-3.165
39	56	Y	95	-81.047	7.123	9.505	-5.525	4.369	-5.804
39	57	Y	96	-78.273	5.298	10.320	-5.833	7.008	-4.426
39	58	Y	97	-76.923	6.721	10.365	-6.304	5.630	-7.181
39	59	Y	98	-73.626	4.774	11.172	-6.647	8.385	-5.656
39	60	Y	99	-71.891	6.337	11.210	-7.122	6.860	-8.495
39	61	Y	100	-68.118	4.298	12.010	-7.499	9.699	-6.853
39	62	Y	101	-66.017	5.971	12.042	-7.978	8.057	-9.746
39	63	Y	102	-61.817	3.871	12.835	-8.390	10.950	-8.019

Z	N		A	ΔM	S_n	S_p	Q_α	Q_{β^-}	Q_{β^+}
39	64	Y	103	-59.368	5.622	12.859	-8.872	9.223	-10.934
39	65	Y	104	-54.789	3.493	13.645	-9.318	12.138	-9.153
39	66	Y	105	-52.009	5.291	13.662	-9.804	10.357	-12.060
39	67	Y	106	-47.100	3.163	14.441	-10.284	13.264	-10.256
39	68	Y	107	-44.006	4.977	14.451	-10.774	11.460	-13.123
40	28	ZR	68	41.773		-2.382			18.860
40	29	ZR	69	32.388	17.456	-2.186		-19.331	20.223
40	30	ZR	70	20.726	19.734	-1.271	-0.543	-20.847	16.492
40	31	ZR	71	12.607	16.191	-1.084	-0.463	-17.310	18.070
40	32	ZR	72	2.003	18.675	-0.177	-0.582	-19.039	14.242
40	33	ZR	73	-4.951	15.025	0.001	-0.585	-15.403	15.998
40	34	ZR	74	-14.560	17.680	0.899	-0.750	-17.308	12.109
40	35	ZR	75	-20.449	13.961	1.069	-0.836	-13.610	14.007
40	36	ZR	76	-29.125	16.748	1.958	-1.046	-15.655	10.094
40	37	ZR	77	-34.049	12.996	2.119	-1.215	-11.931	12.097
40	38	ZR	78	-41.857	15.879	3.000	-1.471	-14.080	8.197
40	39	ZR	79	-45.916	12.131	3.152	-1.723	-10.366	10.267
40	40	ZR	80	-52.919	15.074	4.024	-2.025	-12.581	6.417
40	41	ZR	81	-56.214	11.367	4.167	-2.359	-8.916	8.519
40	42	ZR	82	-62.474	14.332	5.030	-2.707	-11.161	4.755
40	43	ZR	83	-65.104	10.702	5.165	-3.124	-7.580	6.851
40	44	ZR	84	-70.686	13.653	6.019	-3.517	-9.818	3.210
40	45	ZR	85	-72.752	10.138	6.145	-4.017	-6.359	5.264
40	46	ZR	86	-77.718	13.038	6.991	-4.457	-8.552	1.783
40	47	ZR	87	-79.321	9.674	7.108	-5.039	-5.251	3.758
40	48	ZR	88	-83.735	12.486	7.945	-5.524	-7.364	0.474
40	49	ZR	89	-84.973	9.310	8.054	-6.189	-4.258	2.333
40	50	ZR	90	-88.899	11.997	8.882	-6.721	-6.253	-2.503
40	51	ZR	91	-88.055	7.227	8.948	-5.649	-1.560	-1.750
40	52	ZR	92	-88.792	8.809	9.776	-3.464	-2.526	-4.067
40	53	ZR	93	-87.271	6.551	9.836	-3.689	-0.038	-3.075
40	54	ZR	94	-87.564	8.364	10.657	-4.139	-1.240	-5.569
40	55	ZR	95	-85.415	5.923	10.709	-4.399	1.426	-4.369
40	56	ZR	96	-85.281	7.938	11.524	-4.853	0.016	-7.008
40	57	ZR	97	-82.553	5.343	11.569	-5.147	2.830	-5.630
40	58	ZR	98	-82.010	7.529	12.376	-5.605	1.244	-8.385
40	59	ZR	99	-78.751	4.812	12.414	-5.933	4.175	-6.860
40	60	ZR	100	-77.817	7.137	13.215	-6.394	2.444	-9.699
40	61	ZR	101	-74.075	4.329	13.246	-6.757	5.460	-8.057
40	62	ZR	102	-72.767	6.764	14.039	-7.222	3.615	-10.950
40	63	ZR	103	-68.591	3.895	14.063	-7.619	6.687	-9.223
40	64	ZR	104	-66.928	6.408	14.849	-8.088	4.758	-12.138
40	65	ZR	105	-62.366	3.510	14.866	-8.519	7.854	-10.357
40	66	ZR	106	-60.365	6.070	15.645	-8.991	5.872	-13.264
40	67	ZR	107	-55.466	3.173	15.655	-9.457	8.961	-11.460
40	68	ZR	108	-53.144	5.749	16.427	-9.933	6.958	-14.327
40	69	ZR	109	-47.957	2.884	16.429	-10.433	10.010	-12.530
40	70	ZR	110	-45.332	5.447	17.194	-10.912	8.015	-15.328
41	43	NB	84	-60.868	11.415	3.053	-3.958	-5.632	9.818
41	44	NB	85	-66.394	13.597	2.997	-4.086	-7.870	6.359
41	45	NB	86	-69.167	10.844	3.703	-4.363	-4.411	8.552
41	46	NB	87	-74.070	12.975	3.640	-4.539	-6.604	5.251
41	47	NB	88	-76.371	10.373	4.339	-4.900	-3.303	7.364
41	48	NB	89	-80.715	12.416	4.269	-5.124	-5.416	4.258
41	49	NB	90	-82.646	10.002	4.962	-5.569	-2.310	6.253
41	50	NB	91	-86.494	11.920	4.885	-5.840	-4.305	1.560
41	51	NB	92	-86.266	7.844	5.501	-4.483	0.457	2.526
41	52	NB	93	-87.234	9.039	5.731	-2.352	-0.509	0.038
41	53	NB	94	-86.324	7.162	6.341	-2.353	1.979	1.240

Z	N		A	ΔM	S_n	S_p	Q_α	Q_{β^-}	Q_{β^+}
41	54	NB	95	-86.841	8.589	6.566	-2.961	0.777	-1.426
41	55	NB	96	-85.298	6.528	7.171	-2.998	3.443	-0.016
41	56	NB	97	-85.383	8.157	7.391	-3.612	2.033	-2.830
41	57	NB	98	-83.255	5.943	7.991	-3.685	4.847	-1.244
41	58	NB	99	-82.926	7.742	8.204	-4.304	3.261	-4.175
41	59	NB	100	-80.261	5.407	8.799	-4.412	6.192	-2.444
41	60	NB	101	-79.535	7.346	9.007	-5.037	4.461	-5.460
41	61	NB	102	-76.382	4.919	9.597	-5.182	7.477	-3.615
41	62	NB	103	-75.278	6.967	9.800	-5.811	5.632	-6.687
41	63	NB	104	-71.686	4.479	10.384	-5.992	8.704	-4.758
41	64	NB	105	-70.220	6.606	10.581	-6.627	6.775	-7.854
41	65	NB	106	-66.237	4.088	11.160	-6.844	9.871	-5.872
41	66	NB	107	-64.428	6.262	11.352	-7.484	7.889	-8.961
41	67	NB	108	-60.102	3.746	11.925	-7.737	10.978	-6.958
41	68	NB	109	-57.967	5.936	12.112	-8.383	8.975	-10.010
41	69	NB	110	-53.348	3.452	12.680	-8.672	12.027	-8.015
41	70	NB	111	-50.904	5.628	12.861	-9.323	10.032	-10.999
41	71	NB	112	-46.040	3.207	13.423	-9.648	13.016	-9.044
42	44	MO	86	-64.756	14.303	5.651	-4.707	-11.099	4.411
42	45	MO	87	-67.466	10.781	5.588	-4.786	-7.640	6.604
42	46	MO	88	-73.068	13.674	6.287	-4.807	-9.834	3.303
42	47	MO	89	-75.300	10.303	6.217	-4.972	-6.533	5.416
42	48	MO	90	-80.336	13.108	6.910	-5.042	-8.645	2.310
42	49	MO	91	-82.190	9.925	6.833	-5.293	-5.540	4.305
42	50	MO	92	-86.723	12.605	7.518	-5.413	-7.535	-0.457
42	51	MO	93	-86.725	8.073	7.748	-4.177	-3.087	0.509
42	52	MO	94	-88.303	9.649	8.358	-1.829	-4.052	-1.979
42	53	MO	95	-87.618	7.386	8.583	-1.988	-1.565	-0.777
42	54	MO	96	-88.740	9.194	9.188	-2.373	-2.767	-3.443
42	55	MO	97	-87.416	6.747	9.408	-2.570	-0.101	-2.033
42	56	MO	98	-88.102	8.757	10.008	-2.962	-1.511	-4.847
42	57	MO	99	-86.187	6.157	10.221	-3.197	1.303	-3.261
42	58	MO	100	-86.453	8.337	10.816	-3.596	-0.283	-6.192
42	59	MO	101	-83.996	5.615	11.024	-3.868	2.648	-4.461
42	60	MO	102	-83.860	7.935	11.614	-4.274	0.917	-7.477
42	61	MO	103	-80.910	5.122	11.817	-4.584	3.933	-5.632
42	62	MO	104	-80.389	7.551	12.401	-4.997	2.088	-8.704
42	63	MO	105	-76.995	4.677	12.598	-5.345	5.160	-6.775
42	64	MO	106	-76.108	7.184	13.177	-5.765	3.231	-9.871
42	65	MO	107	-72.317	4.281	13.369	-6.150	6.327	-7.889
42	66	MO	108	-71.081	6.835	13.942	-6.578	4.345	-10.978
42	67	MO	109	-66.942	3.933	14.129	-7.001	7.435	-8.975
42	68	MO	110	-65.374	6.504	14.697	-7.435	5.431	-12.027
42	69	MO	111	-60.937	3.634	14.878	-7.895	8.483	-10.032
42	70	MO	112	-59.056	6.190	15.440	-8.336	6.488	-13.016
42	71	MO	113	-54.367	3.383	15.617	-8.835	9.472	-11.061
42	72	MO	114	-52.190	5.895	16.173	-9.283	7.517	-13.946
42	73	MO	115	-47.300	3.181	16.344	-9.819	10.402	-12.062
43	45	TC	88	-63.235	11.480	3.058	-4.791	-6.050	9.834
43	46	TC	89	-68.767	13.604	2.988	-4.798	-8.243	6.533
43	47	TC	90	-71.691	10.995	3.680	-4.949	-4.942	8.645
43	48	TC	91	-76.650	13.031	3.603	-5.005	-7.055	5.540
43	49	TC	92	-79.188	10.610	4.288	-5.242	-3.949	7.535
43	50	TC	93	-83.638	12.521	4.204	-5.347	-5.944	3.087
43	51	TC	94	-84.251	8.684	4.815	-4.029	-1.429	4.052
43	52	TC	95	-86.053	9.874	5.039	-1.984	-2.395	1.565
43	53	TC	96	-85.973	7.991	5.644	-2.131	0.093	2.767
43	54	TC	97	-87.315	9.413	5.864	-2.506	-1.110	0.101
43	55	TC	98	-86.591	7.347	6.464	-2.692	1.557	1.511

Z	N	A		ΔM	S_n	S_p	Q_α	Q_{β^-}	Q_{β^+}
43	56	TC	99	-87.490	8.971	6.677	-3.074	0.147	-1.303
43	57	TC	100	-86.170	6.751	7.272	-3.297	2.961	0.283
43	58	TC	101	-86.644	8.546	7.480	-3.686	1.375	-2.648
43	59	TC	102	-84.777	6.204	8.070	-3.947	4.306	-0.917
43	60	TC	103	-84.844	8.138	8.273	-4.343	2.575	-3.933
43	61	TC	104	-82.478	5.706	8.857	-4.642	5.591	-2.088
43	62	TC	105	-82.155	7.748	9.054	-5.044	3.746	-5.160
43	63	TC	106	-79.339	5.255	9.633	-5.381	6.818	-3.231
43	64	TC	107	-78.644	7.376	9.825	-5.790	4.889	-6.327
43	65	TC	108	-75.426	4.854	10.398	-6.165	7.985	-4.345
43	66	TC	109	-74.376	7.022	10.585	-6.581	6.003	-7.435
43	67	TC	110	-70.806	4.501	11.153	-6.994	9.092	-5.431
43	68	TC	111	-69.420	6.686	11.334	-7.417	7.089	-8.483
43	69	TC	112	-65.544	4.196	11.896	-7.867	10.141	-6.488
43	70	TC	113	-63.839	6.367	12.073	-8.297	8.146	-9.472
43	71	TC	114	-59.708	3.940	12.630	-8.785	11.130	-7.517
43	72	TC	115	-57.702	6.065	12.800	-9.222	9.175	-10.402
43	73	TC	116	-53.362	3.732	13.352	-9.748	12.060	-8.518
43	74	TC	117	-51.073	5.782	13.517	-10.192	10.176	-11.273
44	45	RU	89	-60.524	11.410	4.578	-4.424	-9.348	8.243
44	46	RU	90	-66.748	14.296	5.270	-4.417	-11.541	4.942
44	47	RU	91	-69.595	10.918	5.193	-4.554	-8.241	7.055
44	48	RU	92	-75.239	13.716	5.878	-4.596	-10.353	3.949
44	49	RU	93	-77.694	10.526	5.794	-4.819	-7.247	5.944
44	50	RU	94	-82.821	13.199	6.472	-4.910	-9.242	1.429
44	51	RU	95	-83.658	8.909	6.697	-3.894	-5.043	2.395
44	52	RU	96	-86.066	10.479	7.302	-1.768	-6.009	-0.093
44	53	RU	97	-86.206	8.211	7.521	-1.905	-3.521	1.110
44	54	RU	98	-88.148	10.013	8.121	-2.269	-4.724	-1.557
44	55	RU	99	-87.637	7.561	8.335	-2.444	-2.057	-0.147
44	56	RU	100	-89.131	9.565	8.930	-2.815	-3.467	-2.961
44	57	RU	101	-88.019	6.960	9.138	-3.028	-0.653	-1.375
44	58	RU	102	-89.083	9.135	9.728	-3.406	-2.239	-4.306
44	59	RU	103	-87.419	6.407	9.931	-3.656	0.692	-2.575
44	60	RU	104	-88.069	8.722	10.514	-4.041	-1.039	-5.591
44	61	RU	105	-85.901	5.903	10.712	-4.329	1.977	-3.746
44	62	RU	106	-86.156	8.327	11.291	-4.721	0.132	-6.818
44	63	RU	107	-83.532	5.448	11.483	-5.047	3.204	-4.889
44	64	RU	108	-83.410	7.949	12.056	-5.446	1.275	-7.985
44	65	RU	109	-80.380	5.041	12.243	-5.810	4.371	-6.003
44	66	RU	110	-79.898	7.590	12.811	-6.215	2.389	-9.092
44	67	RU	111	-76.509	4.682	12.992	-6.617	5.478	-7.089
44	68	RU	112	-75.685	7.248	13.554	-7.029	3.475	-10.141
44	69	RU	113	-71.986	4.372	13.730	-7.468	6.527	-8.146
44	70	RU	114	-70.838	6.924	14.287	-7.888	4.532	-11.130
44	71	RU	115	-66.877	4.111	14.458	-8.365	7.516	-9.175
44	72	RU	116	-65.422	6.617	15.010	-8.791	5.561	-12.060
44	73	RU	117	-61.249	3.898	15.175	-9.306	8.446	-10.176
44	74	RU	118	-59.505	6.328	15.721	-9.740	6.562	-12.931
44	75	RU	119	-55.167	3.733	15.881	-10.292	9.316	-11.147
44	76	RU	120	-53.152	6.057	16.422	-10.732	7.533	-13.742
45	46	RH	91	-61.354	14.219	1.895	-3.954	-10.010	8.241
45	47	RH	92	-64.886	11.603	2.580	-4.076	-6.710	10.353
45	48	RH	93	-70.446	13.632	2.496	-4.104	-8.822	7.247
45	49	RH	94	-73.579	11.204	3.174	-4.313	-5.717	9.242
45	50	RH	95	-78.615	13.108	3.083	-4.390	-7.711	5.043
45	51	RH	96	-80.058	9.514	3.688	-3.294	-3.447	6.009
45	52	RH	97	-82.685	10.699	3.907	-1.472	-4.412	3.521
45	53	RH	98	-83.424	8.811	4.507	-1.598	-1.924	4.724

Z	N		A	ΔM	S_n	S_p	Q_α	Q_{β^-}	Q_{β^+}
45	54	RH	99	-85.580	10.227	4.721	-1.952	-3.127	2.057
45	55	RH	100	-85.664	8.156	5.316	-2.116	-0.461	3.467
45	56	RH	101	-87.366	9.774	5.524	-2.476	-1.870	0.653
45	57	RH	102	-86.844	7.549	6.114	-2.678	0.943	2.239
45	58	RH	103	-88.110	9.338	6.317	-3.045	-0.642	-0.692
45	59	RH	104	-87.030	6.991	6.900	-3.285	2.288	1.039
45	60	RH	105	-87.878	8.920	7.098	-3.659	0.557	-1.977
45	61	RH	106	-86.288	6.482	7.677	-3.936	3.574	-0.132
45	62	RH	107	-86.736	8.519	7.869	-4.317	1.729	-3.204
45	63	RH	108	-84.685	6.021	8.442	-4.632	4.800	-1.275
45	64	RH	109	-84.750	8.136	8.629	-5.020	2.871	-4.371
45	65	RH	110	-82.287	5.608	9.196	-5.373	5.967	-2.389
45	66	RH	111	-81.987	7.771	9.378	-5.768	3.986	-5.478
45	67	RH	112	-79.160	5.244	9.940	-6.159	7.075	-3.475
45	68	RH	113	-78.512	7.424	10.116	-6.561	5.071	-6.527
45	69	RH	114	-75.370	4.929	10.673	-6.989	8.123	-4.532
45	70	RH	115	-74.393	7.094	10.844	-7.398	6.129	-7.516
45	71	RH	116	-70.983	4.662	11.396	-7.864	9.113	-5.561
45	72	RH	117	-69.694	6.782	11.561	-8.280	7.158	-8.446
45	73	RH	118	-66.067	4.444	12.107	-8.784	10.042	-6.562
45	74	RH	119	-64.483	6.488	12.267	-9.206	8.158	-9.316
45	75	RH	120	-60.686	4.274	12.808	-9.748	10.913	-7.533
45	76	RH	121	-58.826	6.212	12.963	-10.178	9.130	-10.128
45	77	RH	122	-54.907	4.153	13.498	-10.757	11.724	-8.477
46	47	PD	93	-61.624	11.519	4.027	-3.525	-10.037	8.822
46	48	PD	94	-67.862	14.309	4.705	-3.539	-12.150	5.717
46	49	PD	95	-70.904	11.113	4.614	-3.734	-9.045	7.711
46	50	PD	96	-76.611	13.778	5.285	-3.796	-11.039	3.447
46	51	PD	97	-78.273	9.733	5.504	-3.004	-7.092	4.412
46	52	PD	98	-81.500	11.299	6.104	-1.103	-8.057	1.924
46	53	PD	99	-82.453	9.024	6.318	-1.219	-5.569	3.127
46	54	PD	100	-85.203	10.822	6.912	-1.562	-6.772	0.461
46	55	PD	101	-85.496	8.364	7.121	-1.715	-4.106	1.870
46	56	PD	102	-87.787	10.363	7.710	-2.065	-5.516	-0.943
46	57	PD	103	-87.468	7.752	7.913	-2.256	-2.702	0.642
46	58	PD	104	-89.318	9.922	8.497	-2.612	-4.287	-2.288
46	59	PD	105	-88.436	7.189	8.695	-2.841	-1.357	-0.557
46	60	PD	106	-89.862	9.498	9.273	-3.204	-3.088	-3.574
46	61	PD	107	-88.465	6.674	9.465	-3.471	-0.071	-1.729
46	62	PD	108	-89.486	9.092	10.038	-3.841	-1.917	-4.800
46	63	PD	109	-87.622	6.208	10.225	-4.146	1.155	-2.871
46	64	PD	110	-88.254	8.704	10.793	-4.523	-0.774	-5.967
46	65	PD	111	-85.973	5.790	10.975	-4.865	2.322	-3.986
46	66	PD	112	-86.235	8.334	11.537	-5.249	0.340	-7.075
46	67	PD	113	-83.584	5.421	11.713	-5.629	3.430	-5.071
46	68	PD	114	-83.493	7.981	12.270	-6.020	1.426	-8.123
46	69	PD	115	-80.522	5.100	12.441	-6.438	4.478	-6.129
46	70	PD	116	-80.096	7.646	12.992	-6.836	2.484	-9.113
46	71	PD	117	-76.852	4.827	13.158	-7.291	5.467	-7.158
46	72	PD	118	-76.109	7.329	13.704	-7.696	3.512	-10.042
46	73	PD	119	-72.641	4.604	13.864	-8.189	6.397	-8.158
46	74	PD	120	-71.599	7.029	14.405	-8.601	4.513	-10.913
46	75	PD	121	-67.956	4.428	14.559	-9.132	7.268	-9.130
46	76	PD	122	-66.631	6.747	15.095	-9.551	5.485	-11.724
46	77	PD	123	-62.862	4.302	15.244	-10.120	8.079	-10.073
46	78	PD	124	-61.273	6.483	15.774	-10.545	6.428	-12.476
46	79	PD	125	-57.425	4.224	15.918	-11.152	8.831	-10.988
47	48	AG	95	-61.859	14.218	1.286	-2.930	-10.593	9.045
47	49	AG	96	-65.572	11.784	1.957	-3.110	-7.487	11.039

Z	N	A		ΔM	S_n	S_p	Q_α	Q_{β^-}	Q_{β^+}
47	50	AG	97	-71.181	13.680	1.859	-3.159	-9.482	7.092
47	51	AG	98	-73.443	10.333	2.459	-2.289	-5.471	8.057
47	52	AG	99	-76.883	11.512	2.673	-0.693	-6.436	5.569
47	53	AG	100	-78.431	9.619	3.267	-0.798	-3.948	6.772
47	54	AG	101	-81.390	11.030	3.476	-1.130	-5.151	4.106
47	55	AG	102	-82.272	8.953	4.065	-1.272	-2.485	5.516
47	56	AG	103	-84.766	10.566	4.268	-1.611	-3.895	2.702
47	57	AG	104	-85.031	8.336	4.852	-1.792	-1.081	4.287
47	58	AG	105	-87.079	10.119	5.049	-2.137	-2.666	1.357
47	59	AG	106	-86.774	7.767	5.628	-2.355	0.264	3.088
47	60	AG	107	-88.393	9.690	5.820	-2.708	-1.467	0.071
47	61	AG	108	-87.569	7.247	6.393	-2.964	1.550	1.917
47	62	AG	109	-88.777	9.279	6.580	-3.323	-0.296	-1.155
47	63	AG	110	-87.481	6.775	7.148	-3.617	2.776	0.774
47	64	AG	111	-88.295	8.886	7.329	-3.983	0.847	-2.322
47	65	AG	112	-86.575	6.352	7.892	-4.315	3.943	-0.340
47	66	AG	113	-87.014	8.510	8.068	-4.688	1.961	-3.430
47	67	AG	114	-84.920	5.977	8.625	-5.057	5.051	-1.426
47	68	AG	115	-85.000	8.152	8.795	-5.438	3.047	-4.478
47	69	AG	116	-82.580	5.651	9.347	-5.845	6.099	-2.484
47	70	AG	117	-82.319	7.811	9.512	-6.232	4.105	-5.467
47	71	AG	118	-79.622	5.374	10.059	-6.676	7.088	-3.512
47	72	AG	119	-79.039	7.488	10.219	-7.071	5.133	-6.397
47	73	AG	120	-76.112	5.144	10.759	-7.553	8.018	-4.513
47	74	AG	121	-75.224	7.183	10.914	-7.954	6.134	-7.268
47	75	AG	122	-72.116	4.964	11.449	-8.474	8.889	-5.485
47	76	AG	123	-70.941	6.896	11.599	-8.882	7.106	-8.079
47	77	AG	124	-67.701	4.832	12.129	-9.440	9.700	-6.428
47	78	AG	125	-66.256	6.627	12.272	-9.855	8.049	-8.831
47	79	AG	126	-62.933	4.748	12.797	-10.451	10.452	-7.343
47	80	AG	127	-61.236	6.375	12.935	-10.873	8.964	-9.524
48	49	CD	97	-61.699	11.686	3.416	-2.500	-10.704	9.482
48	50	CD	98	-67.971	14.344	4.080	-2.534	-12.698	5.471
48	51	CD	99	-70.447	10.547	4.294	-1.968	-9.007	6.436
48	52	CD	100	-74.483	12.107	4.888	-0.297	-9.972	3.948
48	53	CD	101	-76.239	9.827	5.097	-0.391	-7.484	5.151
48	54	CD	102	-79.787	11.620	5.686	-0.712	-8.687	2.485
48	55	CD	103	-80.872	9.156	5.889	-0.844	-6.020	3.895
48	56	CD	104	-83.950	11.150	6.473	-1.172	-7.430	1.081
48	57	CD	105	-84.412	8.534	6.670	-1.341	-4.616	2.666
48	58	CD	106	-87.039	10.698	7.249	-1.676	-6.202	-0.264
48	59	CD	107	-86.927	7.960	7.441	-1.883	-3.271	1.467
48	60	CD	108	-89.119	10.263	8.014	-2.225	-5.002	-1.550
48	61	CD	109	-88.481	7.434	8.201	-2.470	-1.986	0.296
48	62	CD	110	-90.256	9.847	8.769	-2.819	-3.831	-2.776
48	63	CD	111	-89.142	6.957	8.950	-3.102	-0.759	-0.847
48	64	CD	112	-90.518	9.448	9.513	-3.458	-2.688	-3.943
48	65	CD	113	-88.975	6.528	9.689	-3.778	0.408	-1.961
48	66	CD	114	-89.970	9.067	10.246	-4.141	-1.574	-5.051
48	67	CD	115	-88.047	6.148	10.416	-4.499	1.515	-3.047
48	68	CD	116	-88.679	8.703	10.968	-4.869	-0.488	-6.099
48	69	CD	117	-86.424	5.817	11.133	-5.265	2.564	-4.105
48	70	CD	118	-86.710	8.357	11.680	-5.641	0.569	-7.088
48	71	CD	119	-84.172	5.534	11.840	-6.075	3.553	-5.133
48	72	CD	120	-84.130	8.029	12.380	-6.459	1.598	-8.018
48	73	CD	121	-81.358	5.299	12.535	-6.930	4.483	-6.134
48	74	CD	122	-81.005	7.719	13.070	-7.321	2.598	-8.889
48	75	CD	123	-78.047	5.113	13.220	-7.830	5.353	-7.106
48	76	CD	124	-77.402	7.426	13.750	-8.227	3.570	-9.700
48	77	CD	125	-74.306	4.976	13.893	-8.775	6.165	-8.049

Z	N	A	ΔM	S_n	S_p	Q_α	Q_{β^-}	Q_{β^+}
48	78	CD 126	-73.385	7.151	14.418	-9.179	4.514	-10.452
48	79	CD 127	-70.201	4.887	14.556	-9.764	6.917	-8.964
48	80	CD 128	-69.023	6.894	15.076	-10.175	5.429	-11.145
48	81	CD 129	-65.798	4.846	15.209	-10.797	7.610	-9.851
48	82	CD 130	-64.381	6.654	15.723	-11.216	6.315	
49	50	IN 99	-61.441	14.239	0.758	-2.006	-10.911	9.007
49	51	IN 100	-64.511	11.142	1.353	-1.364	-7.156	9.972
49	52	IN 101	-68.755	12.315	1.561	0.001	-8.122	7.484
49	53	IN 102	-71.100	10.417	2.150	-0.082	-5.634	8.687
49	54	IN 103	-74.851	11.823	2.353	-0.393	-6.837	6.020
49	55	IN 104	-76.520	9.740	2.937	-0.514	-4.170	7.430
49	56	IN 105	-79.796	11.347	3.135	-0.831	-5.580	4.616
49	57	IN 106	-80.837	9.112	3.713	-0.990	-2.766	6.202
49	58	IN 107	-83.655	10.890	3.906	-1.314	-4.352	3.271
49	59	IN 108	-84.116	8.533	4.479	-1.510	-1.421	5.002
49	60	IN 109	-86.495	10.450	4.666	-1.841	-3.152	1.986
49	61	IN 110	-86.426	8.002	5.233	-2.076	-0.136	3.831
49	62	IN 111	-88.382	10.028	5.415	-2.414	-1.981	0.759
49	63	IN 112	-87.830	7.519	5.977	-2.686	1.091	2.688
49	64	IN 113	-89.383	9.624	6.153	-3.031	-0.838	-0.408
49	65	IN 114	-88.396	7.085	6.710	-3.341	2.258	1.574
49	66	IN 115	-89.562	9.237	6.881	-3.692	0.276	-1.515
49	67	IN 116	-88.191	6.700	7.433	-4.040	3.365	0.488
49	68	IN 117	-88.988	8.869	7.598	-4.399	1.362	-2.564
49	69	IN 118	-87.279	6.363	8.144	-4.784	4.414	-0.569
49	70	IN 119	-87.725	8.517	8.304	-5.150	2.419	-3.553
49	71	IN 120	-85.728	6.074	8.845	-5.573	5.403	-1.598
49	72	IN 121	-85.840	8.184	8.999	-5.946	3.448	-4.483
49	73	IN 122	-83.604	5.834	9.535	-6.407	6.333	-2.598
49	74	IN 123	-83.400	7.868	9.684	-6.786	4.448	-5.353
49	75	IN 124	-80.972	5.643	10.214	-7.285	7.203	-3.570
49	76	IN 125	-80.470	7.570	10.358	-7.671	5.420	-6.165
49	77	IN 126	-77.899	5.500	10.883	-8.208	8.015	-4.514
49	78	IN 127	-77.117	7.290	11.021	-8.601	6.364	-6.917
49	79	IN 128	-74.452	5.406	11.540	-9.175	8.767	-5.429
49	80	IN 129	-73.407	7.027	11.673	-9.576	7.279	-7.610
49	81	IN 130	-70.696	5.360	12.187	-10.188	9.460	-6.315
49	82	IN 131	-69.407	6.782	12.315	-10.595	8.165	
50	50	SN 100	-57.354	14.896	3.203	-1.695		7.156
50	51	SN 101	-60.633	11.350	3.411	-1.359	-12.748	8.122
50	52	SN 102	-65.466	12.905	4.001	0.080	-13.855	5.634
50	53	SN 103	-68.015	10.620	4.204	0.008	-11.137	6.837
50	54	SN 104	-72.350	12.406	4.787	-0.292	-12.446	4.170
50	55	SN 105	-74.216	9.938	4.985	-0.402	-9.592	5.580
50	56	SN 106	-78.071	11.926	5.564	-0.708	-11.078	2.766
50	57	SN 107	-79.303	9.304	5.756	-0.857	-8.112	4.352
50	58	SN 108	-82.695	11.463	6.329	-1.170	-9.749	1.421
50	59	SN 109	-83.343	8.720	6.516	-1.356	-6.697	3.152
50	60	SN 110	-86.290	11.018	7.083	-1.676	-8.462	0.136
50	61	SN 111	-86.401	8.183	7.265	-1.900	-5.347	1.981
50	62	SN 112	-88.921	10.591	7.827	-2.227	-7.213	-1.091
50	63	SN 113	-88.545	7.695	8.003	-2.488	-4.062	0.838
50	64	SN 114	-90.654	10.181	8.560	-2.822	-6.005	-2.258
50	65	SN 115	-89.839	7.256	8.731	-3.121	-2.844	-0.276
50	66	SN 116	-91.556	9.789	9.283	-3.462	-4.838	-3.365
50	67	SN 117	-90.350	6.865	9.448	-3.799	-1.689	-1.362
50	68	SN 118	-91.693	9.415	9.994	-4.147	-3.710	-4.414
50	69	SN 119	-90.144	6.523	10.154	-4.522	-0.600	-2.419
50	70	SN 120	-91.131	9.058	10.695	-4.877	-2.622	-5.403

Z	N	A	ΔM	S_n	S_p	Q_α	Q_{β^-}	Q_{β^+}
50	71	SN 121	-89.289	6.229	10.850	-5.289	0.424	-3.448
50	72	SN 122	-89.936	8.719	11.385	-5.651	-1.574	-6.333
50	73	SN 123	-87.849	5.984	11.534	-6.101	1.383	-4.448
50	74	SN 124	-88.175	8.398	12.064	-6.470	-0.566	-7.203
50	75	SN 125	-85.891	5.787	12.208	-6.958	2.276	-5.420
50	76	SN 126	-85.914	8.095	12.733	-7.334	0.401	-8.015
50	77	SN 127	-83.481	5.639	12.871	-7.859	3.105	-6.364
50	78	SN 128	-83.219	7.809	13.390	-8.242	1.329	-8.767
50	79	SN 129	-80.686	5.539	13.523	-8.805	3.868	-7.279
50	80	SN 130	-80.156	7.541	14.037	-9.195	2.216	-9.460
50	81	SN 131	-77.572	5.488	14.165	-9.796	4.566	-8.165
50	82	SN 132	-76.791	7.291	14.673	-10.193	3.064	
50	83	SN 133	-71.947	2.809		-8.104	7.037	
50	84	SN 134	-68.309	4.433		-5.730	5.758	
51	51	SB 102	-50.276	11.957	-1.573	2.573	-11.251	13.855
51	52	SB 103	-55.563	13.358	-1.279	3.453	-12.359	11.137
51	53	SB 104	-58.738	11.247	-0.673	3.348	-9.641	12.446
51	54	SB 105	-63.505	12.838	-0.390	2.825	-10.950	9.592
51	55	SB 106	-66.012	10.579	0.204	2.663	-8.096	11.078
51	56	SB 107	-70.276	12.335	0.475	2.151	-9.582	8.112
51	57	SB 108	-72.157	9.952	1.058	1.939	-6.616	9.749
51	58	SB 109	-75.934	11.849	1.317	1.437	-8.254	6.697
51	59	SB 110	-77.230	9.367	1.888	1.182	-5.201	8.462
51	60	SB 111	-80.538	11.379	2.135	0.693	-6.966	5.347
51	61	SB 112	-81.291	8.824	2.695	0.401	-3.851	7.213
51	62	SB 113	-84.146	10.926	2.931	-0.075	-5.717	4.062
51	63	SB 114	-84.398	8.323	3.479	-0.397	-2.566	6.005
51	64	SB 115	-86.816	10.490	3.702	-0.859	-4.509	2.844
51	65	SB 116	-86.609	7.864	4.238	-1.204	-1.347	4.838
51	66	SB 117	-88.608	10.071	4.450	-1.650	-3.341	1.689
51	67	SB 118	-87.983	7.447	4.975	-2.012	-0.193	3.710
51	68	SB 119	-89.580	9.668	5.176	-2.442	-2.213	0.600
51	69	SB 120	-88.579	7.071	5.688	-2.813	0.896	2.622
51	70	SB 121	-89.789	9.282	5.877	-3.226	-1.126	-0.424
51	71	SB 122	-88.455	6.737	6.379	-3.601	1.920	1.574
51	72	SB 123	-89.296	8.912	6.556	-3.996	-0.078	-1.383
51	73	SB 124	-87.670	6.445	7.046	-4.366	2.879	0.566
51	74	SB 125	-88.158	8.560	7.211	-4.742	0.930	-2.276
51	75	SB 126	-86.281	6.195	7.688	-5.103	3.772	-0.401
51	76	SB 127	-86.434	8.224	7.843	-5.458	1.898	-3.105
51	77	SB 128	-84.349	5.987	8.309	-5.802	4.601	-1.329
51	78	SB 129	-84.182	7.904	8.451	-6.136	2.825	-3.868
51	79	SB 130	-81.930	5.820	8.905	-6.456	5.364	-2.216
51	80	SB 131	-81.461	7.602	9.036	-6.768	3.713	-4.566
51	81	SB 132	-79.084	5.695	9.478	-7.057	6.062	-3.064
51	82	SB 133	-78.329	7.316	9.598	-7.346	4.560	-7.037
51	83	SB 134	-74.067	3.154	9.409	-6.124	8.849	-5.758
51	84	SB 135	-70.771	4.775	9.751	-3.951	7.567	-8.168
51	85	SB 136	-65.406	2.706	10.092		9.974	-6.714
51	86	SB 137	-61.835	4.500	10.432		8.515	-8.998
52	52	TE 104	-49.097	13.965	0.824	4.348	-15.554	9.641
52	53	TE 105	-52.555	11.529	1.106	4.158	-12.836	10.950
52	54	TE 106	-57.916	13.433	1.700	3.790	-14.146	8.096
52	55	TE 107	-60.694	10.849	1.971	3.581	-11.291	9.582
52	56	TE 108	-65.541	12.918	2.554	3.218	-12.777	6.616
52	57	TE 109	-67.680	10.211	2.813	2.992	-9.811	8.254
52	58	TE 110	-72.029	12.420	3.384	2.636	-11.449	5.201
52	59	TE 111	-73.572	9.614	3.631	2.391	-8.396	6.966
52	60	TE 112	-77.440	11.939	4.191	2.041	-10.161	3.851

Z	N		A	ΔM	S_n	S_p	Q_α	Q_{β^-}	Q_{β^+}
52	61	TE	113	-78.428	9.060	4.426	1.778	-7.046	5.717
52	62	TE	114	-81.831	11.474	4.974	1.436	-8.913	2.566
52	63	TE	115	-82.307	8.547	5.198	1.153	-5.762	4.509
52	64	TE	116	-85.262	11.026	5.735	0.817	-7.705	1.347
52	65	TE	117	-85.267	8.076	5.947	0.516	-4.542	3.341
52	66	TE	118	-87.791	10.595	6.471	0.187	-6.537	0.193
52	67	TE	119	-87.366	7.647	6.672	-0.131	-3.388	2.213
52	68	TE	120	-89.475	10.181	7.185	-0.453	-5.409	-0.896
52	69	TE	121	-88.664	7.260	7.374	-0.792	-2.299	1.126
52	70	TE	122	-90.375	9.783	7.875	-1.107	-4.321	-1.920
52	71	TE	123	-89.218	6.914	8.052	-1.463	-1.275	0.078
52	72	TE	124	-90.549	9.402	8.542	-1.773	-3.273	-2.879
52	73	TE	125	-89.088	6.611	8.707	-2.148	-0.316	-0.930
52	74	TE	126	-90.054	9.038	9.185	-2.450	-2.265	-3.772
52	75	TE	127	-88.331	6.349	9.339	-2.843	0.577	-1.898
52	76	TE	128	-88.950	8.690	9.805	-3.139	-1.298	-4.601
52	77	TE	129	-87.007	6.129	9.947	-3.550	1.406	-2.825
52	78	TE	130	-87.294	8.359	10.402	-3.839	-0.370	-5.364
52	79	TE	131	-85.173	5.950	10.532	-4.269	2.169	-3.713
52	80	TE	132	-85.147	8.045	10.975	-4.552	0.517	-6.062
52	81	TE	133	-82.889	5.814	11.094	-5.000	2.867	-4.560
52	82	TE	134	-82.565	7.747	11.525	-5.276	1.365	-8.849
52	83	TE	135	-78.338	3.493	11.560	-2.882	5.382	-7.567
52	84	TE	136	-75.380	5.113	11.898	-0.596	4.107	-9.974
52	85	TE	137	-70.350	3.041	12.233	-0.828	6.521	-8.515
52	86	TE	138	-67.111	4.832	12.565	-1.227	5.070	-10.795
52	87	TE	139	-61.923	2.883	12.896	-1.745	7.357	-9.253
53	52	I	105	-39.719	14.247	-2.090	4.247	-14.074	12.836
53	53	I	106	-43.771	12.124	-1.495	4.080	-11.356	14.146
53	54	I	107	-49.403	13.704	-1.224	3.735	-12.666	11.291
53	55	I	108	-52.764	11.432	-0.641	3.550	-9.811	12.777
53	56	I	109	-57.869	13.177	-0.383	3.211	-11.297	9.811
53	57	I	110	-60.580	10.782	0.189	3.007	-8.331	11.449
53	58	I	111	-65.176	12.667	0.436	2.675	-9.969	8.396
53	59	I	112	-67.279	10.174	0.996	2.453	-6.916	10.161
53	60	I	113	-71.382	12.174	1.231	2.127	-8.681	7.046
53	61	I	114	-72.919	9.608	1.779	1.887	-5.566	8.913
53	62	I	115	-76.545	11.698	2.003	1.568	-7.433	5.762
53	63	I	116	-77.557	9.084	2.539	1.309	-4.282	7.705
53	64	I	117	-80.724	11.239	2.751	0.997	-6.225	4.542
53	65	I	118	-81.254	8.601	3.276	0.719	-3.062	6.537
53	66	I	119	-83.978	10.796	3.477	0.414	-5.057	3.388
53	67	I	120	-84.067	8.160	3.990	0.118	-1.908	5.409
53	68	I	121	-86.365	10.369	4.178	-0.181	-3.929	2.299
53	69	I	122	-86.054	7.761	4.680	-0.496	-0.819	4.321
53	70	I	123	-87.943	9.960	4.857	-0.788	-2.841	1.275
53	71	I	124	-87.276	7.404	5.346	-1.121	0.205	3.273
53	72	I	125	-88.771	9.567	5.512	-1.407	-1.793	0.316
53	73	I	126	-87.789	7.089	5.990	-1.758	1.163	2.265
53	74	I	127	-88.908	9.191	6.143	-2.037	-0.785	-0.577
53	75	I	128	-87.652	6.815	6.610	-2.407	2.057	1.298
53	76	I	129	-88.412	8.832	6.752	-2.679	0.182	-1.406
53	77	I	130	-86.924	6.583	7.206	-3.068	2.885	0.370
53	78	I	131	-87.342	8.489	7.337	-3.333	1.110	-2.169
53	79	I	132	-85.664	6.393	7.780	-3.740	3.649	-0.517
53	80	I	133	-85.756	8.163	7.898	-3.999	1.997	-2.867
53	81	I	134	-83.930	6.245	8.330	-4.424	4.347	-1.365
53	82	I	135	-83.713	7.854	8.437	-4.677	2.845	-5.382
53	83	I	136	-79.487	3.838	8.438	-3.025	7.168	-4.107
53	84	I	137	-76.871	5.455	8.780	-0.312	5.882	-6.521

Z	N	A		ΔM	S_n	S_p	Q_α	Q_{β^-}	Q_{β^+}
53	85	I	138	-72.181	3.381	9.120	-0.539	8.285	-5.070
53	86	I	139	-69.280	5.170	9.458	-0.934	6.823	-7.357
53	87	I	140	-64.427	3.218	9.793	-1.446	9.100	-5.822
53	88	I	141	-61.443	5.087	10.127	-2.033	7.554	-8.063
53	89	I	142	-56.549	3.177	10.458	-2.658	9.784	-6.512
54	53	XE	107	-36.737	12.394	0.256	4.042	-14.540	12.666
54	54	XE	108	-42.953	14.287	0.839	3.720	-15.850	9.811
54	55	XE	109	-46.572	11.691	1.097	3.558	-12.995	11.297
54	56	XE	110	-52.249	13.749	1.669	3.242	-14.482	8.331
54	57	XE	111	-55.207	11.029	1.916	3.062	-11.515	9.969
54	58	XE	112	-60.363	13.227	2.476	2.753	-13.153	6.916
54	59	XE	113	-62.701	10.410	2.711	2.555	-10.100	8.681
54	60	XE	114	-67.352	12.722	3.259	2.252	-11.865	5.566
54	61	XE	115	-69.112	9.832	3.483	2.035	-8.751	7.433
54	62	XE	116	-73.275	12.234	4.019	1.740	-10.617	4.282
54	63	XE	117	-74.500	9.296	4.231	1.504	-7.466	6.225
54	64	XE	118	-78.191	11.763	4.756	1.215	-9.409	3.062
54	65	XE	119	-78.921	8.801	4.956	0.961	-6.247	5.057
54	66	XE	120	-82.158	11.309	5.469	0.679	-8.241	1.908
54	67	XE	121	-82.436	8.349	5.658	0.406	-5.092	3.929
54	68	XE	122	-85.235	10.871	6.160	0.130	-7.113	0.819
54	69	XE	123	-85.102	7.938	6.337	-0.161	-4.003	2.841
54	70	XE	124	-87.480	10.450	6.826	-0.430	-6.025	-0.205
54	71	XE	125	-86.978	7.569	6.992	-0.739	-2.979	1.793
54	72	XE	126	-88.952	10.045	7.470	-1.001	-4.977	-1.163
54	73	XE	127	-88.123	7.242	7.623	-1.329	-2.021	0.785
54	74	XE	128	-89.709	9.658	8.090	-1.585	-3.970	-2.057
54	75	XE	129	-88.595	6.957	8.232	-1.932	-1.127	-0.182
54	76	XE	130	-89.810	9.287	8.686	-2.181	-3.002	-2.885
54	77	XE	131	-88.452	6.714	8.817	-2.546	-0.299	-1.110
54	78	XE	132	-89.313	8.932	9.260	-2.788	-2.074	-3.649
54	79	XE	133	-87.753	6.512	9.378	-3.171	0.465	-1.997
54	80	XE	134	-88.277	8.595	9.810	-3.407	-1.187	-4.347
54	81	XE	135	-86.558	6.352	9.917	-3.809	1.163	-2.845
54	82	XE	136	-86.760	8.274	10.336	-4.038	-0.339	-7.168
54	83	XE	137	-82.753	4.169	10.555	-2.112	3.747	-5.882
54	84	XE	138	-80.466	5.784	10.884	0.025	2.475	-8.285
54	85	XE	139	-76.103	3.708	11.211	-0.190	4.892	-6.823
54	86	XE	140	-73.527	5.495	11.536	-0.572	3.444	-9.100
54	87	XE	141	-68.997	3.541	11.859	-1.072	5.734	-7.554
54	88	XE	142	-66.333	5.407	12.179	-1.647	4.202	-9.784
54	89	XE	143	-61.758	3.496	12.498	-2.260	6.445	-8.223
54	90	XE	144	-59.060	5.373	12.814	-2.880	4.897	-10.464
54	91	XE	145	-54.435	3.446	13.128	-3.480	7.152	-8.934
55	53	CS	108	-27.103	12.977	-2.346	4.016	-13.028	15.850
55	54	CS	109	-33.577	14.546	-2.087	3.717	-14.337	12.995
55	55	CS	110	-37.768	12.262	-1.515	3.578	-11.482	14.482
55	56	CS	111	-43.692	13.996	-1.268	3.286	-12.969	11.515
55	57	CS	112	-47.210	11.589	-0.709	3.129	-10.002	13.153
55	58	CS	113	-52.601	13.463	-0.473	2.844	-11.640	10.100
55	59	CS	114	-55.487	10.958	0.075	2.669	-8.587	11.865
55	60	CS	115	-60.362	12.946	0.299	2.390	-10.352	8.751
55	61	CS	116	-62.658	10.368	0.835	2.196	-7.238	10.617
55	62	CS	117	-67.034	12.447	1.047	1.924	-9.104	7.466
55	63	CS	118	-68.782	9.820	1.572	1.711	-5.953	9.409
55	64	CS	119	-72.675	11.964	1.772	1.446	-7.896	6.247
55	65	CS	120	-73.918	9.314	2.285	1.215	-4.734	8.241
55	66	CS	121	-77.343	11.497	2.474	0.956	-6.728	5.092
55	67	CS	122	-78.122	8.850	2.975	0.707	-3.580	7.113

Z	N	A	ΔM	S_n	S_p	Q_α	Q_{β^-}	Q_{β^+}
55	68	CS 123	-81.099	11.048	3.152	0.455	-5.600	4.003
55	69	CS 124	-81.455	8.428	3.642	0.187	-2.490	6.025
55	70	CS 125	-83.999	10.615	3.807	-0.059	-4.512	2.979
55	71	CS 126	-83.975	8.047	4.285	-0.345	-1.467	4.977
55	72	CS 127	-86.102	10.199	4.439	-0.584	-3.464	2.021
55	73	CS 128	-85.739	7.709	4.905	-0.889	-0.508	3.970
55	74	CS 129	-87.467	9.800	5.047	-1.121	-2.457	1.127
55	75	CS 130	-86.808	7.412	5.502	-1.444	0.386	3.002
55	76	CS 131	-88.153	9.417	5.632	-1.670	-1.489	0.299
55	77	CS 132	-87.238	7.157	6.075	-2.011	1.214	2.074
55	78	CS 133	-88.218	9.051	6.194	-2.230	-0.561	-0.465
55	79	CS 134	-87.090	6.943	6.625	-2.590	1.977	1.187
55	80	CS 135	-87.720	8.702	6.732	-2.803	0.326	-1.163
55	81	CS 136	-86.421	6.772	7.152	-3.181	2.676	0.339
55	82	CS 137	-86.718	8.369	7.247	-3.387	1.174	-3.747
55	83	CS 138	-82.941	4.512	7.477	-1.530	5.484	-2.475
55	84	CS 139	-80.995	6.125	7.818	0.300	4.195	-4.892
55	85	CS 140	-76.971	4.047	8.157	0.091	6.595	-3.444
55	86	CS 141	-74.731	5.831	8.493	-0.285	5.131	-5.734
55	87	CS 142	-70.535	3.875	8.827	-0.779	7.405	-4.202
55	88	CS 143	-68.203	5.739	9.159	-1.348	5.856	-6.445
55	89	CS 144	-63.957	3.825	9.488	-1.955	8.083	-4.897
55	90	CS 145	-61.587	5.701	9.816	-2.569	6.519	-7.152
55	91	CS 146	-57.288	3.772	10.142	-3.164	8.756	-5.636
55	92	CS 147	-54.827	5.610	10.464	-3.717	7.225	-7.938
56	54	BA 110	-26.285	15.117	-0.003	3.705	-17.471	11.482
56	55	BA 111	-30.723	12.509	0.245	3.589	-14.617	12.969
56	56	BA 112	-37.207	14.555	0.804	3.321	-16.103	10.002
56	57	BA 113	-40.960	11.825	1.040	3.187	-13.136	11.640
56	58	BA 114	-46.900	14.011	1.588	2.925	-14.775	8.587
56	59	BA 115	-50.010	11.181	1.812	2.773	-11.722	10.352
56	60	BA 116	-55.421	13.483	2.348	2.517	-13.486	7.238
56	61	BA 117	-57.929	10.580	2.560	2.347	-10.372	9.104
56	62	BA 118	-62.829	12.971	3.085	2.098	-12.238	5.953
56	63	BA 119	-64.779	10.021	3.285	1.909	-9.087	7.896
56	64	BA 120	-69.184	12.477	3.798	1.667	-11.030	4.734
56	65	BA 121	-70.615	9.503	3.987	1.459	-7.868	6.728
56	66	BA 122	-74.543	11.999	4.488	1.224	-9.862	3.580
56	67	BA 123	-75.499	9.027	4.665	0.998	-6.714	5.600
56	68	BA 124	-78.965	11.538	5.155	0.769	-8.734	2.490
56	69	BA 125	-79.486	8.593	5.320	0.525	-5.625	4.512
56	70	BA 126	-82.508	11.093	5.798	0.302	-7.646	1.467
56	71	BA 127	-82.638	8.201	5.952	0.040	-4.601	3.464
56	72	BA 128	-85.232	10.665	6.418	-0.176	-6.599	0.508
56	73	BA 129	-85.011	7.851	6.560	-0.457	-3.642	2.457
56	74	BA 130	-87.194	10.254	7.015	-0.666	-5.591	-0.386
56	75	BA 131	-86.664	7.542	7.145	-0.966	-2.748	1.489
56	76	BA 132	-88.453	9.860	7.588	-1.168	-4.623	-1.214
56	77	BA 133	-87.656	7.275	7.707	-1.487	-1.920	0.561
56	78	BA 134	-89.067	9.482	8.138	-1.682	-3.696	-1.977
56	79	BA 135	-88.046	7.050	8.245	-2.019	-1.157	-0.326
56	80	BA 136	-89.096	9.121	8.665	-2.208	-2.808	-2.676
56	81	BA 137	-87.892	6.867	8.760	-2.563	-0.459	-1.174
56	82	BA 138	-88.598	8.777	9.168	-2.746	-1.961	-5.484
56	83	BA 139	-85.190	4.836	9.538	-0.986	2.130	-4.195
56	84	BA 140	-83.566	6.447	9.860	0.664	0.860	-6.595
56	85	BA 141	-79.862	4.367	10.180	0.466	3.279	-5.131
56	86	BA 142	-77.940	6.149	10.498	0.101	1.833	-7.405
56	87	BA 143	-74.059	4.190	10.813	-0.381	4.126	-5.856
56	88	BA 144	-72.040	6.052	11.126	-0.938	2.596	-8.083

Z	N	A		ΔM	S_n	S_p	Q_α	Q_{β^-}	Q_{β^+}
56	89	BA	145	-68.106	4.137	11.438	-1.534	4.842	-6.519
56	90	BA	146	-66.044	6.009	11.746	-2.136	3.297	-8.756
56	91	BA	147	-62.052	4.079	12.053	-2.719	5.553	-7.225
56	92	BA	148	-59.896	5.915	12.358	-3.261	4.040	-9.511
56	93	BA	149	-55.756	3.931	12.660	-3.746	6.345	-8.040
57	54	LA	111	-16.107	15.364	-2.890	3.665	-15.896	14.617
57	55	LA	112	-21.104	13.069	-2.330	3.574	-13.041	16.103
57	56	LA	113	-27.824	14.791	-2.094	3.328	-14.527	13.136
57	57	LA	114	-32.125	12.373	-1.546	3.218	-11.561	14.775
57	58	LA	115	-38.288	14.234	-1.323	2.979	-13.199	11.722
57	59	LA	116	-41.934	11.718	-0.786	2.851	-10.146	13.486
57	60	LA	117	-47.558	13.695	-0.574	2.618	-11.911	10.372
57	61	LA	118	-50.591	11.105	-0.049	2.471	-8.797	12.238
57	62	LA	119	-55.691	13.172	0.151	2.246	-10.663	9.087
57	63	LA	120	-58.154	10.534	0.664	2.080	-7.512	11.030
57	64	LA	121	-62.747	12.665	0.853	1.861	-9.455	7.868
57	65	LA	122	-64.680	10.004	1.354	1.677	-6.293	9.862
57	66	LA	123	-68.785	12.176	1.531	1.465	-8.287	6.714
57	67	LA	124	-70.230	9.517	2.021	1.262	-5.138	8.734
57	68	LA	125	-73.862	11.703	2.186	1.057	-7.159	5.625
57	69	LA	126	-74.862	9.071	2.664	0.836	-4.049	7.646
57	70	LA	127	-78.037	11.247	2.818	0.637	-6.071	4.601
57	71	LA	128	-78.633	8.667	3.284	0.397	-3.025	6.599
57	72	LA	129	-81.369	10.807	3.426	0.205	-5.023	3.642
57	73	LA	130	-81.603	8.305	3.881	-0.053	-2.067	5.591
57	74	LA	131	-83.916	10.385	4.011	-0.238	-4.016	2.748
57	75	LA	132	-83.829	7.985	4.454	-0.515	-1.173	4.623
57	76	LA	133	-85.737	9.979	4.573	-0.694	-3.048	1.920
57	77	LA	134	-85.372	7.707	5.004	-0.989	-0.345	3.696
57	78	LA	135	-86.889	9.589	5.111	-1.161	-2.120	1.157
57	79	LA	136	-86.288	7.470	5.531	-1.474	0.419	2.808
57	80	LA	137	-87.433	9.217	5.626	-1.640	-1.233	0.459
57	81	LA	138	-86.637	7.275	6.034	-1.972	1.117	1.961
57	82	LA	139	-87.426	8.861	6.118	-2.131	-0.385	-2.130
57	83	LA	140	-84.426	5.177	6.525	-0.445	3.802	-0.860
57	84	LA	141	-83.141	6.786	6.864	0.934	2.510	-3.279
57	85	LA	142	-79.773	4.703	7.200	0.743	4.908	-1.833
57	86	LA	143	-78.185	6.483	7.534	0.385	3.441	-4.126
57	87	LA	144	-74.636	4.522	7.866	-0.090	5.713	-2.596
57	88	LA	145	-72.948	6.383	8.197	-0.642	4.161	-4.842
57	89	LA	146	-69.341	4.464	8.524	-1.231	6.386	-3.297
57	90	LA	147	-67.605	6.335	8.850	-1.827	4.819	-5.553
57	91	LA	148	-63.936	4.402	9.173	-2.404	7.054	-4.040
57	92	LA	149	-62.101	6.236	9.494	-2.939	5.520	-6.345
57	93	LA	150	-58.280	4.250	9.813	-3.417	7.804	-4.893
57	94	LA	151	-56.228	6.019	10.130	-3.826	6.330	-7.268
57	95	LA	152	-52.116	3.959	10.445	-4.156	8.684	-5.890
58	55	CE	113	-13.296	13.305	-0.519	3.519	-16.105	14.527
58	56	CE	114	-20.564	15.339	0.029	3.297	-17.591	11.561
58	57	CE	115	-25.089	12.596	0.253	3.210	-14.625	13.199
58	58	CE	116	-31.788	14.771	0.789	2.994	-16.263	10.146
58	59	CE	117	-35.646	11.930	1.001	2.889	-13.210	11.911
58	60	CE	118	-41.794	14.219	1.526	2.680	-14.975	8.797
58	61	CE	119	-45.028	11.305	1.726	2.556	-11.860	10.663
58	62	CE	120	-50.642	13.685	2.239	2.354	-13.726	7.512
58	63	CE	121	-53.293	10.722	2.428	2.212	-10.576	9.455
58	64	CE	122	-58.388	13.167	2.929	2.017	-12.518	6.293
58	65	CE	123	-60.498	10.182	3.106	1.856	-9.356	8.287
58	66	CE	124	-65.092	12.665	3.596	1.667	-11.350	5.138

Z	N	A	ΔM	S_n	S_p	Q_α	Q_{β^-}	Q_{β^+}
58	67	CE 125	-66.703	9.682	3.762	1.488	-8.202	7.159
58	68	CE 126	-70.812	12.181	4.239	1.306	-10.222	4.049
58	69	CE 127	-71.966	9.225	4.393	1.108	-7.113	6.071
58	70	CE 128	-75.607	11.713	4.860	0.932	-9.135	3.025
58	71	CE 129	-76.345	8.809	5.002	0.716	-6.089	5.023
58	72	CE 130	-79.536	11.262	5.456	0.547	-8.087	2.067
58	73	CE 131	-79.900	8.436	5.587	0.313	-5.130	4.016
58	74	CE 132	-82.656	10.828	6.030	0.150	-7.079	1.173
58	75	CE 133	-82.689	8.104	6.148	-0.103	-4.237	3.048
58	76	CE 134	-85.027	10.410	6.579	-0.258	-6.111	0.345
58	77	CE 135	-84.769	7.814	6.687	-0.530	-3.408	2.120
58	78	CE 136	-86.707	10.009	7.106	-0.679	-5.184	-0.419
58	79	CE 137	-86.200	7.565	7.201	-0.969	-2.645	1.233
58	80	CE 138	-87.754	9.625	7.609	-1.111	-4.296	-1.117
58	81	CE 139	-87.041	7.359	7.693	-1.420	-1.947	0.385
58	82	CE 140	-88.227	9.257	8.089	-1.555	-3.449	-3.802
58	83	CE 141	-85.651	5.494	8.514	-0.190	0.526	-2.510
58	84	CE 142	-84.681	7.101	8.829	1.319	-0.742	-4.908
58	85	CE 143	-81.626	5.016	9.142	1.139	1.679	-3.441
58	86	CE 144	-80.349	6.794	9.453	0.792	0.235	-5.713
58	87	CE 145	-77.109	4.831	9.762	0.328	2.530	-4.161
58	88	CE 146	-75.727	6.689	10.068	-0.212	1.002	-6.386
58	89	CE 147	-72.424	4.768	10.372	-0.790	3.250	-4.819
58	90	CE 148	-70.990	6.637	10.674	-1.375	1.707	-7.054
58	91	CE 149	-67.621	4.702	10.974	-1.940	3.965	-5.520
58	92	CE 150	-66.084	6.534	11.272	-2.465	2.454	-7.804
58	93	CE 151	-62.558	4.545	11.567	-2.931	4.761	-6.330
58	94	CE 152	-60.800	6.313	11.861	-3.329	3.310	-8.684
58	95	CE 153	-56.979	4.250	12.152	-3.648	5.687	-7.285
58	96	CE 154	-54.846	5.938	12.441	-3.884	4.311	-9.713
59	55	PR 114	-2.973	13.853	-3.035	3.417	-14.454	17.591
59	56	PR 115	-10.464	15.563	-2.811	3.218	-15.940	14.625
59	57	PR 116	-15.525	13.133	-2.274	3.154	-12.974	16.263
59	58	PR 117	-22.437	14.983	-2.062	2.962	-14.612	13.210
59	59	PR 118	-26.820	12.455	-1.538	2.880	-11.559	14.975
59	60	PR 119	-33.168	14.420	-1.337	2.695	-13.324	11.860
59	61	PR 120	-36.915	11.818	-0.824	2.594	-10.210	13.726
59	62	PR 121	-42.717	13.873	-0.635	2.416	-12.076	10.576
59	63	PR 122	-45.869	11.224	-0.134	2.297	-8.925	12.518
59	64	PR 123	-51.142	13.344	0.043	2.125	-10.868	9.356
59	65	PR 124	-53.742	10.671	0.533	1.987	-7.706	11.350
59	66	PR 125	-58.501	12.831	0.698	1.822	-9.700	8.202
59	67	PR 126	-60.590	10.160	1.176	1.666	-6.551	10.222
59	68	PR 127	-64.853	12.335	1.330	1.507	-8.572	7.113
59	69	PR 128	-66.473	9.691	1.796	1.333	-5.462	9.135
59	70	PR 129	-70.257	11.855	1.938	1.181	-7.484	6.089
59	71	PR 130	-71.449	9.264	2.393	0.988	-4.438	8.087
59	72	PR 131	-74.770	11.392	2.523	0.842	-6.436	5.130
59	73	PR 132	-75.577	8.879	2.966	0.631	-3.480	7.079
59	74	PR 133	-78.452	10.946	3.085	0.492	-5.429	4.237
59	75	PR 134	-78.916	8.535	3.516	0.262	-2.586	6.111
59	76	PR 135	-81.361	10.517	3.623	0.130	-4.461	3.408
59	77	PR 136	-81.523	8.233	4.043	-0.118	-1.758	5.184
59	78	PR 137	-83.556	10.104	4.138	-0.244	-3.533	2.645
59	79	PR 138	-83.457	7.973	4.546	-0.510	-0.994	4.296
59	80	PR 139	-85.094	9.708	4.630	-0.629	-2.646	1.947
59	81	PR 140	-84.778	7.755	5.026	-0.915	-0.296	3.449
59	82	PR 141	-86.035	9.329	5.098	-1.027	-1.798	-0.526
59	83	PR 142	-83.939	5.833	5.577	0.318	2.123	0.742
59	84	PR 143	-83.305	7.437	5.913	1.590	0.830	-1.679

Z	N	A		ΔM	S_n	S_p	Q_α	Q_{β^-}	Q_{β^+}
59	85	PR	144	-80.584	5.350	6.247	1.417	3.226	-0.235
59	86	PR	145	-79.639	7.126	6.579	1.077	1.756	-2.530
59	87	PR	146	-76.729	5.161	6.909	0.619	4.026	-1.002
59	88	PR	147	-75.674	7.016	7.236	0.086	2.473	-3.250
59	89	PR	148	-72.697	5.094	7.562	-0.486	4.695	-1.707
59	90	PR	149	-71.586	6.960	7.885	-1.063	3.127	-3.965
59	91	PR	150	-68.538	5.023	8.206	-1.622	5.360	-2.454
59	92	PR	151	-67.319	6.852	8.524	-2.139	3.824	-4.761
59	93	PR	152	-64.110	4.862	8.841	-2.599	6.106	-3.310
59	94	PR	153	-62.666	6.627	9.155	-2.990	4.630	-5.687
59	95	PR	154	-59.157	4.562	9.467	-3.302	6.982	-4.311
59	96	PR	155	-57.334	6.248	9.777	-3.531	5.581	-6.763
59	97	PR	156	-53.367	4.104	10.085	-3.676	8.008	-5.462
59	98	PR	157	-51.007	5.711	10.391	-3.738	6.681	-7.984
60	56	ND	116	-2.551	16.099	-0.624	3.087	-18.928	12.974
60	57	ND	117	-7.824	13.345	-0.412	3.047	-15.961	14.612
60	58	ND	118	-15.261	15.508	0.113	2.878	-17.599	11.559
60	59	ND	119	-19.844	12.655	0.313	2.820	-14.546	13.324
60	60	ND	120	-26.706	14.933	0.826	2.658	-16.311	10.210
60	61	ND	121	-30.641	12.007	1.015	2.581	-13.197	12.076
60	62	ND	122	-36.944	14.375	1.516	2.425	-15.063	8.925
60	63	ND	123	-40.274	11.401	1.693	2.330	-11.912	10.868
60	64	ND	124	-46.036	13.833	2.183	2.181	-13.855	7.706
60	65	ND	125	-48.801	10.837	2.349	2.067	-10.693	9.700
60	66	ND	126	-54.038	13.309	2.826	1.925	-12.687	6.551
60	67	ND	127	-56.281	10.314	2.980	1.792	-9.539	8.572
60	68	ND	128	-61.011	12.801	3.447	1.657	-11.559	5.462
60	69	ND	129	-62.772	9.833	3.589	1.506	-8.449	7.484
60	70	ND	130	-67.011	12.310	4.043	1.377	-10.471	4.438
60	71	ND	131	-68.334	9.394	4.174	1.207	-7.426	6.436
60	72	ND	132	-72.098	11.835	4.617	1.085	-9.424	3.480
60	73	ND	133	-73.023	8.997	4.735	0.897	-6.467	5.429
60	74	ND	134	-76.330	11.378	5.166	0.782	-8.416	2.586
60	75	ND	135	-76.900	8.642	5.274	0.575	-5.573	4.461
60	76	ND	136	-79.765	10.936	5.693	0.466	-7.448	1.758
60	77	ND	137	-80.022	8.329	5.788	0.242	-4.745	3.533
60	78	ND	138	-82.463	10.512	6.196	0.139	-6.521	0.994
60	79	ND	139	-82.448	8.057	6.280	-0.104	-3.982	2.646
60	80	ND	140	-84.482	10.105	6.676	-0.200	-5.633	0.296
60	81	ND	141	-84.237	7.827	6.748	-0.461	-3.283	1.798
60	82	ND	142	-85.879	9.714	7.133	-0.550	-4.786	-2.123
60	83	ND	143	-84.135	6.144	7.485	0.425	-1.067	-0.830
60	84	ND	144	-83.810	7.746	7.794	1.993	-2.333	-3.226
60	85	ND	145	-81.395	5.656	8.100	1.831	0.090	-1.756
60	86	ND	146	-80.755	7.431	8.405	1.501	-1.353	-4.026
60	87	ND	147	-78.147	5.463	8.707	1.054	0.943	-2.473
60	88	ND	148	-77.392	7.316	9.007	0.532	-0.583	-4.695
60	89	ND	149	-74.713	5.392	9.305	-0.029	1.666	-3.127
60	90	ND	150	-73.898	7.256	9.601	-0.596	0.124	-5.360
60	91	ND	151	-71.143	5.316	9.894	-1.144	2.385	-3.824
60	92	ND	152	-70.216	7.144	10.186	-1.651	0.875	-6.106
60	93	ND	153	-67.296	5.151	10.475	-2.100	3.183	-4.630
60	94	ND	154	-66.139	6.914	10.762	-2.480	1.734	-6.982
60	95	ND	155	-62.915	4.847	11.047	-2.782	4.112	-5.581
60	96	ND	156	-61.375	6.531	11.330	-3.000	2.737	-8.008
60	97	ND	157	-57.688	4.384	11.610	-3.134	5.191	-6.681
60	98	ND	158	-55.606	5.989	11.888	-3.185	3.891	-9.178
60	99	ND	159	-51.303	3.768	12.164	-3.157	6.415	-7.915
61	56	PM	117	8.137	16.311	-3.399	2.904	-17.203	15.961

Z	N	A	ΔM	S_n	S_p	Q_α	Q_{β^-}	Q_{β^+}
61	57	PM 118	2.339	13.869	-2.874	2.887	-14.236	17.599
61	58	PM 119	-5.298	15.708	-2.674	2.742	-15.874	14.546
61	59	PM 120	-10.394	13.168	-2.161	2.706	-12.821	16.311
61	60	PM 121	-17.444	15.122	-1.972	2.568	-14.586	13.197
61	61	PM 122	-21.881	12.508	-1.471	2.514	-11.472	15.063
61	62	PM 123	-28.362	14.552	-1.294	2.382	-13.338	11.912
61	63	PM 124	-32.181	11.891	-0.804	2.309	-10.187	13.855
61	64	PM 125	-38.108	13.999	-0.639	2.184	-12.130	10.693
61	65	PM 126	-41.351	11.315	-0.161	2.093	-8.968	12.687
61	66	PM 127	-46.742	13.463	-0.007	1.975	-10.962	9.539
61	67	PM 128	-49.451	10.780	0.459	1.865	-7.813	11.559
61	68	PM 129	-54.323	12.943	0.601	1.753	-9.834	8.449
61	69	PM 130	-56.539	10.288	1.056	1.626	-6.724	10.471
61	70	PM 131	-60.908	12.440	1.186	1.520	-8.746	7.426
61	71	PM 132	-62.674	9.837	1.629	1.374	-5.700	9.424
61	72	PM 133	-66.557	11.954	1.748	1.275	-7.698	6.467
61	73	PM 134	-67.914	9.429	2.179	1.111	-4.742	8.416
61	74	PM 135	-71.327	11.485	2.286	1.018	-6.691	5.573
61	75	PM 136	-72.317	9.062	2.706	0.835	-3.848	7.448
61	76	PM 137	-75.277	11.032	2.801	0.750	-5.723	4.745
61	77	PM 138	-75.942	8.736	3.209	0.548	-3.020	6.521
61	78	PM 139	-78.467	10.596	3.293	0.469	-4.795	3.982
61	79	PM 140	-78.849	8.453	3.689	0.249	-2.256	5.633
61	80	PM 141	-80.954	10.177	3.761	0.177	-3.908	3.283
61	81	PM 142	-81.094	8.212	4.146	-0.061	-1.558	4.786
61	82	PM 143	-82.796	9.774	4.206	-0.127	-3.060	1.067
61	83	PM 144	-81.477	6.480	4.631	0.962	0.451	2.333
61	84	PM 145	-81.485	8.079	4.964	2.267	-0.844	-0.090
61	85	PM 146	-79.402	5.988	5.296	2.112	1.551	1.353
61	86	PM 147	-79.090	7.759	5.624	1.790	0.080	-0.943
61	87	PM 148	-76.809	5.790	5.951	1.350	2.348	0.583
61	88	PM 149	-76.379	7.641	6.276	0.835	0.794	-1.666
61	89	PM 150	-74.022	5.714	6.598	0.282	3.015	-0.124
61	90	PM 151	-73.528	7.577	6.919	-0.279	1.444	-2.385
61	91	PM 152	-71.091	5.634	7.237	-0.819	3.676	-0.875
61	92	PM 153	-70.479	7.459	7.552	-1.318	2.139	-3.183
61	93	PM 154	-67.873	5.465	7.866	-1.760	4.419	-1.734
61	94	PM 155	-67.027	7.225	8.177	-2.133	2.942	-4.112
61	95	PM 156	-64.112	5.156	8.486	-2.427	5.293	-2.737
61	96	PM 157	-62.879	6.838	8.793	-2.638	3.890	-5.191
61	97	PM 158	-59.497	4.689	9.098	-2.765	6.315	-3.891
61	98	PM 159	-57.718	6.292	9.401	-2.809	4.987	-6.415
61	99	PM 160	-53.715	4.068	9.701	-2.773	7.483	-5.178
61	100	PM 161	-51.248	5.604	10.000	-2.666	6.217	-7.759
61	101	PM 162	-46.496	3.319	10.296	-2.493	8.770	-6.567
62	57	SM 119	10.577	14.070	-0.949	2.675	-17.153	15.874
62	58	SM 120	2.427	16.221	-0.436	2.553	-18.791	12.821
62	59	SM 121	-2.858	13.357	-0.247	2.541	-15.738	14.586
62	60	SM 122	-10.410	15.623	0.254	2.426	-17.503	11.472
62	61	SM 123	-15.024	12.685	0.431	2.396	-14.388	13.338
62	62	SM 124	-21.994	15.042	0.921	2.287	-16.255	10.187
62	63	SM 125	-25.978	12.056	1.086	2.238	-13.104	12.130
62	64	SM 126	-32.384	14.477	1.564	2.136	-15.047	8.968
62	65	SM 127	-35.781	11.468	1.718	2.069	-11.885	10.962
62	66	SM 128	-41.638	13.929	2.184	1.973	-13.879	7.813
62	67	SM 129	-44.489	10.922	2.326	1.887	-10.730	9.834
62	68	SM 130	-49.815	13.398	2.781	1.799	-12.751	6.724
62	69	SM 131	-52.162	10.418	2.911	1.694	-9.641	8.746
62	70	SM 132	-56.974	12.883	3.354	1.612	-11.663	5.700
62	71	SM 133	-58.858	9.956	3.473	1.489	-8.617	7.698

Z	N	A		ΔM	S_n	S_p	Q_α	Q_{β^-}	Q_{β^+}
62	72	SM	134	-63.172	12.385	3.904	1.414	-10.615	4.742
62	73	SM	135	-64.636	9.536	4.011	1.273	-7.659	6.691
62	74	SM	136	-68.469	11.904	4.431	1.204	-9.607	3.848
62	75	SM	137	-69.554	9.157	4.526	1.044	-6.765	5.723
62	76	SM	138	-72.923	11.440	4.934	0.982	-8.640	3.020
62	77	SM	139	-73.671	8.820	5.018	0.804	-5.937	4.795
62	78	SM	140	-76.592	10.992	5.414	0.748	-7.712	2.256
62	79	SM	141	-77.046	8.525	5.486	0.552	-5.173	3.908
62	80	SM	142	-79.535	10.561	5.871	0.503	-6.825	1.558
62	81	SM	143	-79.736	8.272	5.931	0.288	-4.475	3.060
62	82	SM	144	-81.811	10.147	6.304	0.245	-5.977	-0.451
62	83	SM	145	-80.641	6.784	6.453	1.093	-2.650	0.844
62	84	SM	146	-80.953	8.383	6.757	2.684	-3.916	-1.551
62	85	SM	147	-79.170	6.288	7.057	2.540	-1.492	-0.080
62	86	SM	148	-79.157	8.058	7.356	2.228	-2.933	-2.348
62	87	SM	149	-77.173	6.087	7.653	1.797	-0.637	-0.794
62	88	SM	150	-77.037	7.935	7.947	1.293	-2.162	-3.015
62	89	SM	151	-74.972	6.006	8.239	0.750	0.088	-1.444
62	90	SM	152	-74.767	7.866	8.528	0.200	-1.453	-3.676
62	91	SM	153	-72.618	5.922	8.816	-0.330	0.808	-2.139
62	92	SM	154	-72.292	7.745	9.102	-0.819	-0.700	-4.419
62	93	SM	155	-69.969	5.748	9.385	-1.251	1.609	-2.942
62	94	SM	156	-69.405	7.507	9.667	-1.614	0.161	-5.293
62	95	SM	157	-66.769	5.435	9.946	-1.898	2.540	-3.890
62	96	SM	158	-65.812	7.114	10.222	-2.098	1.167	-6.315
62	97	SM	159	-62.705	4.964	10.497	-2.215	3.621	-4.987
62	98	SM	160	-61.198	6.564	10.769	-2.248	2.322	-7.483
62	99	SM	161	-57.465	4.338	11.039	-2.202	4.847	-6.217
62	100	SM	162	-55.266	5.872	11.307	-2.085	3.611	-8.770
62	101	SM	163	-50.780	3.585	11.573	-1.902	6.192	-7.550
62	102	SM	164	-47.777	5.068	11.836	-1.665	5.002	-10.135
63	58	EU	121	12.880	16.410	-3.164	2.318	-17.002	15.738
63	59	EU	122	7.093	13.858	-2.663	2.330	-13.949	17.503
63	60	EU	123	-0.635	15.800	-2.485	2.238	-15.714	14.388
63	61	EU	124	-5.739	13.175	-1.996	2.231	-12.599	16.255
63	62	EU	125	-12.874	15.207	-1.830	2.145	-14.466	13.104
63	63	EU	126	-17.337	12.534	-1.352	2.120	-11.315	15.047
63	64	EU	127	-23.896	14.631	-1.199	2.041	-13.258	11.885
63	65	EU	128	-27.759	11.935	-0.732	1.997	-10.095	13.879
63	66	EU	129	-33.759	14.071	-0.590	1.925	-12.090	10.730
63	67	EU	130	-37.064	11.377	-0.136	1.862	-8.941	12.751
63	68	EU	131	-42.521	13.528	-0.005	1.797	-10.962	9.641
63	69	EU	132	-45.311	10.861	0.438	1.716	-7.852	11.663
63	70	EU	133	-50.241	13.002	0.556	1.657	-9.874	8.617
63	71	EU	134	-52.557	10.387	0.988	1.558	-6.828	10.615
63	72	EU	135	-56.978	12.492	1.095	1.506	-8.826	7.659
63	73	EU	136	-58.861	9.955	1.514	1.388	-5.869	9.607
63	74	EU	137	-62.789	11.999	1.610	1.342	-7.818	6.765
63	75	EU	138	-64.283	9.565	2.017	1.206	-4.976	8.640
63	76	EU	139	-67.735	11.523	2.101	1.167	-6.851	5.937
63	77	EU	140	-68.880	9.216	2.497	1.012	-4.147	7.712
63	78	EU	141	-71.872	11.064	2.569	0.980	-5.923	5.173
63	79	EU	142	-72.711	8.910	2.954	0.807	-3.384	6.825
63	80	EU	143	-75.261	10.621	3.014	0.781	-5.036	4.475
63	81	EU	144	-75.834	8.645	3.387	0.590	-2.686	5.977
63	82	EU	145	-77.958	10.195	3.436	0.571	-4.188	2.650
63	83	EU	146	-77.037	7.117	3.685	1.746	-1.212	3.916
63	84	EU	147	-77.678	8.712	4.014	2.965	-2.507	1.492
63	85	EU	148	-76.224	6.617	4.343	2.828	-0.114	2.933
63	86	EU	149	-76.536	8.383	4.668	2.524	-1.585	0.637

Z	N	A	ΔM	S_n	S_p	Q_α	Q_{β^-}	Q_{β^+}
63	87	EU 150	-74.875	6.410	4.991	2.102	0.682	2.162
63	88	EU 151	-75.060	8.256	5.312	1.605	-0.873	-0.088
63	89	EU 152	-73.314	6.325	5.631	1.070	1.347	1.453
63	90	EU 153	-73.426	8.183	5.948	0.528	-0.224	-0.808
63	91	EU 154	-71.592	6.237	6.263	0.005	2.006	0.700
63	92	EU 155	-71.578	8.057	6.575	-0.475	0.468	-1.609
63	93	EU 156	-69.566	6.059	6.886	-0.900	2.747	-0.161
63	94	EU 157	-69.309	7.814	7.193	-1.255	1.269	-2.540
63	95	EU 158	-66.979	5.741	7.499	-1.531	3.618	-1.167
63	96	EU 159	-66.326	7.418	7.803	-1.724	2.214	-3.621
63	97	EU 160	-63.520	5.265	8.104	-1.833	4.639	-2.322
63	98	EU 161	-62.312	6.863	8.403	-1.858	3.310	-4.847
63	99	EU 162	-58.877	4.636	8.701	-1.805	5.804	-3.611
63	100	EU 163	-56.972	6.166	8.995	-1.679	4.539	-6.192
63	101	EU 164	-52.779	3.878	9.288	-1.489	7.089	-5.002
63	102	EU 165	-50.067	5.359	9.579	-1.244	5.869	-7.616
63	103	EU 166	-45.028	3.032	9.866	-0.957	8.454	-6.448
63	104	EU 167	-41.444	4.487	10.153	-0.639	7.255	-9.071
64	58	GD 122	21.042	16.911	-0.873	2.042	-19.863	13.949
64	59	GD 123	15.079	14.035	-0.696	2.077	-16.810	15.714
64	60	GD 124	6.860	16.290	-0.207	2.009	-18.575	12.599
64	61	GD 125	1.591	13.341	-0.041	2.025	-15.460	14.466
64	62	GD 126	-6.022	15.685	0.437	1.963	-17.326	11.315
64	63	GD 127	-10.638	12.688	0.590	1.961	-14.176	13.258
64	64	GD 128	-17.664	15.097	1.057	1.905	-16.118	10.095
64	65	GD 129	-21.669	12.077	1.199	1.885	-12.956	12.090
64	66	GD 130	-28.123	14.526	1.653	1.836	-14.950	8.941
64	67	GD 131	-31.559	11.507	1.784	1.797	-11.802	10.962
64	68	GD 132	-37.458	13.971	2.227	1.755	-13.822	7.852
64	69	GD 133	-40.367	10.980	2.345	1.697	-10.713	9.874
64	70	GD 134	-45.729	13.433	2.777	1.662	-12.735	6.828
64	71	GD 135	-48.152	10.494	2.884	1.586	-9.689	8.826
64	72	GD 136	-52.992	12.912	3.303	1.557	-11.687	5.869
64	73	GD 137	-54.971	10.051	3.399	1.462	-8.730	7.818
64	74	GD 138	-59.307	12.407	3.807	1.440	-10.679	4.976
64	75	GD 139	-60.884	9.649	3.890	1.327	-7.837	6.851
64	76	GD 140	-64.732	11.920	4.287	1.312	-9.711	4.147
64	77	GD 141	-65.949	9.288	4.359	1.180	-7.008	5.923
64	78	GD 142	-69.327	11.449	4.743	1.171	-8.784	3.384
64	79	GD 143	-70.225	8.970	4.803	1.022	-6.245	5.036
64	80	GD 144	-73.148	10.994	5.176	1.019	-7.896	2.686
64	81	GD 145	-73.770	8.693	5.225	0.851	-5.547	4.188
64	82	GD 146	-76.255	10.557	5.586	0.855	-7.049	1.212
64	83	GD 147	-75.171	7.417	5.423	2.067	-4.229	2.507
64	84	GD 148	-76.110	9.010	5.721	3.393	-5.494	0.114
64	85	GD 149	-74.951	6.912	6.016	3.265	-3.070	1.585
64	86	GD 150	-75.557	8.677	6.310	2.971	-4.511	-0.682
64	87	GD 151	-74.187	6.701	6.601	2.558	-2.214	0.873
64	88	GD 152	-74.661	8.545	6.890	2.071	-3.738	-1.347
64	89	GD 153	-73.202	6.612	7.177	1.546	-1.488	0.224
64	90	GD 154	-73.598	8.467	7.461	1.014	-3.028	-2.006
64	91	GD 155	-72.046	6.519	7.743	0.501	-0.767	-0.468
64	92	GD 156	-72.313	8.338	8.024	0.029	-2.275	-2.747
64	93	GD 157	-70.578	6.336	8.301	-0.385	0.035	-1.269
64	94	GD 158	-70.597	8.090	8.577	-0.730	-1.412	-3.618
64	95	GD 159	-68.540	6.014	8.850	-0.996	0.968	-2.214
64	96	GD 160	-68.159	7.690	9.122	-1.179	-0.406	-4.639
64	97	GD 161	-65.622	5.534	9.391	-1.278	2.049	-3.310
64	98	GD 162	-64.681	7.130	9.658	-1.294	0.751	-5.804
64	99	GD 163	-61.511	4.901	9.923	-1.231	3.276	-4.539

Z	N	A	ΔM	S_n	S_p	Q_α	Q_{β^-}	Q_{β^+}
64	100	GD 164	-59.868	6.428	10.185	-1.095	2.041	-7.089
64	101	GD 165	-55.936	4.139	10.446	-0.896	4.622	-5.869
64	102	GD 166	-53.482	5.617	10.704	-0.641	3.432	-8.454
64	103	GD 167	-48.699	3.288	10.960	-0.344	6.048	-7.255
64	104	GD 168	-45.369	4.741	11.214	-0.017	4.879	-9.849
64	105	GD 169	-39.697	2.399	11.466	0.329	7.503	-8.646
65	59	TB 124	25.435	14.525	-3.067	1.792	-14.974	18.575
65	60	TB 125	17.051	16.455	-2.902	1.747	-16.739	15.460
65	61	TB 126	11.304	13.818	-2.424	1.786	-13.624	17.326
65	62	TB 127	3.537	15.839	-2.270	1.748	-15.490	14.176
65	63	TB 128	-1.545	13.154	-1.804	1.769	-12.340	16.118
65	64	TB 129	-8.713	15.239	-1.662	1.737	-14.282	12.956
65	65	TB 130	-13.173	12.531	-1.207	1.740	-11.120	14.950
65	66	TB 131	-19.757	14.656	-1.077	1.714	-13.114	11.802
65	67	TB 132	-23.636	11.950	-0.634	1.698	-9.966	13.822
65	68	TB 133	-29.654	14.090	-0.515	1.680	-11.986	10.713
65	69	TB 134	-32.994	11.411	-0.084	1.645	-8.877	12.735
65	70	TB 135	-38.463	13.540	0.023	1.633	-10.899	9.689
65	71	TB 136	-41.305	10.914	0.443	1.581	-7.853	11.687
65	72	TB 137	-46.241	13.007	0.538	1.575	-9.851	8.730
65	73	TB 138	-48.628	10.458	0.946	1.504	-6.894	10.679
65	74	TB 139	-53.048	12.491	1.030	1.505	-8.843	7.837
65	75	TB 140	-55.021	10.045	1.426	1.416	-6.001	9.711
65	76	TB 141	-58.941	11.992	1.498	1.423	-7.875	7.008
65	77	TB 142	-60.543	9.673	1.882	1.315	-5.172	8.784
65	78	TB 143	-63.980	11.509	1.943	1.330	-6.948	6.245
65	79	TB 144	-65.252	9.343	2.316	1.203	-4.409	7.896
65	80	TB 145	-68.223	11.043	2.364	1.224	-6.060	5.547
65	81	TB 146	-69.207	9.055	2.725	1.079	-3.711	7.049
65	82	TB 147	-71.729	10.594	2.762	1.107	-5.213	4.229
65	83	TB 148	-70.616	7.745	2.734	2.925	-2.861	5.494
65	84	TB 149	-71.881	9.336	3.060	3.685	-4.157	3.070
65	85	TB 150	-71.046	7.236	3.384	3.566	-1.764	4.511
65	86	TB 151	-71.973	8.998	3.705	3.280	-3.236	2.214
65	87	TB 152	-70.923	7.021	4.025	2.876	-0.970	3.738
65	88	TB 153	-71.714	8.862	4.342	2.397	-2.525	1.488
65	89	TB 154	-70.570	6.927	4.657	1.880	-0.306	3.028
65	90	TB 155	-71.279	8.780	4.970	1.356	-1.877	0.767
65	91	TB 156	-70.038	6.830	5.281	0.851	0.353	2.275
65	92	TB 157	-70.613	8.646	5.589	0.388	-1.186	-0.035
65	93	TB 158	-69.185	6.643	5.896	-0.018	1.092	1.412
65	94	TB 159	-69.508	8.394	6.200	-0.355	-0.386	-0.968
65	95	TB 160	-67.753	6.316	6.502	-0.612	1.963	0.406
65	96	TB 161	-67.671	7.989	6.801	-0.787	0.559	-2.049
65	97	TB 162	-65.432	5.832	7.099	-0.878	2.983	-0.751
65	98	TB 163	-64.787	7.426	7.395	-0.886	1.652	-3.276
65	99	TB 164	-61.909	5.193	7.687	-0.814	4.147	-2.041
65	100	TB 165	-60.558	6.720	7.979	-0.671	2.881	-4.622
65	101	TB 166	-56.914	4.427	8.267	-0.462	5.431	-3.432
65	102	TB 167	-54.747	5.904	8.554	-0.200	4.210	-6.048
65	103	TB 168	-50.248	3.572	8.838	0.106	6.795	-4.879
65	104	TB 169	-47.200	5.023	9.120	0.442	5.596	-7.503
65	105	TB 170	-41.808	2.679	9.400	0.795	8.188	-6.331
65	106	TB 171	-37.866	4.129	9.678	1.153	6.985	-8.938
65	107	TB 172	-31.593	1.798	9.954	1.502	9.560	-7.735
66	59	DY 125	33.790	14.690	-1.066	1.483		16.739
66	60	DY 126	24.928	16.933	-0.588	1.461		13.624
66	61	DY 127	19.028	13.972	-0.434	1.524		15.490
66	62	DY 128	10.794	16.305	0.032	1.509		12.340

Z	N	A	ΔM	S_n	S_p	Q_α	Q_{β^-}	Q_{β^+}
66	63	DY 129	5.570	13.296	0.174	1.554		14.282
66	64	DY 130	-2.053	15.694	0.629	1.545		11.120
66	65	DY 131	-6.643	12.662	0.759	1.571		13.114
66	66	DY 132	-13.670	15.099	1.202	1.569		9.966
66	67	DY 133	-17.668	12.069	1.321	1.576		11.986
66	68	DY 134	-24.117	14.521	1.752	1.581		8.877
66	69	DY 135	-27.564	11.518	1.859	1.570		10.899
66	70	DY 136	-33.452	13.960	2.279	1.582		7.853
66	71	DY 137	-36.390	11.009	2.374	1.552		9.851
66	72	DY 138	-41.734	13.415	2.782	1.570		6.894
66	73	DY 139	-44.205	10.542	2.866	1.522		8.843
66	74	DY 140	-49.020	12.887	3.262	1.547		6.001
66	75	DY 141	-51.066	10.117	3.334	1.481		7.875
66	76	DY 142	-55.371	12.376	3.718	1.512		5.172
66	77	DY 143	-57.032	9.733	3.779	1.427		6.948
66	78	DY 144	-60.843	11.882	4.152	1.465		4.409
66	79	DY 145	-62.163	9.392	4.200	1.362		6.060
66	80	DY 146	-65.496	11.404	4.561	1.406		3.711
66	81	DY 147	-66.516	9.092	4.598	1.284		5.213
66	82	DY 148	-69.388	10.943	4.948	1.336		2.861
66	83	DY 149	-67.724	8.040	4.397	3.581	-6.308	4.157
66	84	DY 150	-69.282	9.629	4.690	4.118	-7.771	1.764
66	85	DY 151	-68.737	7.526	4.980	4.009	-5.144	3.236
66	86	DY 152	-69.953	9.287	5.269	3.732	-6.970	0.970
66	87	DY 153	-69.189	7.307	5.555	3.337	-4.085	2.525
66	88	DY 154	-70.264	9.146	5.839	2.868	-6.086	0.306
66	89	DY 155	-69.402	7.209	6.121	2.360	-3.148	1.877
66	90	DY 156	-70.391	9.060	6.401	1.845	-5.170	-0.353
66	91	DY 157	-69.427	7.107	6.678	1.350	-2.309	1.186
66	92	DY 158	-70.277	8.921	6.953	0.896	-4.228	-1.092
66	93	DY 159	-69.122	6.916	7.226	0.499	-1.513	0.386
66	94	DY 160	-69.716	8.665	7.497	0.172	-3.240	-1.963
66	95	DY 161	-68.230	6.585	7.766	-0.077	-0.702	-0.559
66	96	DY 162	-68.415	8.256	8.033	-0.243	-2.190	-2.983
66	97	DY 163	-66.439	6.095	8.296	-0.324	0.164	-1.652
66	98	DY 164	-66.056	7.688	8.558	-0.322	-1.081	-4.147
66	99	DY 165	-63.439	5.454	8.819	-0.242	1.099	-2.881
66	100	DY 166	-62.345	6.977	9.076	-0.089	0.069	-5.431
66	101	DY 167	-58.957	4.683	9.332	0.129	2.099	-4.210
66	102	DY 168	-57.043	6.157	9.585	0.400	1.230	-6.795
66	103	DY 169	-52.796	3.824	9.837	0.715	3.147	-5.596
66	104	DY 170	-49.996	5.271	10.085	1.061	2.377	-8.188
66	105	DY 171	-44.851	2.926	10.332	1.423	4.230	-6.985
66	106	DY 172	-41.153	4.373	10.576	1.791	3.489	-9.560
66	107	DY 173	-35.123	2.041	10.819	2.149	5.331	-8.327
66	108	DY 174	-30.566	3.514	11.059	2.486	4.553	-10.859
66	109	DY 175	-23.715	1.220	11.297	2.788	6.436	-9.571
66	110	DY 176	-18.388	2.744	11.533	3.045	5.562	-12.039
66	111	DY 177	-10.826	0.509	11.766	3.247	7.530	-10.678
66	112	DY 178	-4.857	2.102	11.998	3.384	6.516	-13.068
67	82	HO 149	-59.858		1.271	5.941		6.308
67	83	HO 150	-60.458	8.671	1.581	6.324	-5.357	7.771
67	84	HO 151	-62.814	10.428	1.874	6.490	-6.813	5.144
67	85	HO 152	-62.855	8.112	2.186	5.205	-4.212	6.970
67	86	HO 153	-65.017	10.234	2.481	4.204	-6.031	4.085
67	87	HO 154	-64.606	7.661	2.793	4.083	-3.171	6.086
67	88	HO 155	-66.492	9.958	3.089	3.112	-5.164	3.148
67	89	HO 156	-65.754	7.333	3.403	2.683	-2.252	5.170
67	90	HO 157	-67.335	9.652	3.700	1.779	-4.266	2.309
67	91	HO 158	-66.368	7.105	4.013	1.543	-1.431	4.228

Z	N	A		ΔM	S_n	S_p	Q_α	Q_{β^-}	Q_{β^+}
67	92	HO	159	-67.618	9.321	4.311	1.095	-3.342	1.513
67	93	HO	160	-66.467	6.921	4.625	1.179	-0.653	3.240
67	94	HO	161	-67.340	8.945	4.922	0.959	-2.371	0.702
67	95	HO	162	-65.991	6.723	5.238	1.030	0.140	2.190
67	96	HO	163	-66.430	8.510	5.538	0.714	-1.340	-0.164
67	97	HO	164	-64.832	6.474	5.855	0.652	0.987	1.081
67	98	HO	165	-64.782	8.021	6.158	0.282	-0.251	-1.099
67	99	HO	166	-62.874	6.163	6.480	0.269	1.902	-0.069
67	100	HO	167	-62.303	7.501	6.787	-0.015	0.877	-2.099
67	101	HO	168	-60.029	5.797	7.114	0.021	2.879	-1.230
67	102	HO	169	-58.935	6.978	7.425	-0.439	2.016	-3.147
67	103	HO	170	-56.256	5.392	7.757	-0.876	3.905	-2.377
67	104	HO	171	-54.665	6.481	8.075	-2.252	3.140	-4.230
67	105	HO	172	-51.558	4.965	8.412	-3.987	4.965	-3.489
67	106	HO	173	-49.517	6.030	8.737	-7.036	4.229	-5.331
67	107	HO	174	-45.976	4.531	9.079	-10.611	6.043	-4.553
67	108	HO	175	-43.543	5.639	9.409	-15.541	5.270	-6.436
67	109	HO	176	-39.576	4.104	9.758	-20.812	7.126	-5.562
67	110	HO	177	-36.816	5.312	10.091	-27.141	6.258	-7.530
67	111	HO	178	-32.441	3.697	10.444	-33.418	8.199	-6.516
67	112	HO	179	-29.418	5.048	10.782	-40.361	7.191	-8.601
67	113	HO	180	-24.665	3.319	11.137	-46.959	9.249	-7.425
67	114	HO	181	-21.428	4.835	11.477	-54.006	8.081	-9.643
68	82	ER	150	-55.101		2.532	7.970		5.357
68	83	ER	151	-56.001	8.972	2.832	8.090	-7.756	6.813
68	84	ER	152	-58.643	10.713	3.117	4.808	-9.205	4.212
68	85	ER	153	-58.986	8.415	3.420	4.755	-6.630	6.031
68	86	ER	154	-61.435	10.520	3.707	4.369	-8.441	3.171
68	87	ER	155	-61.328	7.965	4.011	4.205	-5.607	5.164
68	88	ER	156	-63.502	10.245	4.299	3.898	-7.591	2.252
68	89	ER	157	-63.069	7.638	4.604	3.608	-4.704	4.266
68	90	ER	158	-64.938	9.940	4.892	3.329	-6.710	1.431
68	91	ER	159	-64.276	7.410	5.197	2.939	-3.900	3.342
68	92	ER	160	-65.814	9.609	5.485	2.685	-5.802	0.653
68	93	ER	161	-64.969	7.226	5.791	2.250	-3.139	2.371
68	94	ER	162	-66.132	9.234	6.080	2.039	-4.849	-0.140
68	95	ER	163	-65.090	7.030	6.387	1.616	-2.363	1.340
68	96	ER	164	-65.819	8.801	6.679	1.463	-3.836	-0.987
68	97	ER	165	-64.531	6.783	6.988	1.086	-1.535	0.251
68	98	ER	166	-64.775	8.315	7.282	0.981	-2.766	-1.902
68	99	ER	167	-63.180	6.476	7.595	0.661	-0.641	-0.877
68	100	ER	168	-62.908	7.799	7.894	0.580	-1.659	-2.879
68	101	ER	169	-60.951	6.115	8.211	0.307	0.315	-2.016
68	102	ER	170	-60.161	7.282	8.515	0.219	-0.542	-3.905
68	103	ER	171	-57.805	5.715	8.838	-0.026	1.320	-3.140
68	104	ER	172	-56.523	6.790	9.147	-0.149	0.560	-4.965
68	105	ER	173	-53.746	5.294	9.476	-0.383	2.357	-4.229
68	106	ER	174	-52.019	6.345	9.792	-0.565	1.627	-6.043
68	107	ER	175	-48.814	4.866	10.127	-0.804	3.413	-5.270
68	108	ER	176	-46.701	5.959	10.447	-1.057	2.646	-7.126
68	109	ER	177	-43.074	4.444	10.787	-1.313	4.474	-6.258
68	110	ER	178	-40.640	5.637	11.113	-1.642	3.613	-8.199
68	111	ER	179	-36.609	4.041	11.457	-1.927	5.526	-7.191
68	112	ER	180	-33.915	5.377	11.786	-2.326	4.526	-9.249
68	113	ER	181	-29.509	3.666	12.133	-2.648	6.558	-8.081
68	114	ER	182	-26.604	5.166	12.464	-3.104	5.397	-10.273
68	115	ER	183	-21.855	3.323	12.813	-3.463	7.563	-8.953
68	116	ER	184	-18.759	4.976	13.146	-3.944	6.251	-11.275
69	82	TM	151	-48.245		0.433			7.756

Z	N	A		ΔM	S_n	S_p	Q_α	Q_{β^-}	Q_{β^+}
69	83	TM	152	-49.438	9.264	0.726		-6.816	9.205
69	84	TM	153	-52.356	10.990	1.002	5.077	-8.257	6.630
69	85	TM	154	-52.994	8.710	1.297	5.039	-5.707	8.441
69	86	TM	155	-55.722	10.799	1.576	4.668	-7.510	5.607
69	87	TM	156	-55.911	8.261	1.872	4.519	-4.700	7.591
69	88	TM	157	-58.365	10.525	2.151	4.228	-6.676	4.704
69	89	TM	158	-58.228	7.934	2.448	3.954	-3.814	6.710
69	90	TM	159	-60.376	10.220	2.728	3.691	-5.811	3.900
69	91	TM	160	-60.012	7.707	3.025	3.317	-3.025	5.802
69	92	TM	161	-61.830	9.890	3.305	3.080	-4.918	3.139
69	93	TM	162	-61.283	7.524	3.602	2.661	-2.280	4.849
69	94	TM	163	-62.726	9.515	3.884	2.467	-3.981	2.363
69	95	TM	164	-61.983	7.328	4.182	2.059	-1.521	3.836
69	96	TM	165	-62.996	9.084	4.465	1.920	-2.985	1.535
69	97	TM	166	-62.009	7.085	4.767	1.558	-0.711	2.766
69	98	TM	167	-62.539	8.601	5.053	1.466	-1.934	0.641
69	99	TM	168	-61.248	6.781	5.357	1.159	0.165	1.659
69	100	TM	169	-61.266	8.089	5.648	1.091	-0.846	-0.315
69	101	TM	170	-59.619	6.424	5.957	0.830	1.102	0.542
69	102	TM	171	-59.125	7.577	6.252	0.754	0.251	-1.320
69	103	TM	172	-57.083	6.030	6.567	0.521	2.085	-0.560
69	104	TM	173	-56.103	7.091	6.869	0.408	1.332	-2.357
69	105	TM	174	-53.646	5.615	7.190	0.185	3.102	-1.627
69	106	TM	175	-52.227	6.652	7.496	0.013	2.377	-3.413
69	107	TM	176	-49.348	5.192	7.823	-0.214	4.137	-2.646
69	108	TM	177	-47.548	6.272	8.136	-0.456	3.376	-4.474
69	109	TM	178	-44.252	4.776	8.467	-0.701	5.177	-3.613
69	110	TM	179	-42.135	5.954	8.785	-1.017	4.323	-5.526
69	111	TM	180	-38.441	4.377	9.121	-1.290	6.210	-4.526
69	112	TM	181	-36.067	5.698	9.442	-1.676	5.217	-6.558
69	113	TM	182	-32.001	4.005	9.781	-1.984	7.223	-5.397
69	114	TM	183	-29.418	5.489	10.104	-2.425	6.071	-7.563
69	115	TM	184	-25.011	3.664	10.445	-2.770	8.212	-6.251
69	116	TM	185	-22.240	5.300	10.769	-3.236	6.908	-8.548
69	117	TM	186	-17.513	3.345	11.111	-3.607	9.180	-7.131
69	118	TM	187	-14.529	5.087	11.436	-4.052	7.772	-9.526
69	119	TM	188	-9.493	3.035	11.778	-4.433	10.142	-8.088
70	83	YB	153	-44.100	9.549	1.951		-9.213	8.257
70	84	YB	154	-47.287	11.259	2.220	5.389	-10.645	5.707
70	85	YB	155	-48.212	8.997	2.507	5.364	-8.120	7.510
70	86	YB	156	-51.211	11.070	2.778	5.007	-9.914	4.700
70	87	YB	157	-51.688	8.549	3.066	4.873	-7.129	6.676
70	88	YB	158	-54.414	10.797	3.338	4.596	-9.095	3.814
70	89	YB	159	-54.566	8.223	3.627	4.338	-6.256	5.811
70	90	YB	160	-56.987	10.493	3.900	4.091	-8.243	3.025
70	91	YB	161	-56.912	7.996	4.189	3.732	-5.481	4.918
70	92	YB	162	-59.003	10.162	4.462	3.510	-7.365	2.280
70	93	YB	163	-58.745	7.814	4.751	3.107	-4.750	3.981
70	94	YB	164	-60.462	9.789	5.025	2.927	-6.442	1.521
70	95	YB	165	-60.010	7.620	5.316	2.534	-4.006	2.985
70	96	YB	166	-61.298	9.359	5.592	2.409	-5.462	0.711
70	97	YB	167	-60.605	7.378	5.885	2.060	-3.212	1.934
70	98	YB	168	-61.414	8.880	6.164	1.981	-4.427	-0.165
70	99	YB	169	-60.420	7.078	6.461	1.686	-2.353	0.846
70	100	YB	170	-60.721	8.372	6.743	1.630	-3.357	-1.102
70	101	YB	171	-59.375	6.726	7.045	1.380	-1.435	-0.251
70	102	YB	172	-59.168	7.865	7.333	1.315	-2.279	-2.085
70	103	YB	173	-57.435	6.338	7.640	1.092	-0.471	-1.332
70	104	YB	174	-56.748	7.385	7.934	0.989	-1.217	-3.102
70	105	YB	175	-54.604	5.928	8.247	0.776	0.526	-2.377

Z	N	A		ΔM	S_n	S_p	Q_α	Q_{β^-}	Q_{β^+}
70	106	YB	176	-53.484	6.952	8.547	0.614	-0.191	-4.137
70	107	YB	177	-50.924	5.511	8.866	0.396	1.542	-3.376
70	108	YB	178	-49.430	6.577	9.170	0.165	0.789	-5.177
70	109	YB	179	-46.458	5.100	9.495	-0.069	2.564	-4.323
70	110	YB	180	-44.651	6.264	9.804	-0.374	1.717	-6.210
70	111	YB	181	-41.284	4.705	10.133	-0.635	3.579	-5.217
70	112	YB	182	-39.224	6.011	10.446	-1.009	2.594	-7.223
70	113	YB	183	-35.489	4.336	10.777	-1.305	4.575	-6.071
70	114	YB	184	-33.222	5.805	11.093	-1.732	3.432	-8.212
70	115	YB	185	-29.148	3.997	11.426	-2.063	5.548	-6.908
70	116	YB	186	-26.694	5.617	11.743	-2.515	4.255	-9.180
70	117	YB	187	-22.301	3.679	12.077	-2.871	6.503	-7.772
70	118	YB	188	-19.635	5.405	12.395	-3.300	5.105	-10.142
70	119	YB	189	-14.933	3.369	12.729	-3.666	7.451	-8.713
70	120	YB	190	-11.977	5.116	13.047	-4.020	6.032	-11.104
70	121	YB	191	-6.966	3.061	13.382	-4.388	8.398	-9.769
71	85	LU	156	-41.297	9.277	0.374	5.716	-7.184	9.914
71	86	LU	157	-44.560	11.334	0.638	5.371	-8.967	7.129
71	87	LU	158	-45.319	8.831	0.920	5.250	-6.205	9.095
71	88	LU	159	-48.310	11.062	1.185	4.987	-8.160	6.256
71	89	LU	160	-48.744	8.506	1.467	4.742	-5.344	8.243
71	90	LU	161	-51.431	10.758	1.733	4.509	-7.320	5.481
71	91	LU	162	-51.638	8.279	2.015	4.165	-4.581	7.365
71	92	LU	163	-53.995	10.428	2.281	3.957	-6.454	4.750
71	93	LU	164	-54.020	8.097	2.564	3.567	-3.862	6.442
71	94	LU	165	-56.004	10.056	2.831	3.401	-5.544	4.006
71	95	LU	166	-55.837	7.904	3.115	3.021	-3.131	5.462
71	96	LU	167	-57.393	9.628	3.384	2.908	-4.577	3.212
71	97	LU	168	-56.987	7.665	3.671	2.572	-2.351	4.427
71	98	LU	169	-58.067	9.151	3.942	2.504	-3.556	2.353
71	99	LU	170	-57.364	7.368	4.233	2.220	-1.507	3.357
71	100	LU	171	-57.940	8.648	4.508	2.174	-2.502	1.435
71	101	LU	172	-56.890	7.021	4.804	1.934	-0.605	2.279
71	102	LU	173	-56.964	8.146	5.084	1.878	-1.440	0.471
71	103	LU	174	-55.531	6.638	5.385	1.664	0.342	1.217
71	104	LU	175	-55.131	7.671	5.672	1.569	-0.396	-0.526
71	105	LU	176	-53.294	6.235	5.978	1.365	1.322	0.191
71	106	LU	177	-52.466	7.244	6.271	1.212	0.613	-1.542
71	107	LU	178	-50.219	5.824	6.583	1.003	2.320	-0.789
71	108	LU	179	-49.022	6.875	6.881	0.780	1.576	-2.564
71	109	LU	180	-46.368	5.417	7.199	0.555	3.325	-1.717
71	110	LU	181	-44.863	6.567	7.501	0.260	2.487	-3.579
71	111	LU	182	-41.818	5.027	7.823	0.009	4.325	-2.594
71	112	LU	183	-40.065	6.318	8.129	-0.354	3.350	-4.575
71	113	LU	184	-36.654	4.661	8.454	-0.638	5.307	-3.432
71	114	LU	185	-34.696	6.114	8.763	-1.054	4.173	-5.548
71	115	LU	186	-30.948	4.323	9.089	-1.372	6.267	-4.255
71	116	LU	187	-28.804	5.927	9.399	-1.810	4.983	-6.503
71	117	LU	188	-24.739	4.007	9.727	-2.153	7.208	-5.105
71	118	LU	189	-22.383	5.715	10.037	-2.568	5.821	-7.451
71	119	LU	190	-18.009	3.697	10.365	-2.920	8.144	-6.032
71	120	LU	191	-15.364	5.427	10.676	-3.260	6.736	-8.398
71	121	LU	192	-10.682	3.389	11.004	-3.614	9.080	-7.073
72	85	HF	157	-35.593	9.551	1.585	6.081	-9.580	8.967
72	86	HF	158	-39.114	11.593	1.844	5.748	-11.352	6.205
72	87	HF	159	-40.150	9.107	2.119	5.638	-8.612	8.160
72	88	HF	160	-43.400	11.321	2.379	5.386	-10.555	5.344
72	89	HF	161	-44.110	8.782	2.655	5.154	-7.761	7.320
72	90	HF	162	-47.057	11.018	2.915	4.933	-9.725	4.581

Z	N	A		ΔM	S_n	S_p	Q_α	Q_{β^-}	Q_{β^+}
72	91	HF	163	-47.541	8.556	3.192	4.600	-7.007	6.454
72	92	HF	164	-50.158	10.688	3.452	4.405	-8.868	3.862
72	93	HF	165	-50.460	8.374	3.729	4.027	-6.298	5.544
72	94	HF	166	-52.705	10.317	3.990	3.873	-7.967	3.131
72	95	HF	167	-52.817	8.183	4.269	3.504	-5.577	4.577
72	96	HF	168	-54.636	9.891	4.532	3.402	-7.011	2.351
72	97	HF	169	-54.511	7.946	4.813	3.075	-4.808	3.556
72	98	HF	170	-55.856	9.417	5.079	3.017	-6.002	1.507
72	99	HF	171	-55.438	7.653	5.363	2.742	-3.977	2.502
72	100	HF	172	-56.284	8.918	5.633	2.704	-4.961	0.605
72	101	HF	173	-55.524	7.311	5.923	2.472	-3.089	1.440
72	102	HF	174	-55.873	8.421	6.198	2.423	-3.914	-0.342
72	103	HF	175	-54.734	6.933	6.493	2.216	-2.155	0.396
72	104	HF	176	-54.615	7.952	6.774	2.128	-2.884	-1.322
72	105	HF	177	-53.079	6.535	7.074	1.931	-1.191	-0.613
72	106	HF	178	-52.539	7.531	7.361	1.784	-1.890	-2.320
72	107	HF	179	-50.597	6.130	7.668	1.582	-0.207	-1.576
72	108	HF	180	-49.693	7.167	7.960	1.367	-0.942	-3.325
72	109	HF	181	-47.351	5.729	8.272	1.149	0.784	-2.487
72	110	HF	182	-46.143	6.864	8.569	0.862	-0.044	-4.325
72	111	HF	183	-43.414	5.343	8.885	0.619	1.770	-3.350
72	112	HF	184	-41.961	6.618	9.185	0.265	0.806	-5.307
72	113	HF	185	-38.869	4.980	9.504	-0.010	2.741	-4.173
72	114	HF	186	-37.215	6.417	9.807	-0.415	1.618	-6.267
72	115	HF	187	-33.787	4.644	10.128	-0.723	3.690	-4.983
72	116	HF	188	-31.948	6.232	10.432	-1.150	2.418	-7.208
72	117	HF	189	-28.204	4.328	10.754	-1.481	4.621	-5.821
72	118	HF	190	-26.153	6.020	11.059	-1.884	3.246	-8.144
72	119	HF	191	-22.101	4.019	11.381	-2.224	5.548	-6.736
72	120	HF	192	-19.762	5.732	11.686	-2.552	4.152	-9.080
72	121	HF	193	-15.401	3.711	12.008	-2.893	6.475	-7.766
72	122	HF	194	-12.660	5.331	12.314	-3.108	5.173	-9.989
73	86	TA	159	-31.538	11.847	-0.288	6.129	-10.392	8.612
73	87	TA	160	-32.844	9.378	-0.016	6.028	-7.672	10.555
73	88	TA	161	-36.349	11.576	0.239	5.786	-9.602	7.761
73	89	TA	162	-37.332	9.054	0.511	5.563	-6.828	9.725
73	90	TA	163	-40.534	11.273	0.766	5.351	-8.778	7.007
73	91	TA	164	-41.290	8.828	1.038	5.029	-6.080	8.868
73	92	TA	165	-44.163	10.944	1.294	4.843	-7.927	6.298
73	93	TA	166	-44.738	8.647	1.567	4.475	-5.377	7.967
73	94	TA	167	-47.240	10.573	1.823	4.330	-7.034	5.577
73	95	TA	168	-47.625	8.457	2.097	3.970	-4.664	7.011
73	96	TA	169	-49.703	10.149	2.356	3.877	-6.085	4.808
73	97	TA	170	-49.854	8.223	2.632	3.558	-3.903	6.002
73	98	TA	171	-51.461	9.679	2.894	3.507	-5.085	3.977
73	99	TA	172	-51.323	7.933	3.174	3.239	-3.081	4.961
73	100	TA	173	-52.435	9.183	3.440	3.207	-4.054	3.089
73	101	TA	174	-51.959	7.596	3.724	2.980	-2.204	3.914
73	102	TA	175	-52.579	8.691	3.995	2.936	-3.018	2.155
73	103	TA	176	-51.731	7.223	4.286	2.734	-1.282	2.884
73	104	TA	177	-51.888	8.229	4.562	2.651	-2.000	1.191
73	105	TA	178	-50.649	6.832	4.858	2.457	-0.329	1.890
73	106	TA	179	-50.390	7.813	5.141	2.315	-1.018	0.207
73	107	TA	180	-48.751	6.432	5.443	2.118	0.643	0.942
73	108	TA	181	-48.135	7.455	5.731	1.907	-0.081	-0.784
73	109	TA	182	-46.099	6.036	6.038	1.694	1.623	0.044
73	110	TA	183	-45.185	7.157	6.330	1.412	0.807	-1.770
73	111	TA	184	-42.767	5.654	6.642	1.176	2.599	-0.806
73	112	TA	185	-41.610	6.914	6.938	0.828	1.647	-2.741
73	113	TA	186	-38.833	5.294	7.252	0.561	3.560	-1.618

Z	N	A		ΔM	S_n	S_p	Q_α	Q_{β^-}	Q_{β^+}
73	114	TA	187	-37.477	6.715	7.551	0.163	2.451	-3.690
73	115	TA	188	-34.366	4.960	7.867	-0.136	4.502	-2.418
73	116	TA	189	-32.826	6.532	8.167	-0.554	3.243	-4.621
73	117	TA	190	-29.400	4.645	8.484	-0.876	5.427	-3.246
73	118	TA	191	-27.649	6.321	8.785	-1.270	4.065	-5.548
73	119	TA	192	-23.914	4.337	9.102	-1.600	6.347	-4.152
73	120	TA	193	-21.876	6.033	9.403	-1.917	4.965	-6.475
73	121	TA	194	-17.833	4.029	9.721	-2.249	7.267	-5.173
73	122	TA	195	-15.394	5.632	10.022	-2.454	5.979	-7.373
73	123	TA	196	-11.072	3.750	10.341	-2.816	8.159	-6.307
74	86	W	160	-25.172	12.098	0.923	6.517	-12.781	7.672
74	87	W	161	-26.747	9.646	1.192	6.421	-10.080	9.602
74	88	W	162	-30.504	11.828	1.444	6.186	-11.994	6.828
74	89	W	163	-31.756	9.323	1.713	5.969	-9.238	8.778
74	90	W	164	-35.210	11.526	1.965	5.765	-11.173	6.080
74	91	W	165	-36.235	9.097	2.234	5.450	-8.494	7.927
74	92	W	166	-39.361	11.197	2.487	5.271	-10.325	5.377
74	93	W	167	-40.206	8.917	2.757	4.910	-7.793	7.034
74	94	W	168	-42.961	10.827	3.011	4.772	-9.435	4.664
74	95	W	169	-43.618	8.728	3.282	4.418	-7.084	6.085
74	96	W	170	-45.951	10.405	3.537	4.330	-8.490	3.903
74	97	W	171	-46.376	8.496	3.811	4.016	-6.328	5.085
74	98	W	172	-48.242	9.937	4.069	3.970	-7.496	3.081
74	99	W	173	-48.381	8.211	4.347	3.705	-5.512	4.054
74	100	W	174	-49.755	9.446	4.609	3.676	-6.472	2.204
74	101	W	175	-49.561	7.877	4.891	3.452	-4.642	3.018
74	102	W	176	-50.449	8.959	5.159	3.411	-5.443	1.282
74	103	W	177	-49.888	7.511	5.446	3.210	-3.728	2.000
74	104	W	178	-50.319	8.502	5.720	3.129	-4.433	0.329
74	105	W	179	-49.373	7.125	6.013	2.937	-2.783	1.018
74	106	W	180	-49.394	8.093	6.293	2.796	-3.459	-0.643
74	107	W	181	-48.054	6.731	6.592	2.600	-1.819	0.081
74	108	W	182	-47.722	7.740	6.877	2.391	-2.530	-1.623
74	109	W	183	-45.991	6.340	7.181	2.181	-0.847	-0.807
74	110	W	184	-45.366	7.446	7.471	1.902	-1.650	-2.599
74	111	W	185	-43.257	5.962	7.779	1.669	0.123	-1.647
74	112	W	186	-42.393	7.208	8.072	1.325	-0.815	-3.560
74	113	W	187	-39.928	5.606	8.384	1.062	1.078	-2.451
74	114	W	188	-38.867	7.011	8.679	0.669	-0.016	-4.502
74	115	W	189	-36.069	5.273	8.993	0.376	2.015	-3.243
74	116	W	190	-34.826	6.829	9.290	-0.036	0.772	-5.427
74	117	W	191	-31.714	4.959	9.604	-0.352	2.937	-4.065
74	118	W	192	-30.261	6.618	9.901	-0.739	1.591	-6.347
74	119	W	193	-26.841	4.651	10.216	-1.061	3.855	-4.965
74	120	W	194	-25.100	6.331	10.514	-1.372	2.488	-7.267
74	121	W	195	-21.373	4.344	10.829	-1.697	4.772	-5.979
74	122	W	196	-19.232	5.931	11.127	-1.895	3.499	-8.159
74	123	W	197	-15.226	4.066	11.443	-2.250	5.661	-7.106
74	124	W	198	-12.574	5.419	11.743	-2.339	4.622	-8.949
74	125	W	199	-8.396	3.893	12.060	-2.801	6.447	-8.315
75	87	RE	162	-18.510	9.914	-0.948	6.828	-9.170	11.994
75	88	RE	163	-22.517	12.079	-0.698	6.596	-11.067	9.238
75	89	RE	164	-24.037	9.591	-0.430	6.383	-8.328	11.173
75	90	RE	165	-27.742	11.777	-0.179	6.183	-10.245	8.494
75	91	RE	166	-29.036	9.365	0.089	5.871	-7.581	10.325
75	92	RE	167	-32.413	11.448	0.341	5.696	-9.395	7.793
75	93	RE	168	-33.527	9.185	0.610	5.339	-6.880	9.435
75	94	RE	169	-36.534	11.079	0.862	5.204	-8.505	7.084
75	95	RE	170	-37.461	8.998	1.132	4.852	-6.170	8.490

Z	N	A		ΔM	S_n	S_p	Q_α	Q_{β^-}	Q_{β^+}
75	96	RE	171	-40.048	10.659	1.386	4.767	-7.560	6.328
75	97	RE	172	-40.746	8.769	1.659	4.455	-5.415	7.496
75	98	RE	173	-42.868	10.194	1.916	4.410	-6.568	5.512
75	99	RE	174	-43.284	8.487	2.192	4.146	-4.602	6.472
75	100	RE	175	-44.919	9.707	2.453	4.117	-5.546	4.642
75	101	RE	176	-45.006	8.158	2.734	3.892	-3.735	5.443
75	102	RE	177	-46.161	9.226	3.001	3.850	-4.521	3.728
75	103	RE	178	-45.886	7.797	3.287	3.648	-2.825	4.433
75	104	RE	179	-46.589	8.775	3.559	3.565	-3.515	2.783
75	105	RE	180	-45.935	7.417	3.851	3.371	-1.884	3.459
75	106	RE	181	-46.235	8.371	4.129	3.229	-2.545	1.819
75	107	RE	182	-45.192	7.029	4.427	3.031	-0.925	2.530
75	108	RE	183	-45.144	8.024	4.711	2.821	-1.620	0.847
75	109	RE	184	-43.717	6.644	5.014	2.610	0.044	1.650
75	110	RE	185	-43.380	7.735	5.303	2.330	-0.743	-0.123
75	111	RE	186	-41.578	6.270	5.610	2.097	1.011	0.815
75	112	RE	187	-41.006	7.500	5.902	1.754	0.089	-1.078
75	113	RE	188	-38.851	5.916	6.212	1.492	1.965	0.016
75	114	RE	189	-38.085	7.305	6.506	1.101	0.887	-2.015
75	115	RE	190	-35.599	5.586	6.819	0.810	2.902	-0.772
75	116	RE	191	-34.652	7.124	7.114	0.400	1.676	-2.937
75	117	RE	192	-31.853	5.272	7.427	0.088	3.825	-1.591
75	118	RE	193	-30.696	6.915	7.724	-0.295	2.496	-3.855
75	119	RE	194	-27.589	4.964	8.037	-0.614	4.743	-2.488
75	120	RE	195	-26.145	6.627	8.333	-0.921	3.394	-4.772
75	121	RE	196	-22.731	4.657	8.647	-1.241	5.662	-3.499
75	122	RE	197	-20.887	6.228	8.944	-1.436	4.406	-5.661
75	123	RE	198	-17.196	4.381	9.259	-1.788	6.551	-4.622
75	124	RE	199	-14.843	5.718	9.558	-1.874	5.529	-6.447
75	125	RE	200	-10.981	4.210	9.874	-2.333	7.337	-5.827
75	126	RE	201	-8.040	5.130	10.175	-2.344	6.733	-8.831
75	127	RE	202	-2.542	2.573	10.622	-1.341	9.592	-7.582
75	128	RE	203	1.764	3.766	10.566	-0.580	8.343	-9.208
76	87	OS	163	-11.450	10.182	0.229	7.271	-11.651	11.067
76	88	OS	164	-15.709	12.330	0.481	7.038	-13.529	8.328
76	89	OS	165	-17.497	9.860	0.750	6.825	-10.804	10.245
76	90	OS	166	-21.454	12.029	1.001	6.625	-12.701	7.581
76	91	OS	167	-23.017	9.634	1.270	6.314	-10.052	9.395
76	92	OS	168	-26.646	11.701	1.523	6.139	-11.846	6.880
76	93	OS	169	-28.030	9.455	1.792	5.781	-9.346	8.505
76	94	OS	170	-31.291	11.332	2.045	5.645	-10.950	6.170
76	95	OS	171	-32.488	9.269	2.316	5.293	-8.631	7.560
76	96	OS	172	-35.330	10.914	2.571	5.206	-10.002	5.415
76	97	OS	173	-36.301	9.042	2.844	4.892	-7.872	6.568
76	98	OS	174	-38.682	10.452	3.102	4.845	-9.007	4.602
76	99	OS	175	-39.374	8.763	3.379	4.578	-7.057	5.546
76	100	OS	176	-41.272	9.970	3.641	4.545	-7.983	3.735
76	101	OS	177	-41.640	8.440	3.923	4.316	-6.188	4.521
76	102	OS	178	-43.062	9.493	4.190	4.269	-6.957	2.825
76	103	OS	179	-43.074	8.084	4.477	4.062	-5.278	3.515
76	104	OS	180	-44.051	9.048	4.750	3.974	-5.951	1.884
76	105	OS	181	-43.689	7.710	5.043	3.775	-4.337	2.545
76	106	OS	182	-44.268	8.650	5.322	3.627	-4.981	0.925
76	107	OS	183	-43.524	7.328	5.621	3.424	-3.377	1.620
76	108	OS	184	-43.761	8.308	5.905	3.209	-4.056	-0.044
76	109	OS	185	-42.636	6.947	6.209	2.993	-2.408	0.743
76	110	OS	186	-42.589	8.024	6.498	2.709	-3.177	-1.011
76	111	OS	187	-41.095	6.578	6.806	2.472	-1.439	-0.089
76	112	OS	188	-40.816	7.792	7.099	2.125	-2.343	-1.965
76	113	OS	189	-38.972	6.227	7.410	1.861	-0.482	-0.887

Z	N	A		ΔM	S_n	S_p	Q_α	Q_{β^-}	Q_{β^+}
76	114	OS	190	-38.501	7.601	7.705	1.468	-1.541	-2.902
76	115	OS	191	-36.328	5.898	8.018	1.175	0.459	-1.676
76	116	OS	192	-35.677	7.421	8.314	0.765	-0.748	-3.825
76	117	OS	193	-33.192	5.586	8.628	0.453	1.387	-2.496
76	118	OS	194	-32.332	7.212	8.925	0.069	0.078	-4.743
76	119	OS	195	-29.539	5.278	9.239	-0.250	2.311	-3.394
76	120	OS	196	-28.393	6.925	9.537	-0.556	0.982	-5.662
76	121	OS	197	-25.293	4.972	9.851	-0.877	3.235	-4.406
76	122	OS	198	-23.747	6.526	10.149	-1.072	1.999	-6.551
76	123	OS	199	-20.372	4.696	10.465	-1.424	4.129	-5.529
76	124	OS	200	-18.318	6.017	10.764	-1.511	3.126	-7.337
76	125	OS	201	-14.773	4.527	11.081	-1.972	4.919	-6.733
76	126	OS	202	-12.134	5.432	11.383	-1.984	4.334	-9.592
76	127	OS	203	-6.580	2.517	11.327	-0.608	7.554	-8.343
76	128	OS	204	-2.720	4.211	11.772	0.010	6.305	-9.982
76	129	OS	205	2.823	2.529	11.728	-0.393	7.930	-8.813
76	130	OS	206	6.767	4.128	12.159	-0.699	6.762	-10.525
76	131	OS	207	12.445	2.393	12.135	-0.950	8.451	-9.407
77	88	IR	165	-6.694	12.585	-1.727	7.549	-12.733	10.804
77	89	IR	166	-8.753	10.131	-1.455	7.332	-10.020	12.701
77	90	IR	167	-12.965	12.283	-1.200	7.127	-11.895	10.052
77	91	IR	168	-14.800	9.906	-0.928	6.812	-9.257	11.846
77	92	IR	169	-18.684	11.956	-0.673	6.633	-11.030	9.346
77	93	IR	170	-20.340	9.727	-0.401	6.271	-8.540	10.950
77	94	IR	171	-23.857	11.588	-0.145	6.131	-10.124	8.631
77	95	IR	172	-25.328	9.543	0.129	5.774	-7.816	10.002
77	96	IR	173	-28.429	11.172	0.387	5.681	-9.166	7.872
77	97	IR	174	-29.675	9.318	0.663	5.361	-7.049	9.007
77	98	IR	175	-32.317	10.713	0.924	5.307	-8.163	7.057
77	99	IR	176	-33.289	9.043	1.204	5.032	-6.226	7.983
77	100	IR	177	-35.452	10.235	1.469	4.992	-7.133	6.188
77	101	IR	178	-36.105	8.724	1.754	4.754	-5.352	6.957
77	102	IR	179	-37.797	9.763	2.024	4.698	-6.101	5.278
77	103	IR	180	-38.099	8.374	2.314	4.482	-4.436	5.951
77	104	IR	181	-39.352	9.324	2.590	4.384	-5.090	4.337
77	105	IR	182	-39.286	8.006	2.886	4.175	-3.491	4.981
77	106	IR	183	-40.147	8.932	3.168	4.018	-4.115	3.377
77	107	IR	184	-39.705	7.630	3.470	3.806	-2.526	4.056
77	108	IR	185	-40.229	8.596	3.757	3.581	-3.185	2.408
77	109	IR	186	-39.411	7.254	4.064	3.356	-1.550	3.177
77	110	IR	187	-39.656	8.316	4.356	3.064	-2.300	1.439
77	111	IR	188	-38.473	6.889	4.667	2.819	-0.575	2.343
77	112	IR	189	-38.490	8.088	4.963	2.465	-1.458	0.482
77	113	IR	190	-36.959	6.541	5.277	2.194	0.390	1.541
77	114	IR	191	-36.787	7.899	5.575	1.795	-0.648	-0.459
77	115	IR	192	-34.929	6.214	5.891	1.496	1.340	0.748
77	116	IR	193	-34.578	7.720	6.190	1.081	0.155	-1.387
77	117	IR	194	-32.410	5.903	6.507	0.764	2.278	-0.078
77	118	IR	195	-31.850	7.512	6.807	0.377	0.991	-2.311
77	119	IR	196	-29.374	5.596	7.124	0.054	3.213	-0.982
77	120	IR	197	-28.528	7.225	7.424	-0.257	1.905	-3.235
77	121	IR	198	-25.746	5.289	7.742	-0.582	4.147	-1.999
77	122	IR	199	-24.501	6.827	8.043	-0.781	2.932	-4.129
77	123	IR	200	-21.444	5.014	8.361	-1.138	5.051	-3.126
77	124	IR	201	-19.693	6.320	8.664	-1.230	4.070	-4.919
77	125	IR	202	-16.468	4.847	8.984	-1.697	5.850	-4.334
77	126	IR	203	-14.133	5.736	9.288	-1.715	5.286	-7.554
77	127	IR	204	-9.024	2.962	9.733	-0.468	8.370	-6.305
77	128	IR	205	-5.107	4.154	9.676	0.508	7.121	-7.930
77	129	IR	206	0.005	2.960	10.107	0.122	8.760	-6.762

Z	N	A		ΔM	S_n	S_p	Q_α	Q_{β^-}	Q_{β^+}
77	130	IR	207	3.995	4.082	10.061	-0.194	7.591	-8.451
77	131	IR	208	9.267	2.799	10.468	-0.420	9.303	-7.333
77	132	IR	209	13.445	3.893	10.443	-0.616	8.185	-8.985
77	133	IR	210	18.901	2.615	10.818	-0.815	9.867	-7.850
77	134	IR	211	23.219	3.754	10.822	-1.058	8.733	-9.439
77	135	IR	212	28.787	2.503	11.159	-1.326	10.357	-8.310
78	96	PT	174	-22.626	11.435	1.486	6.240	-11.779	7.049
78	97	PT	175	-24.154	9.600	1.768	5.909	-9.672	8.163
78	98	PT	176	-27.062	10.980	2.034	5.843	-10.763	6.226
78	99	PT	177	-28.319	9.328	2.320	5.557	-8.837	7.133
78	100	PT	178	-30.753	10.505	2.590	5.504	-9.720	5.352
78	101	PT	179	-31.696	9.014	2.880	5.253	-7.950	6.101
78	102	PT	180	-33.664	10.039	3.156	5.183	-8.678	4.436
78	103	PT	181	-34.262	8.670	3.451	4.954	-7.024	5.090
78	104	PT	182	-35.796	9.605	3.733	4.841	-7.656	3.491
78	105	PT	183	-36.031	8.307	4.034	4.618	-6.069	4.115
78	106	PT	184	-37.179	9.219	4.321	4.447	-6.671	2.526
78	107	PT	185	-37.044	7.937	4.628	4.220	-5.093	3.185
78	108	PT	186	-37.861	8.888	4.921	3.982	-5.730	1.550
78	109	PT	187	-37.356	7.566	5.234	3.743	-4.107	2.300
78	110	PT	188	-37.898	8.614	5.531	3.438	-4.834	0.575
78	111	PT	189	-37.032	7.205	5.848	3.180	-3.119	1.458
78	112	PT	190	-37.350	8.389	6.149	2.814	-3.979	-0.390
78	113	PT	191	-36.139	6.860	6.468	2.532	-2.141	0.648
78	114	PT	192	-36.270	8.202	6.772	2.122	-3.155	-1.340
78	115	PT	193	-34.734	6.535	7.093	1.813	-1.177	-0.155
78	116	PT	194	-34.687	8.025	7.398	1.389	-2.337	-2.278
78	117	PT	195	-32.841	6.225	7.720	1.062	-0.224	-0.991
78	118	PT	196	-32.587	7.817	8.026	0.666	-1.486	-3.213
78	119	PT	197	-30.433	5.918	8.348	0.334	0.727	-1.905
78	120	PT	198	-29.893	7.531	8.654	0.014	-0.556	-4.147
78	121	PT	199	-27.434	5.612	8.977	-0.319	1.677	-2.932
78	122	PT	200	-26.495	7.133	9.283	-0.528	0.487	-5.051
78	123	PT	201	-23.762	5.338	9.607	-0.894	2.597	-4.070
78	124	PT	202	-22.318	6.627	9.915	-0.996	1.639	-5.850
78	125	PT	203	-19.420	5.173	10.240	-1.472	3.410	-5.286
78	126	PT	204	-17.395	6.046	10.550	-1.501	2.870	-8.370
78	127	PT	205	-12.228	2.905	10.493	0.120	6.329	-7.121
78	128	PT	206	-8.755	4.598	10.937	0.955	5.080	-8.760
78	129	PT	207	-3.597	2.914	10.891	0.558	6.706	-7.591
78	130	PT	208	-0.036	4.511	11.320	0.258	5.537	-9.303
78	131	PT	209	5.261	2.774	11.295	0.013	7.227	-8.185
78	132	PT	210	9.034	4.298	11.700	-0.157	6.108	-9.867
78	133	PT	211	14.486	2.620	11.704	-0.384	7.760	-8.733
78	134	PT	212	18.431	4.127	12.077	-0.593	6.626	-10.357
78	135	PT	213	23.961	2.541	12.116	-0.894	8.214	-9.228
78	136	PT	214	28.026	4.006	12.452	-1.150	7.085	-10.829
78	137	PT	215	33.618	2.480	12.527	-1.464	8.648	-9.754
78	138	PT	216	37.838	3.851	12.823	-1.684	7.572	-11.366
79	98	AU	177	-19.483	11.254	-0.291	6.521	-10.177	8.837
79	99	AU	178	-21.033	9.622	0.003	6.218	-8.259	9.720
79	100	AU	179	-23.745	10.784	0.281	6.147	-9.117	7.950
79	101	AU	180	-24.986	9.312	0.579	5.878	-7.356	8.678
79	102	AU	181	-27.238	10.323	0.863	5.790	-8.058	7.024
79	103	AU	182	-28.139	8.973	1.167	5.541	-6.413	7.656
79	104	AU	183	-29.963	9.895	1.456	5.409	-7.020	6.069
79	105	AU	184	-30.508	8.617	1.766	5.167	-5.441	6.671
79	106	AU	185	-31.951	9.515	2.061	4.976	-6.019	5.093
79	107	AU	186	-32.131	8.252	2.376	4.730	-4.450	5.730

Z	N	A		ΔM	S_n	S_p	Q_α	Q_{β^-}	Q_{β^+}
80	128	HG	208	-13.027	4.981	10.014	1.942	3.590	-7.454
80	129	HG	209	-8.251	3.295	9.967	1.552	5.216	-6.285
80	130	HG	210	-5.071	4.891	10.394	1.258	4.048	-7.997
80	131	HG	211	-0.153	3.153	10.368	1.019	5.737	-6.879
80	132	HG	212	3.243	4.675	10.772	0.855	4.618	-8.561
80	133	HG	213	8.319	2.995	10.774	0.634	6.270	-7.427
80	134	HG	214	11.890	4.501	11.146	0.431	5.136	-9.051
80	135	HG	215	17.047	2.914	11.182	0.137	6.724	-7.922
80	136	HG	216	20.742	4.377	11.517	-0.113	5.596	-9.524
80	137	HG	217	25.964	2.849	11.590	-0.421	7.158	-8.448
80	138	HG	218	29.816	4.219	11.885	-0.635	6.082	-10.060
80	139	HG	219	35.168	2.719	11.997	-0.874	7.655	-9.056
80	140	HG	220	39.264	3.976	12.250	-0.999	6.651	-10.678
80	141	HG	221	44.832	2.503	12.399	-1.150	8.234	-9.731
80	142	HG	222	49.240	3.663	12.611	-1.201	7.287	-11.338
80	143	HG	223	55.071	2.241	12.797	-1.302	8.857	-10.418
80	144	HG	224	59.807	3.335	12.970	-1.336	7.936	-11.986
80	145	HG	225	65.894	1.984	13.187	-1.440	9.471	-11.071
81	107	TL	188	-21.692	8.918	0.793	6.391	-7.168	7.926
81	108	TL	189	-23.448	9.828	1.119	6.078	-7.719	6.316
81	109	TL	190	-23.940	8.563	1.465	5.766	-6.111	6.989
81	110	TL	191	-25.436	9.567	1.796	5.389	-6.752	5.287
81	111	TL	192	-25.579	8.215	2.145	5.061	-5.051	6.091
81	112	TL	193	-26.861	9.354	2.480	4.626	-5.823	4.264
81	113	TL	194	-26.669	7.879	2.832	4.277	-3.996	5.222
81	114	TL	195	-27.771	9.174	3.169	3.802	-4.921	3.253
81	115	TL	196	-27.259	7.560	3.524	3.430	-2.952	4.356
81	116	TL	197	-28.188	9.001	3.862	2.944	-4.021	2.252
81	117	TL	198	-27.369	7.252	4.217	2.557	-1.917	3.456
81	118	TL	199	-28.091	8.794	4.556	2.101	-3.086	1.252
81	119	TL	200	-26.966	6.946	4.912	1.710	-0.882	2.475
81	120	TL	201	-27.403	8.509	5.251	1.332	-2.072	0.252
81	121	TL	202	-25.973	6.641	5.607	0.939	0.153	1.384
81	122	TL	203	-26.015	8.113	5.947	0.671	-0.945	-0.716
81	123	TL	204	-24.313	6.370	6.304	0.244	1.155	0.184
81	124	TL	205	-23.853	7.611	6.645	0.081	0.288	-1.576
81	125	TL	206	-21.992	6.210	7.004	-0.459	2.048	-1.093
81	126	TL	207	-20.957	7.037	7.347	-0.552	1.598	-4.839
81	127	TL	208	-16.618	3.732	7.789	1.222	5.263	-3.590
81	128	TL	209	-13.467	4.921	7.729	2.666	4.014	-5.216
81	129	TL	210	-9.119	3.723	8.157	2.291	5.652	-4.048
81	130	TL	211	-5.890	4.842	8.107	1.988	4.484	-5.737
81	131	TL	212	-1.375	3.557	8.511	1.774	6.196	-4.618
81	132	TL	213	2.049	4.647	8.483	1.590	5.077	-6.270
81	133	TL	214	6.754	3.367	8.855	1.403	6.760	-5.136
81	134	TL	215	10.323	4.502	8.856	1.173	5.626	-6.724
81	135	TL	216	15.146	3.248	9.190	0.917	7.249	-5.596
81	136	TL	217	18.806	4.412	9.225	0.634	6.121	-7.158
81	137	TL	218	23.734	3.144	9.520	0.368	7.722	-6.082
81	138	TL	219	27.513	4.292	9.592	0.119	6.646	-7.655
81	139	TL	220	32.612	2.972	9.845	-0.078	8.258	-6.651
81	140	TL	221	36.598	4.086	9.955	-0.239	7.255	-8.234
81	141	TL	222	41.953	2.716	10.167	-0.347	8.877	-7.287
81	142	TL	223	46.214	3.811	10.315	-0.435	7.930	-8.857
81	143	TL	224	51.871	2.415	10.489	-0.496	9.537	-7.936
81	144	TL	225	56.423	3.519	10.673	-0.564	8.616	-9.471
81	145	TL	226	62.372	2.123	10.811	-0.631	10.184	-8.556
81	146	TL	227	67.190	3.253	11.027	-0.723	9.269	-10.049
81	147	TL	228	73.394	1.868	11.135	-0.824	10.792	-9.138
81	148	TL	229	78.443	3.022	11.378	-0.947	9.880	-10.603

Z	N	A	ΔM	S_n	S_p	Q_α	Q_{β^-}	Q_{β^+}
79	108	AU 187	-33.249	9.189	2.677	4.473	-5.061	4.107
79	109	AU 188	-33.064	7.887	2.997	4.215	-3.446	4.834
79	110	AU 189	-33.912	8.919	3.303	3.892	-4.148	3.119
79	111	AU 190	-33.370	7.530	3.628	3.616	-2.441	3.979
79	112	AU 191	-33.998	8.699	3.937	3.233	-3.275	2.141
79	113	AU 192	-33.114	7.188	4.265	2.934	-1.444	3.155
79	114	AU 193	-33.557	8.514	4.576	2.508	-2.431	1.177
79	115	AU 194	-32.350	6.865	4.906	2.185	-0.459	2.337
79	116	AU 195	-32.617	8.338	5.219	1.745	-1.593	0.224
79	117	AU 196	-31.101	6.555	5.549	1.404	0.515	1.486
79	118	AU 197	-31.160	8.131	5.862	0.994	-0.720	-0.727
79	119	AU 198	-29.337	6.249	6.193	0.648	1.487	0.556
79	120	AU 199	-29.111	7.845	6.507	0.315	0.232	-1.677
79	121	AU 200	-26.983	5.943	6.838	-0.033	2.459	-0.487
79	122	AU 201	-26.359	7.448	7.152	-0.256	1.296	-2.597
79	123	AU 202	-23.958	5.670	7.484	-0.636	3.399	-1.639
79	124	AU 203	-22.829	6.943	7.800	-0.753	2.469	-3.410
79	125	AU 204	-20.264	5.506	8.134	-1.245	4.233	-2.870
79	126	AU 205	-18.557	6.364	8.452	-1.290	3.720	-6.329
79	127	AU 206	-13.835	3.349	8.895	0.209	7.064	-5.080
79	128	AU 207	-10.302	4.539	8.837	1.406	5.815	-6.706
79	129	AU 208	-5.574	3.343	9.266	1.026	7.454	-5.537
79	130	AU 209	-1.966	4.464	9.219	0.716	6.285	-7.227
79	131	AU 210	2.926	3.179	9.624	0.496	7.997	-6.108
79	132	AU 211	6.726	4.272	9.597	0.306	6.879	-7.760
79	133	AU 212	11.805	2.993	9.970	0.113	8.561	-6.626
79	134	AU 213	15.747	4.129	9.973	-0.123	7.427	-8.214
79	135	AU 214	20.941	2.877	10.309	-0.385	9.051	-7.085
79	136	AU 215	24.970	4.043	10.346	-0.674	7.922	-8.648
79	137	AU 216	30.266	2.776	10.641	-0.947	9.524	-7.572
79	138	AU 217	34.412	3.925	10.715	-1.202	8.448	-9.145
79	139	AU 218	39.876	2.607	10.970	-1.405	10.060	-8.141
79	140	AU 219	44.224	3.723	11.082	-1.572	9.056	-9.724
79	141	AU 220	49.942	2.354	11.295	-1.686	10.678	-8.777
79	142	AU 221	54.563	3.451	11.445	-1.781	9.731	-10.347
80	103	HG 183	-22.942	9.288	2.092	6.329	-9.351	7.020
80	104	HG 184	-25.066	10.195	2.393	6.172	-9.930	5.441
80	105	HG 185	-25.932	8.937	2.713	5.905	-8.357	6.019
80	106	HG 186	-27.682	9.821	3.020	5.689	-8.907	4.450
80	107	HG 187	-28.188	8.578	3.346	5.418	-7.343	5.061
80	108	HG 188	-29.618	9.501	3.658	5.136	-7.926	3.446
80	109	HG 189	-29.765	8.218	3.989	4.855	-6.316	4.148
80	110	HG 190	-30.929	9.236	4.306	4.507	-6.989	2.441
80	111	HG 191	-30.723	7.865	4.641	4.208	-5.287	3.275
80	112	HG 192	-31.670	9.019	4.962	3.803	-6.091	1.444
80	113	HG 193	-31.125	7.526	5.300	3.482	-4.264	2.431
80	114	HG 194	-31.891	8.837	5.623	3.034	-5.222	0.459
80	115	HG 195	-31.024	7.205	5.963	2.689	-3.253	1.593
80	116	HG 196	-31.615	8.662	6.287	2.229	-4.356	-0.515
80	117	HG 197	-30.440	6.896	6.629	1.869	-2.252	0.720
80	118	HG 198	-30.824	8.455	6.953	1.438	-3.456	-1.487
80	119	HG 199	-29.343	6.590	7.295	1.073	-1.252	-0.232
80	120	HG 200	-29.441	8.170	7.620	0.721	-2.475	-2.459
80	121	HG 201	-27.655	6.285	7.962	0.353	-0.252	-1.296
80	122	HG 202	-27.357	7.773	8.287	0.111	-1.384	-3.399
80	123	HG 203	-25.299	6.013	8.630	-0.290	0.716	-2.469
80	124	HG 204	-24.497	7.270	8.957	-0.427	-0.184	-4.233
80	125	HG 205	-22.277	5.851	9.302	-0.940	1.576	-3.720
80	126	HG 206	-20.899	6.693	9.631	-1.006	1.093	-7.064
80	127	HG 207	-16.118	3.290	9.572	0.877	4.839	-5.815

Z	N	A	ΔM	S_n	S_p	Q_α	Q_{β^-}	Q_{β^+}
81	149	TL 230	84.874	1.640	11.461	-1.072	11.369	-9.705
82	109	PB 191	-18.684	8.926	2.033	7.079	-7.796	6.752
82	110	PB 192	-20.528	9.915	2.381	6.666	-8.590	5.051
82	111	PB 193	-21.038	8.582	2.748	6.302	-7.063	5.823
82	112	PB 194	-22.672	9.706	3.100	5.832	-7.994	3.996
82	113	PB 195	-22.850	8.249	3.470	5.448	-6.346	4.921
82	114	PB 196	-24.307	9.528	3.825	4.939	-7.433	2.952
82	115	PB 197	-24.167	7.932	4.197	4.534	-5.646	4.021
82	116	PB 198	-25.452	9.356	4.552	4.014	-6.881	1.917
82	117	PB 199	-25.005	7.625	4.925	3.595	-4.961	3.086
82	118	PB 200	-26.084	9.151	5.282	3.106	-6.298	0.882
82	119	PB 201	-25.332	7.319	5.655	2.684	-4.280	2.072
82	120	PB 202	-26.126	8.865	6.011	2.274	-5.639	-0.153
82	121	PB 203	-25.069	7.015	6.385	1.849	-3.603	0.945
82	122	PB 204	-25.468	8.470	6.742	1.549	-4.873	-1.155
82	123	PB 205	-24.141	6.745	7.117	1.089	-2.963	-0.288
82	124	PB 206	-24.040	7.970	7.475	0.892	-4.004	-2.048
82	125	PB 207	-22.555	6.586	7.852	0.319	-2.438	-1.598
82	126	PB 208	-21.881	7.397	8.213	0.192	-3.067	-5.263
82	127	PB 209	-17.481	3.672	8.152	2.371	0.840	-4.014
82	128	PB 210	-14.771	5.361	8.593	3.703	-0.263	-5.652
82	129	PB 211	-10.374	3.674	8.544	3.319	1.508	-4.484
82	130	PB 212	-7.571	5.269	8.970	3.032	0.482	-6.196
82	131	PB 213	-3.028	3.529	8.942	2.798	2.312	-5.077
82	132	PB 214	-0.006	5.049	9.344	2.640	1.332	-6.760
82	133	PB 215	4.698	3.368	9.345	2.426	3.121	-5.626
82	134	PB 216	7.897	4.872	9.715	2.229	2.121	-7.249
82	135	PB 217	12.685	3.283	9.750	1.941	3.842	-6.121
82	136	PB 218	16.011	4.745	10.083	1.697	2.844	-7.722
82	137	PB 219	20.867	3.216	10.155	1.395	4.535	-6.646
82	138	PB 220	24.354	4.584	10.448	1.187	3.586	-8.258
82	139	PB 221	29.343	3.083	10.559	0.954	5.283	-7.255
82	140	PB 222	33.077	4.338	10.810	0.836	4.402	-8.877
82	141	PB 223	38.284	2.864	10.958	0.691	6.105	-7.930
82	142	PB 224	42.334	4.022	11.169	0.645	5.276	-9.537
82	143	PB 225	47.807	2.598	11.352	0.551	6.963	-8.616
82	144	PB 226	52.188	3.691	11.525	0.523	6.156	-10.184
82	145	PB 227	57.921	2.338	11.740	0.425	7.803	-9.269
82	146	PB 228	62.602	3.390	11.877	0.370	6.999	-10.792
82	147	PB 229	68.563	2.111	12.120	0.244	8.601	-9.880
82	148	PB 230	73.505	3.129	12.227	0.152	7.795	-11.369
82	149	PB 231	79.671	1.905	12.492	0.007	9.365	-10.471
82	150	PB 232	84.858	2.885	12.573	-0.099	8.569	-11.945
82	151	PB 233	91.238	1.691	12.854	-0.233	10.126	-11.070
82	152	PB 234	96.680	2.629	12.917	-0.324	9.349	-12.545
82	153	PB 235	103.307	1.444	13.207	-0.422	10.910	-11.691
82	154	PB 236	109.029	2.349	13.257	-0.485	10.150	-13.168
82	155	PB 237	115.937	1.164	13.549	-0.546	11.715	-12.322
82	156	PB 238	121.953	2.055	13.594	-0.593	10.960	-13.794
82	157	PB 239	129.155	0.870	13.881	-0.638	12.523	-12.937
83	110	BI 193	-13.975	10.109	0.736	7.049	-7.392	7.063
83	111	BI 194	-14.678	8.775	0.929	6.838	-5.865	7.994
83	112	BI 195	-16.504	9.898	1.121	6.507	-6.796	6.346
83	113	BI 196	-16.873	8.441	1.312	6.281	-5.148	7.433
83	114	BI 197	-18.520	9.719	1.503	5.916	-6.235	5.646
83	115	BI 198	-18.570	8.121	1.692	5.674	-4.448	6.881
83	116	BI 199	-20.044	9.545	1.881	5.302	-5.683	4.961
83	117	BI 200	-19.786	7.813	2.070	5.049	-3.763	6.298
83	118	BI 201	-21.052	9.338	2.257	4.711	-5.100	4.280

Z	N	A		ΔM	S_n	S_p	Q_α	Q_{β^-}	Q_{β^+}
83	119	BI	202	-20.487	7.506	2.444	4.457	-3.081	5.639
83	120	BI	203	-21.467	9.051	2.630	4.200	-4.441	3.603
83	121	BI	204	-20.595	7.200	2.815	3.946	-2.405	4.873
83	122	BI	205	-21.178	8.654	2.999	3.800	-3.674	2.963
83	123	BI	206	-20.035	6.928	3.183	3.513	-1.765	4.004
83	124	BI	207	-20.116	8.153	3.366	3.474	-2.806	2.438
83	125	BI	208	-18.814	6.769	3.548	3.075	-1.240	3.067
83	126	BI	209	-18.321	7.579	3.729	3.108	-1.869	-0.840
83	127	BI	210	-14.508	4.259	4.316	5.059	1.631	0.263
83	128	BI	211	-11.881	5.444	4.399	6.651	0.529	-1.508
83	129	BI	212	-8.053	4.243	4.968	6.140	2.312	-0.482
83	130	BI	213	-5.340	5.359	5.058	5.702	1.286	-2.312
83	131	BI	214	-1.338	4.069	5.599	5.356	3.139	-1.332
83	132	BI	215	1.577	5.157	5.706	5.042	2.159	-3.121
83	133	BI	216	5.776	3.872	6.211	4.726	3.978	-2.121
83	134	BI	217	8.843	5.004	6.343	4.369	2.979	-3.842
83	135	BI	218	13.168	3.747	6.806	3.989	4.735	-2.844
83	136	BI	219	16.332	4.907	6.968	3.584	3.737	-4.535
83	137	BI	220	20.768	3.635	7.388	3.197	5.467	-3.586
83	138	BI	221	24.060	4.780	7.583	2.830	4.517	-5.283
83	139	BI	222	28.675	3.457	7.957	2.517	6.254	-4.402
83	140	BI	223	32.179	4.567	8.186	2.241	5.373	-6.105
83	141	BI	224	37.058	3.193	8.515	2.021	7.115	-5.276
83	142	BI	225	40.845	4.285	8.778	1.822	6.287	-6.963
83	143	BI	226	46.031	2.885	9.065	1.653	8.010	-6.156
83	144	BI	227	50.117	3.985	9.359	1.479	7.204	-7.803
83	145	BI	228	55.603	2.586	9.607	1.308	8.884	-6.999
83	146	BI	229	59.962	3.713	9.929	1.114	8.080	-8.601
83	147	BI	230	65.710	2.324	10.142	0.913	9.711	-7.795
83	148	BI	231	70.306	3.475	10.488	0.691	8.906	-9.365
83	149	BI	232	76.289	2.089	10.671	0.470	10.499	-8.569
83	150	BI	233	81.111	3.249	11.035	0.244	9.703	-10.126
83	151	BI	234	87.331	1.852	11.196	0.032	11.277	-9.349
83	152	BI	235	92.397	3.005	11.572	-0.169	10.500	-10.910
83	153	BI	236	98.879	1.589	11.716	-0.348	12.071	-10.150
83	154	BI	237	104.222	2.729	12.097	-0.511	11.311	-11.715
83	155	BI	238	110.994	1.299	12.232	-0.655	12.881	-10.960
83	156	BI	239	116.632	2.434	12.611	-0.791	12.125	-12.523
83	157	BI	240	123.700	1.003	12.744	-0.922	13.685	-11.752
83	158	BI	241	129.627	2.144	13.114	-1.056	12.914	-13.307
83	159	BI	242	136.971	0.728	13.252	-1.201	14.458	-12.507
83	160	BI	243	143.162	1.881	13.605	-1.355	13.658	-14.054
84	111	PO	195	-9.708	8.967	2.319	6.551	-8.297	6.796
84	112	PO	196	-11.726	10.089	2.510	6.377	-9.228	5.148
84	113	PO	197	-12.285	8.631	2.701	6.328	-7.580	6.235
84	114	PO	198	-14.122	9.908	2.891	6.125	-8.667	4.448
84	115	PO	199	-14.361	8.310	3.080	6.064	-6.881	5.683
84	116	PO	200	-16.023	9.733	3.268	5.859	-8.115	3.763
84	117	PO	201	-15.952	8.000	3.455	5.790	-6.195	5.100
84	118	PO	202	-17.405	9.525	3.642	5.622	-7.532	3.081
84	119	PO	203	-17.026	7.692	3.828	5.555	-5.514	4.441
84	120	PO	204	-18.191	9.237	4.013	5.469	-6.873	2.405
84	121	PO	205	-17.504	7.385	4.198	5.403	-4.837	3.674
84	122	PO	206	-18.270	8.838	4.381	5.431	-6.107	1.765
84	123	PO	207	-17.310	7.111	4.564	5.334	-4.197	2.806
84	124	PO	208	-17.574	8.335	4.746	5.470	-5.239	1.240
84	125	PO	209	-16.452	6.950	4.927	5.265	-3.672	1.869
84	126	PO	210	-16.140	7.759	5.108	5.475	-4.301	-1.631
84	127	PO	211	-12.410	4.342	5.191	7.720	-0.704	-0.529
84	128	PO	212	-10.365	6.026	5.773	9.091	-1.807	-2.312

Z	N	A	ΔM	S_n	S_p	Q_α	Q_{β^-}	Q_{β^+}
84	129	PO 213	-6.627	4.333	5.863	8.430	-0.036	-1.286
84	130	PO 214	-4.477	5.922	6.426	7.869	-1.062	-3.139
84	131	PO 215	-0.583	4.177	6.533	7.366	0.768	-2.159
84	132	PO 216	1.797	5.692	7.068	6.944	-0.212	-3.978
84	133	PO 217	5.864	4.005	7.200	6.468	1.577	-2.979
84	134	PO 218	8.433	5.503	7.699	6.014	0.577	-4.735
84	135	PO 219	12.595	3.909	7.862	5.473	2.298	-3.737
84	136	PO 220	15.302	5.365	8.319	4.980	1.300	-5.467
84	137	PO 221	19.543	3.830	8.515	4.433	2.991	-4.517
84	138	PO 222	22.421	5.193	8.928	3.985	2.042	-6.254
84	139	PO 223	26.806	3.686	9.158	3.515	3.739	-5.373
84	140	PO 224	29.942	4.935	9.526	3.164	2.858	-7.115
84	141	PO 225	34.558	3.456	9.789	2.790	4.561	-6.287
84	142	PO 226	38.021	4.608	10.112	2.520	3.732	-8.010
84	143	PO 227	42.913	3.179	10.407	2.204	5.419	-7.204
84	144	PO 228	46.719	4.266	10.688	1.960	4.613	-8.884
84	145	PO 229	51.882	2.908	11.010	1.650	6.259	-8.080
84	146	PO 230	55.999	3.954	11.252	1.386	5.455	-9.711
84	147	PO 231	61.401	2.670	11.598	1.055	7.057	-8.906
84	148	PO 232	65.790	3.682	11.805	0.763	6.251	-10.499
84	149	PO 233	71.409	2.453	12.169	0.422	7.821	-9.703
84	150	PO 234	76.053	3.427	12.347	0.123	7.025	-11.277
84	151	PO 235	81.897	2.228	12.723	-0.199	8.582	-10.500
84	152	PO 236	86.808	3.160	12.878	-0.474	7.805	-12.071
84	153	PO 237	92.910	1.970	13.258	-0.752	9.366	-11.311
84	154	PO 238	98.113	2.869	13.397	-0.992	8.606	-12.881
84	155	PO 239	104.507	1.678	13.776	-1.225	10.172	-12.125
84	156	PO 240	110.015	2.564	13.906	-1.439	9.416	-13.685
84	157	PO 241	116.713	1.373	14.275	-1.649	10.979	-12.914
84	158	PO 242	122.513	2.272	14.403	-1.865	10.209	-14.458
85	112	AT 197	-4.705	10.279	0.269	6.845	-7.936	7.580
85	113	AT 198	-5.455	8.821	0.458	6.799	-6.287	8.667
85	114	AT 199	-7.481	10.097	0.647	6.599	-7.375	6.881
85	115	AT 200	-7.908	8.499	0.836	6.541	-5.588	8.115
85	116	AT 201	-9.757	9.921	1.023	6.339	-6.823	6.195
85	117	AT 202	-9.873	8.187	1.210	6.273	-4.902	7.532
85	118	AT 203	-11.512	9.711	1.396	6.108	-6.240	5.514
85	119	AT 204	-11.317	7.877	1.581	6.044	-4.221	6.873
85	120	AT 205	-12.667	9.421	1.765	5.961	-5.581	4.837
85	121	AT 206	-12.164	7.568	1.949	5.898	-3.544	6.107
85	122	AT 207	-13.113	9.021	2.132	5.929	-4.814	4.197
85	123	AT 208	-12.335	7.293	2.314	5.836	-2.904	5.239
85	124	AT 209	-12.780	8.516	2.495	5.974	-3.946	3.672
85	125	AT 210	-11.838	7.130	2.676	5.772	-2.380	4.301
85	126	AT 211	-11.706	7.939	2.855	5.986	-3.009	0.704
85	127	AT 212	-8.558	4.924	3.437	7.831	0.186	1.807
85	128	AT 213	-6.590	6.103	3.514	9.306	-0.916	0.036
85	129	AT 214	-3.415	4.897	4.078	8.668	0.866	1.062
85	130	AT 215	-1.350	6.007	4.162	8.106	-0.159	-0.768
85	131	AT 216	2.009	4.712	4.697	7.638	1.694	0.212
85	132	AT 217	4.287	5.793	4.799	7.203	0.714	-1.577
85	133	AT 218	7.855	4.504	5.298	6.769	2.533	-0.577
85	134	AT 219	10.297	5.630	5.425	6.296	1.533	-2.298
85	135	AT 220	14.002	4.367	5.882	5.801	3.290	-1.300
85	136	AT 221	16.552	5.522	6.039	5.284	2.291	-2.991
85	137	AT 222	20.379	4.244	6.453	4.787	4.021	-2.042
85	138	AT 223	23.068	5.383	6.642	4.311	3.072	-3.739
85	139	AT 224	27.085	4.054	7.011	3.892	4.809	-2.858
85	140	AT 225	29.997	5.159	7.234	3.512	3.928	-4.561
85	141	AT 226	34.289	3.780	7.558	3.189	5.670	-3.732

Z	N	A	ΔM	S_n	S_p	Q_α	Q_{β^-}	Q_{β^+}
85	142	AT 227	37.495	4.866	7.815	2.891	4.841	-5.419
85	143	AT 228	42.106	3.460	8.096	2.624	6.565	-4.613
85	144	AT 229	45.622	4.555	8.385	2.353	5.759	-6.259
85	145	AT 230	50.544	3.150	8.627	2.088	7.439	-5.455
85	146	AT 231	54.344	4.271	8.944	1.802	6.635	-7.057
85	147	AT 232	59.539	2.877	9.151	1.511	8.265	-6.251
85	148	AT 233	63.588	4.022	9.491	1.201	7.460	-7.821
85	149	AT 234	69.028	2.631	9.669	0.894	9.053	-7.025
85	150	AT 235	73.315	3.785	10.028	0.584	8.257	-8.582
85	151	AT 236	79.003	2.383	10.183	0.290	9.832	-7.805
85	152	AT 237	83.545	3.530	10.553	0.008	9.055	-9.366
85	153	AT 238	89.507	2.109	10.692	-0.248	10.626	-8.606
85	154	AT 239	94.335	3.243	11.067	-0.487	9.866	-10.172
85	155	AT 240	100.599	1.808	11.197	-0.705	11.435	-9.416
85	156	AT 241	105.734	2.936	11.570	-0.912	10.679	-10.979
85	157	AT 242	112.305	1.501	11.698	-1.114	12.240	-10.209
85	158	AT 243	117.741	2.635	12.061	-1.316	11.469	-11.763
85	159	AT 244	124.598	1.214	12.194	-1.526	13.012	-10.963
85	160	AT 245	130.308	2.361	12.542	-1.744	12.213	-12.510
85	161	AT 246	137.421	0.959	12.687	-1.975	13.742	-11.681
86	113	RN 199	-0.106	9.010	1.940	7.178	-8.622	7.375
86	114	RN 200	-2.320	10.285	2.128	6.981	-9.710	5.588
86	115	RN 201	-2.935	8.686	2.316	6.926	-7.923	6.823
86	116	RN 202	-4.971	10.108	2.502	6.727	-9.158	4.902
86	117	RN 203	-5.272	8.373	2.688	6.664	-7.237	6.240
86	118	RN 204	-7.096	9.896	2.874	6.502	-8.575	4.221
86	119	RN 205	-7.086	8.061	3.058	6.441	-6.556	5.581
86	120	RN 206	-8.619	9.605	3.241	6.361	-7.916	3.544
86	121	RN 207	-8.299	7.751	3.424	6.302	-5.879	4.814
86	122	RN 208	-9.430	9.203	3.606	6.335	-7.149	2.904
86	123	RN 209	-8.834	7.475	3.788	6.245	-5.240	3.946
86	124	RN 210	-9.459	8.697	3.968	6.387	-6.281	2.380
86	125	RN 211	-8.698	7.310	4.148	6.188	-4.715	3.009
86	126	RN 212	-8.744	8.118	4.327	6.405	-5.344	-0.186
86	127	RN 213	-5.674	5.001	4.404	8.353	-2.049	0.916
86	128	RN 214	-4.282	6.679	4.981	9.433	-3.151	-0.866
86	129	RN 215	-1.191	4.981	5.065	8.794	-1.381	0.159
86	130	RN 216	0.316	6.564	5.623	8.256	-2.406	-1.694
86	131	RN 217	3.574	4.813	5.725	7.776	-0.576	-0.714
86	132	RN 218	5.322	6.323	6.254	7.375	-1.556	-2.533
86	133	RN 219	8.764	4.630	6.381	6.922	0.233	-1.533
86	134	RN 220	10.712	6.123	6.874	6.490	-0.767	-3.290
86	135	RN 221	14.260	4.523	7.030	5.971	0.954	-2.291
86	136	RN 222	16.358	5.974	7.483	5.500	-0.044	-4.021
86	137	RN 223	19.996	4.433	7.672	4.976	1.647	-3.072
86	138	RN 224	22.276	5.791	8.081	4.550	0.698	-4.809
86	139	RN 225	26.070	4.278	8.304	4.102	2.394	-3.928
86	140	RN 226	28.619	5.522	8.667	3.773	1.513	-5.670
86	141	RN 227	32.654	4.037	8.924	3.422	3.217	-4.841
86	142	RN 228	35.541	5.184	9.242	3.174	2.388	-6.565
86	143	RN 229	39.864	3.749	9.531	2.881	4.074	-5.759
86	144	RN 230	43.105	4.830	9.807	2.659	3.268	-7.439
86	145	RN 231	47.709	3.467	10.123	2.371	4.915	-6.635
86	146	RN 232	51.273	4.507	10.360	2.130	4.111	-8.265
86	147	RN 233	56.128	3.217	10.700	1.821	5.712	-7.460
86	148	RN 234	59.975	4.224	10.902	1.552	4.907	-9.053
86	149	RN 235	65.058	2.989	11.260	1.232	6.477	-8.257
86	150	RN 236	69.171	3.958	11.432	0.956	5.681	-9.832
86	151	RN 237	74.490	2.753	11.802	0.656	7.238	-9.055
86	152	RN 238	78.881	3.680	11.952	0.403	6.461	-10.626

Z	N	A		ΔM	S_n	S_p	Q_α	Q_{β^-}	Q_{β^+}
86	153	RN	239	84.469	2.484	12.327	0.147	8.021	-9.866
86	154	RN	240	89.164	3.377	12.461	-0.069	7.262	-11.435
86	155	RN	241	95.054	2.181	12.833	-0.280	8.827	-10.679
86	156	RN	242	100.065	3.061	12.958	-0.473	8.071	-12.240
86	157	RN	243	106.272	1.865	13.322	-0.659	9.635	-11.469
86	158	RN	244	111.586	2.758	13.444	-0.854	8.864	-13.012
86	159	RN	245	118.095	1.562	13.792	-1.043	10.419	-12.213
87	114	FR	201	4.989	10.473	-0.019	7.269	-8.469	7.923
87	115	FR	202	4.187	8.873	0.167	7.217	-6.682	9.158
87	116	FR	203	1.965	10.294	0.353	7.021	-7.917	7.237
87	117	FR	204	1.479	8.558	0.538	6.962	-5.997	8.575
87	118	FR	205	-0.530	10.080	0.723	6.802	-7.334	6.556
87	119	FR	206	-0.704	8.245	0.906	6.744	-5.315	7.916
87	120	FR	207	-2.419	9.787	1.089	6.668	-6.675	5.879
87	121	FR	208	-2.281	7.933	1.271	6.611	-4.639	7.149
87	122	FR	209	-3.594	9.384	1.453	6.648	-5.908	5.240
87	123	FR	210	-3.178	7.655	1.633	6.561	-3.999	6.281
87	124	FR	211	-3.983	8.876	1.813	6.706	-5.040	4.715
87	125	FR	212	-3.400	7.489	1.992	6.510	-3.474	5.344
87	126	FR	213	-3.625	8.296	2.170	6.730	-4.103	2.049
87	127	FR	214	-1.131	5.577	2.746	8.283	-1.206	3.151
87	128	FR	215	0.189	6.751	2.818	9.471	-2.309	1.381
87	129	FR	216	2.722	5.539	3.376	8.855	-0.526	2.406
87	130	FR	217	4.150	6.643	3.455	8.315	-1.551	0.576
87	131	FR	218	6.879	5.343	3.984	7.869	0.301	1.556
87	132	FR	219	8.531	6.419	4.080	7.457	-0.678	-0.233
87	133	FR	220	11.479	5.124	4.574	7.045	1.141	0.767
87	134	FR	221	13.306	6.244	4.695	6.594	0.141	-0.954
87	135	FR	222	16.402	4.976	5.147	6.122	1.897	0.044
87	136	FR	223	18.349	6.125	5.298	5.627	0.899	-1.647
87	137	FR	224	21.579	4.842	5.706	5.152	2.629	-0.698
87	138	FR	225	23.675	5.975	5.890	4.699	1.680	-2.394
87	139	FR	226	27.106	4.641	6.253	4.302	3.417	-1.513
87	140	FR	227	29.437	5.740	6.471	3.944	2.535	-3.217
87	141	FR	228	33.153	4.355	6.789	3.644	4.278	-2.388
87	142	FR	229	35.790	5.435	7.041	3.368	3.449	-4.074
87	143	FR	230	39.837	4.024	7.316	3.123	5.173	-3.268
87	144	FR	231	42.794	5.114	7.599	2.875	4.367	-4.915
87	145	FR	232	47.163	3.703	7.836	2.632	6.047	-4.111
87	146	FR	233	50.415	4.819	8.147	2.368	5.243	-5.712
87	147	FR	234	55.068	3.419	8.349	2.099	6.873	-4.907
87	148	FR	235	58.581	4.559	8.683	1.812	6.068	-6.477
87	149	FR	236	63.491	3.162	8.856	1.527	7.661	-5.681
87	150	FR	237	67.252	4.310	9.209	1.239	6.865	-7.238
87	151	FR	238	72.421	2.903	9.358	0.967	8.440	-6.461
87	152	FR	239	76.448	4.044	9.723	0.708	7.663	-8.021
87	153	FR	240	81.902	2.617	9.856	0.474	9.234	-7.262
87	154	FR	241	86.227	3.746	10.225	0.258	8.474	-8.827
87	155	FR	242	91.994	2.305	10.350	0.062	10.043	-8.071
87	156	FR	243	96.637	3.428	10.717	-0.123	9.287	-9.635
87	157	FR	244	102.721	1.987	10.840	-0.302	10.847	-8.864
87	158	FR	245	107.677	3.116	11.198	-0.482	10.076	-10.419
87	159	FR	246	114.059	1.689	11.325	-0.670	11.620	-9.619
87	160	FR	247	119.300	2.831	11.667	-0.865	10.821	-11.166
87	161	FR	248	125.948	1.423	11.806	-1.074	12.350	-10.336
88	115	RA	203	9.882	9.059	1.594	7.563	-8.980	7.917
88	116	RA	204	7.475	10.479	1.779	7.370	-10.215	5.997
88	117	RA	205	6.804	8.742	1.963	7.314	-8.294	7.334
88	118	RA	206	4.612	10.264	2.147	7.158	-9.632	5.315

Z	N	A		ΔM	S_n	S_p	Q_α	Q_{β^-}	Q_{β^+}
88	119	RA	207	4.255	8.428	2.330	7.103	-7.613	6.675
88	120	RA	208	2.357	9.969	2.512	7.029	-8.973	4.639
88	121	RA	209	2.314	8.114	2.693	6.976	-6.937	5.908
88	122	RA	210	0.821	9.565	2.874	7.016	-8.206	3.999
88	123	RA	211	1.058	7.835	3.054	6.932	-6.297	5.040
88	124	RA	212	0.074	9.055	3.233	7.079	-7.338	3.474
88	125	RA	213	0.478	7.667	3.411	6.887	-5.772	4.103
88	126	RA	214	0.075	8.474	3.588	7.109	-6.401	1.206
88	127	RA	215	2.498	5.649	3.660	8.771	-3.399	2.309
88	128	RA	216	3.248	7.322	4.231	9.567	-4.502	0.526
88	129	RA	217	5.701	5.618	4.310	8.950	-2.731	1.551
88	130	RA	218	6.577	7.196	4.862	8.434	-3.757	-0.301
88	131	RA	219	9.210	5.439	4.958	7.976	-1.927	0.678
88	132	RA	220	10.338	6.943	5.482	7.598	-2.907	-1.141
88	133	RA	221	13.165	5.245	5.603	7.167	-1.118	-0.141
88	134	RA	222	14.505	6.732	6.091	6.757	-2.118	-1.897
88	135	RA	223	17.449	5.127	6.242	6.261	-0.397	-0.899
88	136	RA	224	18.949	6.572	6.688	5.813	-1.395	-2.629
88	137	RA	225	21.995	5.026	6.872	5.310	0.296	-1.680
88	138	RA	226	23.689	6.377	7.275	4.907	-0.653	-3.417
88	139	RA	227	26.902	4.859	7.493	4.481	1.044	-2.535
88	140	RA	228	28.876	6.097	7.850	4.175	0.163	-4.278
88	141	RA	229	32.340	4.607	8.102	3.846	1.866	-3.449
88	142	RA	230	34.664	5.748	8.415	3.620	1.037	-5.173
88	143	RA	231	38.428	4.308	8.698	3.350	2.724	-4.367
88	144	RA	232	41.116	5.384	8.968	3.150	1.918	-6.047
88	145	RA	233	45.173	4.014	9.279	2.884	3.564	-5.243
88	146	RA	234	48.195	5.049	9.510	2.665	2.760	-6.873
88	147	RA	235	52.513	3.753	9.844	2.379	4.362	-6.068
88	148	RA	236	55.830	4.755	10.040	2.131	3.556	-7.661
88	149	RA	237	60.387	3.514	10.393	1.834	5.126	-6.865
88	150	RA	238	63.981	4.477	10.560	1.581	4.330	-8.440
88	151	RA	239	68.785	3.267	10.924	1.303	5.887	-7.663
88	152	RA	240	72.668	4.188	11.068	1.073	5.110	-9.234
88	153	RA	241	77.753	2.987	11.438	0.839	6.671	-8.474
88	154	RA	242	81.950	3.874	11.566	0.644	5.911	-10.043
88	155	RA	243	87.350	2.672	11.933	0.456	7.477	-9.287
88	156	RA	244	91.874	3.547	12.052	0.286	6.721	-10.847
88	157	RA	245	97.600	2.345	12.410	0.121	8.284	-10.076
88	158	RA	246	102.439	3.233	12.527	-0.051	7.514	-11.620
88	159	RA	247	108.479	2.031	12.869	-0.217	9.068	-10.821
88	160	RA	248	113.598	2.953	12.991	-0.412	8.268	-12.350
88	161	RA	249	119.928	1.742	13.310	-0.592	9.815	-11.521
88	162	RA	250	125.294	2.705	13.443	-0.809	8.986	-13.051
88	163	RA	251	131.901	1.465	13.733	-0.990	10.540	-12.201
89	117	AC	206	14.244	8.926	-0.151	7.632	-7.165	9.632
89	118	AC	207	11.869	10.447	0.032	7.479	-8.503	7.613
89	119	AC	208	11.330	8.610	0.214	7.427	-6.484	8.973
89	120	AC	209	9.251	10.151	0.395	7.356	-7.843	6.937
89	121	AC	210	9.027	8.295	0.576	7.306	-5.807	8.206
89	122	AC	211	7.354	9.745	0.756	7.349	-7.077	6.297
89	123	AC	212	7.412	8.014	0.935	7.268	-5.167	7.338
89	124	AC	213	6.250	9.234	1.113	7.419	-6.209	5.772
89	125	AC	214	6.476	7.845	1.291	7.229	-4.642	6.401
89	126	AC	215	5.897	8.650	1.467	7.455	-5.271	3.399
89	127	AC	216	7.749	6.219	2.038	8.725	-2.664	4.502
89	128	AC	217	8.433	7.388	2.104	9.633	-3.767	2.731
89	129	AC	218	10.334	6.170	2.656	9.040	-1.984	3.757
89	130	AC	219	11.137	7.269	2.730	8.523	-3.009	1.927
89	131	AC	220	13.245	5.963	3.253	8.099	-1.157	2.907

Z	N	A	ΔM	S_n	S_p	Q_α	Q_{β^-}	Q_{β^+}
89	132	AC 221	14.283	7.033	3.344	7.709	-2.136	1.118
89	133	AC 222	16.622	5.732	3.832	7.319	-0.317	2.118
89	134	AC 223	17.846	6.847	3.947	6.891	-1.317	0.397
89	135	AC 224	20.344	5.573	4.394	6.441	0.439	1.395
89	136	AC 225	21.699	6.717	4.539	5.968	-0.559	-0.296
89	137	AC 226	24.342	5.428	4.942	5.516	1.171	0.653
89	138	AC 227	25.858	6.556	5.120	5.084	0.222	-1.044
89	139	AC 228	28.713	5.216	5.477	4.710	1.958	-0.163
89	140	AC 229	30.475	6.310	5.690	4.375	1.077	-1.866
89	141	AC 230	33.627	4.919	6.003	4.096	2.820	-1.037
89	142	AC 231	35.704	5.994	6.249	3.843	1.991	-2.724
89	143	AC 232	39.198	4.577	6.519	3.620	3.715	-1.918
89	144	AC 233	41.608	5.661	6.796	3.394	2.908	-3.564
89	145	AC 234	45.435	4.245	7.027	3.173	4.589	-2.760
89	146	AC 235	48.151	5.355	7.333	2.932	3.784	-4.362
89	147	AC 236	52.273	3.950	7.529	2.686	5.415	-3.556
89	148	AC 237	55.261	5.084	7.858	2.421	4.610	-5.126
89	149	AC 238	59.651	3.681	8.025	2.158	6.203	-4.330
89	150	AC 239	62.898	4.824	8.372	1.892	5.407	-5.887
89	151	AC 240	67.558	3.411	8.516	1.643	6.982	-5.110
89	152	AC 241	71.083	4.547	8.875	1.406	6.204	-6.671
89	153	AC 242	76.040	3.115	9.003	1.194	7.775	-5.911
89	154	AC 243	79.873	4.238	9.366	1.000	7.016	-7.477
89	155	AC 244	85.153	2.791	9.485	0.826	8.585	-6.721
89	156	AC 245	89.316	3.909	9.847	0.664	7.829	-8.284
89	157	AC 246	94.925	2.462	9.964	0.507	9.389	-7.514
89	158	AC 247	99.411	3.585	10.316	0.350	8.618	-9.068
89	159	AC 248	105.330	2.153	10.438	0.184	10.162	-8.268
89	160	AC 249	110.112	3.289	10.775	0.011	9.363	-9.815
89	161	AC 250	116.308	1.876	10.908	-0.176	10.892	-8.986
89	162	AC 251	121.361	3.019	11.222	-0.364	10.063	-10.540
89	163	AC 252	127.816	1.616	11.373	-0.557	11.593	-9.690
90	118	TH 208	17.814	10.629	1.344	7.914	-10.770	6.484
90	119	TH 209	17.094	8.791	1.525	7.866	-8.751	7.843
90	120	TH 210	14.835	10.331	1.705	7.798	-10.111	5.807
90	121	TH 211	14.431	8.475	1.885	7.751	-8.074	7.077
90	122	TH 212	12.579	9.924	2.064	7.797	-9.344	5.167
90	123	TH 213	12.458	8.192	2.242	7.719	-7.435	6.209
90	124	TH 214	11.119	9.411	2.420	7.873	-8.476	4.642
90	125	TH 215	11.169	8.022	2.597	7.686	-6.910	5.271
90	126	TH 216	10.414	8.826	2.773	7.915	-7.539	2.664
90	127	TH 217	12.199	6.286	2.839	9.297	-4.823	3.767
90	128	TH 218	12.318	7.953	3.404	9.818	-5.925	1.984
90	129	TH 219	14.146	6.243	3.477	9.223	-4.155	3.009
90	130	TH 220	14.402	7.816	4.024	8.730	-5.180	1.157
90	131	TH 221	16.420	6.053	4.114	8.294	-3.351	2.136
90	132	TH 222	16.940	7.552	4.633	7.938	-4.330	0.317
90	133	TH 223	19.163	5.848	4.748	7.529	-2.542	1.317
90	134	TH 224	19.905	7.330	5.230	7.142	-3.541	-0.439
90	135	TH 225	22.258	5.719	5.376	6.668	-1.821	0.559
90	136	TH 226	23.171	7.158	5.817	6.242	-2.819	-1.171
90	137	TH 227	25.636	5.607	5.995	5.762	-1.127	-0.222
90	138	TH 228	26.755	6.953	6.392	5.381	-2.077	-1.958
90	139	TH 229	29.397	5.429	6.605	4.977	-0.380	-1.077
90	140	TH 230	30.807	6.662	6.956	4.693	-1.261	-2.820
90	141	TH 231	33.713	5.165	7.203	4.387	0.442	-1.991
90	142	TH 232	35.484	6.301	7.510	4.183	-0.386	-3.715
90	143	TH 233	38.700	4.855	7.787	3.935	1.300	-2.908
90	144	TH 234	40.846	5.925	8.051	3.757	0.494	-4.589
90	145	TH 235	44.367	4.551	8.357	3.514	2.141	-3.784

Z	N	A	ΔM	S_n	S_p	Q_α	Q_{β^-}	Q_{β^+}
90	146	TH 236	46.858	5.580	8.582	3.317	1.336	-5.415
90	147	TH 237	50.651	4.279	8.911	3.053	2.938	-4.610
90	148	TH 238	53.448	5.274	9.102	2.828	2.133	-6.203
90	149	TH 239	57.491	4.028	9.449	2.553	3.702	-5.407
90	150	TH 240	60.577	4.986	9.610	2.322	2.906	-6.982
90	151	TH 241	64.878	3.770	9.969	2.067	4.464	-6.204
90	152	TH 242	68.264	4.686	10.108	1.859	3.687	-7.775
90	153	TH 243	72.857	3.478	10.471	1.647	5.247	-7.016
90	154	TH 244	76.568	4.360	10.594	1.475	4.487	-8.585
90	155	TH 245	81.487	3.153	10.955	1.309	6.053	-7.829
90	156	TH 246	85.536	4.022	11.069	1.161	5.297	-9.389
90	157	TH 247	90.793	2.815	11.421	1.019	6.861	-8.618
90	158	TH 248	95.168	3.697	11.533	0.869	6.090	-10.162
90	159	TH 249	100.750	2.489	11.869	0.725	7.644	-9.363
90	160	TH 250	105.416	3.405	11.985	0.552	6.845	-10.892
90	161	TH 251	111.298	2.189	12.299	0.394	8.392	-10.063
90	162	TH 252	116.223	3.147	12.427	0.200	7.562	-11.593
90	163	TH 253	122.394	1.901	12.711	0.042	9.116	-10.743
90	164	TH 254	127.569	2.896	12.857	-0.150	8.266	-12.295
90	165	TH 255	134.046	1.595	13.107	-0.280	9.847	-11.435
91	119	PA 210	24.945	8.972	-0.562	8.277	-7.740	10.111
91	120	PA 211	22.506	10.511	-0.382	8.212	-9.099	8.074
91	121	PA 212	21.923	8.654	-0.203	8.168	-7.063	9.344
91	122	PA 213	19.893	10.102	-0.025	8.217	-8.333	7.435
91	123	PA 214	19.595	8.370	0.153	8.142	-6.423	8.476
91	124	PA 215	18.078	9.588	0.329	8.299	-7.464	6.910
91	125	PA 216	17.952	8.198	0.505	8.116	-5.898	7.539
91	126	PA 217	17.022	9.002	0.680	8.348	-6.527	4.823
91	127	PA 218	18.243	6.851	1.245	9.342	-4.202	5.925
91	128	PA 219	18.301	8.014	1.306	9.979	-5.304	4.155
91	129	PA 220	19.582	6.790	1.853	9.408	-3.521	5.180
91	130	PA 221	19.770	7.883	1.920	8.913	-4.547	3.351
91	131	PA 222	21.270	6.572	2.439	8.511	-2.694	4.330
91	132	PA 223	21.705	7.637	2.524	8.144	-3.674	2.542
91	133	PA 224	23.446	6.330	3.006	7.776	-1.855	3.541
91	134	PA 225	24.078	7.439	3.116	7.370	-2.854	1.821
91	135	PA 226	25.990	6.160	3.557	6.943	-1.098	2.819
91	136	PA 227	26.763	7.298	3.697	6.492	-2.096	1.127
91	137	PA 228	28.831	6.004	4.094	6.062	-0.366	2.077
91	138	PA 229	29.777	7.126	4.267	5.653	-1.315	0.380
91	139	PA 230	32.068	5.780	4.618	5.301	0.421	1.261
91	140	PA 231	33.271	6.869	4.825	4.988	-0.460	-0.442
91	141	PA 232	35.870	5.472	5.132	4.732	1.282	0.386
91	142	PA 233	37.400	6.542	5.373	4.501	0.454	-1.300
91	143	PA 234	40.352	5.119	5.637	4.300	2.177	-0.494
91	144	PA 235	42.226	6.198	5.909	4.097	1.371	-2.141
91	145	PA 236	45.521	4.776	6.134	3.899	3.051	-1.336
91	146	PA 237	47.713	5.880	6.434	3.679	2.247	-2.938
91	147	PA 238	51.315	4.469	6.625	3.455	3.878	-2.133
91	148	PA 239	53.789	5.598	6.948	3.213	3.073	-3.702
91	149	PA 240	57.670	4.190	7.110	2.972	4.666	-2.906
91	150	PA 241	60.414	5.327	7.451	2.729	3.870	-4.464
91	151	PA 242	64.577	3.908	7.590	2.502	5.444	-3.687
91	152	PA 243	67.610	5.039	7.943	2.288	4.667	-5.247
91	153	PA 244	72.081	3.601	8.065	2.098	6.238	-4.487
91	154	PA 245	75.434	4.719	8.424	1.926	5.478	-6.053
91	155	PA 246	80.239	3.266	8.537	1.775	7.048	-5.297
91	156	PA 247	83.932	4.378	8.893	1.634	6.292	-6.861
91	157	PA 248	89.078	2.926	9.004	1.500	7.852	-6.090
91	158	PA 249	93.106	4.044	9.351	1.365	7.081	-7.644

Z	N	A	ΔM	S_n	S_p	Q_α	Q_{β^-}	Q_{β^+}
91	159	PA 250	98.571	2.606	9.467	1.221	8.625	-6.845
91	160	PA 251	102.907	3.736	9.798	1.071	7.825	-8.392
91	161	PA 252	108.661	2.317	9.926	0.906	9.355	-7.562
91	162	PA 253	113.278	3.455	10.234	0.741	8.525	-9.116
91	163	PA 254	119.303	2.047	10.380	0.570	10.056	-8.266
91	164	PA 255	124.199	3.175	10.659	0.413	9.206	-9.847
91	165	PA 256	130.506	1.764	10.828	0.265	10.758	-8.987
91	166	PA 257	135.709	2.869	11.073	0.147	9.897	-10.606
91	167	PA 258	142.334	1.447	11.270	0.045	11.483	-9.733
92	120	U 212	28.986	10.690	0.809	8.747	-11.317	7.063
92	121	U 213	28.226	8.832	0.987	8.706	-9.281	8.333
92	122	U 214	26.018	10.279	1.164	8.758	-10.551	6.423
92	123	U 215	25.543	8.546	1.341	8.687	-8.641	7.464
92	124	U 216	23.850	9.764	1.517	8.847	-9.683	5.898
92	125	U 217	23.549	8.373	1.692	8.666	-8.117	6.527
92	126	U 218	22.445	9.176	1.866	8.901	-8.745	4.202
92	127	U 219	23.605	6.911	1.927	10.012	-6.307	5.304
92	128	U 220	23.103	8.573	2.486	10.265	-7.409	3.521
92	129	U 221	24.317	6.858	2.554	9.693	-5.639	4.547
92	130	U 222	23.964	8.424	3.095	9.222	-6.665	2.694
92	131	U 223	25.379	6.657	3.180	8.808	-4.835	3.674
92	132	U 224	25.301	8.149	3.693	8.474	-5.815	1.855
92	133	U 225	26.933	6.440	3.803	8.088	-4.026	2.854
92	134	U 226	27.088	7.916	4.280	7.723	-5.025	1.098
92	135	U 227	28.859	6.300	4.419	7.271	-3.305	2.096
92	136	U 228	29.198	7.733	4.855	6.868	-4.303	0.366
92	137	U 229	31.093	6.176	5.028	6.410	-2.612	1.315
92	138	U 230	31.647	7.517	5.419	6.051	-3.561	-0.421
92	139	U 231	33.731	5.988	5.626	5.670	-1.864	0.460
92	140	U 232	34.588	7.215	5.972	5.408	-2.745	-1.282
92	141	U 233	36.946	5.713	6.213	5.124	-1.042	-0.454
92	142	U 234	38.175	6.843	6.514	4.943	-1.871	-2.177
92	143	U 235	40.855	5.391	6.786	4.717	-0.184	-1.371
92	144	U 236	42.470	6.456	7.045	4.562	-0.990	-3.051
92	145	U 237	45.465	5.076	7.345	4.341	0.657	-2.247
92	146	U 238	47.437	6.100	7.565	4.166	-0.148	-3.878
92	147	U 239	50.716	4.793	7.888	3.924	1.454	-3.073
92	148	U 240	53.005	5.783	8.073	3.722	0.649	-4.666
92	149	U 241	56.545	4.531	8.414	3.469	2.218	-3.870
92	150	U 242	59.133	5.483	8.570	3.260	1.422	-5.444
92	151	U 243	62.943	4.261	8.923	3.027	2.980	-4.667
92	152	U 244	65.843	5.172	9.056	2.841	2.202	-6.238
92	153	U 245	69.955	3.959	9.415	2.652	3.763	-5.478
92	154	U 246	73.191	4.835	9.531	2.502	3.003	-7.048
92	155	U 247	77.640	3.622	9.888	2.358	4.569	-6.292
92	156	U 248	81.226	4.486	9.995	2.233	3.813	-7.852
92	157	U 249	86.025	3.273	10.342	2.113	5.377	-7.081
92	158	U 250	89.947	4.149	10.448	1.986	4.606	-8.625
92	159	U 251	95.082	2.937	10.779	1.864	6.160	-7.825
92	160	U 252	99.306	3.847	10.890	1.714	5.360	-9.355
92	161	U 253	104.753	2.625	11.198	1.578	6.907	-8.525
92	162	U 254	109.247	3.577	11.320	1.406	6.078	-10.056
92	163	U 255	114.993	2.325	11.599	1.270	7.632	-9.206
92	164	U 256	119.749	3.316	11.739	1.101	6.782	-10.758
92	165	U 257	125.812	2.008	11.984	0.993	8.363	-9.897
92	166	U 258	130.851	3.032	12.147	0.857	7.502	-11.483
92	167	U 259	137.270	1.652	12.352	0.800	9.121	-10.610
92	168	U 260	142.625	2.717	12.544	0.707	8.248	-12.224
92	169	U 261	149.431	1.265	12.707	0.691	9.899	-11.317

Z	N	A	ΔM	S_n	S_p	Q_α	Q_{β^-}	Q_{β^+}
93	121	NP 214	36.569	9.009	-1.054	9.199	-8.366	10.551
93	122	NP 215	34.184	10.456	-0.877	9.254	-9.636	8.641
93	123	NP 216	33.533	8.722	-0.701	9.185	-7.726	9.683
93	124	NP 217	31.666	9.939	-0.526	9.348	-8.768	8.117
93	125	NP 218	31.190	8.547	-0.352	9.171	-7.201	8.745
93	126	NP 219	29.912	9.350	-0.178	9.409	-7.830	6.307
93	127	NP 220	30.513	7.471	0.381	10.136	-5.778	7.409
93	128	NP 221	29.956	8.628	0.436	10.509	-6.881	5.639
93	129	NP 222	30.629	7.399	0.977	9.961	-5.098	6.665
93	130	NP 223	30.214	8.487	1.039	9.488	-6.123	4.835
93	131	NP 224	31.116	7.169	1.552	9.109	-4.271	5.815
93	132	NP 225	30.959	8.229	1.632	8.763	-5.250	4.026
93	133	NP 226	32.113	6.917	2.108	8.418	-3.431	5.025
93	134	NP 227	32.164	8.020	2.213	8.034	-4.431	3.305
93	135	NP 228	33.500	6.735	2.648	7.629	-2.675	4.303
93	136	NP 229	33.704	7.868	2.782	7.201	-3.673	2.612
93	137	NP 230	35.208	6.568	3.174	6.793	-1.943	3.561
93	138	NP 231	35.595	7.684	3.341	6.407	-2.892	1.864
93	139	NP 232	37.333	6.334	3.687	6.077	-1.156	2.745
93	140	NP 233	37.988	7.416	3.888	5.786	-2.037	1.042
93	141	NP 234	40.045	6.014	4.190	5.553	-0.294	1.871
93	142	NP 235	41.039	7.078	4.425	5.343	-1.123	0.184
93	143	NP 236	43.460	5.650	4.684	5.165	0.600	0.990
93	144	NP 237	44.809	6.723	4.950	4.984	-0.206	-0.657
93	145	NP 238	47.585	5.295	5.170	4.808	1.475	0.148
93	146	NP 239	49.262	6.394	5.464	4.611	0.670	-1.454
93	147	NP 240	52.356	4.978	5.649	4.410	2.301	-0.649
93	148	NP 241	54.327	6.101	5.967	4.189	1.496	-2.218
93	149	NP 242	57.711	4.687	6.123	3.971	3.089	-1.422
93	150	NP 243	59.963	5.819	6.459	3.750	2.293	-2.980
93	151	NP 244	63.640	4.394	6.592	3.545	3.868	-2.202
93	152	NP 245	66.192	5.519	6.939	3.353	3.090	-3.763
93	153	NP 246	70.188	4.076	7.056	3.186	4.661	-3.003
93	154	NP 247	73.072	5.188	7.409	3.037	3.902	-4.569
93	155	NP 248	77.413	3.730	7.516	2.907	5.471	-3.813
93	156	NP 249	80.648	4.836	7.867	2.789	4.715	-5.377
93	157	NP 250	85.341	3.378	7.973	2.677	6.275	-4.606
93	158	NP 251	88.922	4.491	8.314	2.565	5.504	-6.160
93	159	NP 252	93.946	3.047	8.425	2.443	7.048	-5.360
93	160	NP 253	97.845	4.172	8.750	2.315	6.248	-6.907
93	161	NP 254	103.169	2.747	8.872	2.173	7.778	-6.078
93	162	NP 255	107.361	3.879	9.175	2.030	6.949	-7.632
93	163	NP 256	112.967	2.466	9.315	1.881	8.479	-6.782
93	164	NP 257	117.449	3.589	9.589	1.747	7.629	-8.363
93	165	NP 258	123.348	2.172	9.752	1.621	9.181	-7.502
93	166	NP 259	128.149	3.271	9.991	1.525	8.321	-9.121
93	167	NP 260	134.377	1.844	10.183	1.445	9.906	-8.248
93	168	NP 261	139.532	2.916	10.382	1.398	9.033	-9.899
93	169	NP 262	146.114	1.489	10.606	1.356	10.647	-8.993
93	170	NP 263	151.634	2.552	10.763	1.329	9.740	-10.651
94	122	PU 216	41.259	10.632	0.214	9.849	-11.781	7.726
94	123	PU 217	40.433	8.898	0.389	9.783	-9.871	8.768
94	124	PU 218	38.392	10.113	0.563	9.949	-10.913	7.201
94	125	PU 219	37.742	8.721	0.737	9.775	-9.347	7.830
94	126	PU 220	36.291	9.522	0.910	10.016	-9.975	5.778
94	127	PU 221	36.837	7.526	0.965	10.863	-7.807	6.881
94	128	PU 222	35.727	9.182	1.519	10.857	-8.909	5.098
94	129	PU 223	36.337	7.461	1.581	10.307	-7.139	6.123
94	130	PU 224	35.386	9.022	2.116	9.858	-8.164	4.271
94	131	PU 225	36.209	7.249	2.196	9.467	-6.334	5.250

Z	N	A	ΔM	S_n	S_p	Q_α	Q_{β^-}	Q_{β^+}
94	132	PU 226	35.545	8.736	2.703	9.156	-7.314	3.431
94	133	PU 227	36.595	7.021	2.807	8.792	-5.525	4.431
94	134	PU 228	36.175	8.492	3.278	8.449	-6.525	2.675
94	135	PU 229	37.377	6.870	3.412	8.020	-4.804	3.673
94	136	PU 230	37.151	8.298	3.842	7.638	-5.802	1.943
94	137	PU 231	38.487	6.735	4.010	7.203	-4.111	2.892
94	138	PU 232	38.488	8.070	4.395	6.866	-5.060	1.156
94	139	PU 233	40.025	6.535	4.597	6.508	-3.364	2.037
94	140	PU 234	40.340	7.757	4.937	6.268	-4.245	0.294
94	141	PU 235	42.162	6.249	5.172	6.006	-2.541	1.123
94	142	PU 236	42.860	7.374	5.468	5.847	-3.370	-0.600
94	143	PU 237	45.015	5.917	5.735	5.644	-1.684	0.206
94	144	PU 238	46.110	6.976	5.988	5.511	-2.490	-1.475
94	145	PU 239	48.592	5.590	6.282	5.312	-0.843	-0.670
94	146	PU 240	50.055	6.608	6.496	5.160	-1.647	-2.301
94	147	PU 241	52.831	5.296	6.814	4.940	-0.046	-1.496
94	148	PU 242	54.622	6.280	6.994	4.760	-0.851	-3.089
94	149	PU 243	57.670	5.023	7.329	4.530	0.719	-2.293
94	150	PU 244	59.773	5.969	7.480	4.343	-0.077	-3.868
94	151	PU 245	63.102	4.742	7.827	4.132	1.480	-3.090
94	152	PU 246	65.527	5.647	7.955	3.969	0.703	-4.661
94	153	PU 247	69.170	4.428	8.307	3.802	2.263	-3.902
94	154	PU 248	71.942	5.299	8.419	3.674	1.504	-5.471
94	155	PU 249	75.933	4.081	8.769	3.553	3.069	-4.715
94	156	PU 250	79.066	4.939	8.871	3.450	2.313	-6.275
94	157	PU 251	83.417	3.720	9.213	3.352	3.877	-5.504
94	158	PU 252	86.898	4.591	9.313	3.247	3.106	-7.048
94	159	PU 253	91.597	3.372	9.638	3.147	4.661	-6.248
94	160	PU 254	95.391	4.277	9.743	3.020	3.861	-7.778
94	161	PU 255	100.412	3.050	10.046	2.906	5.408	-6.949
94	162	PU 256	104.488	3.996	10.162	2.757	4.578	-8.479
94	163	PU 257	109.820	2.739	10.436	2.643	6.132	-7.629
94	164	PU 258	114.168	3.724	10.571	2.496	5.283	-9.181
94	165	PU 259	119.828	2.411	10.809	2.410	6.863	-8.321
94	166	PU 260	124.470	3.429	10.967	2.297	6.003	-9.906
94	167	PU 261	130.498	2.043	11.167	2.262	7.622	-9.033
94	168	PU 262	135.467	3.103	11.353	2.192	6.749	-10.647
94	169	PU 263	141.893	1.646	11.510	2.198	8.400	-9.740
94	170	PU 264	147.195	2.770	11.728	2.145	7.493	-11.360
94	171	PU 265	154.003	1.263	11.840	2.148	9.152	-10.390
94	172	PU 266	159.591	2.484	12.091	2.059	8.182	-11.992
95	123	AM 218	49.304	9.072	-1.582	10.311	-9.022	10.913
95	124	AM 219	47.089	10.287	-1.408	10.480	-10.063	9.347
95	125	AM 220	46.267	8.894	-1.235	10.309	-8.497	9.975
95	126	AM 221	44.643	9.695	-1.063	10.553	-9.126	7.807
95	127	AM 222	44.635	8.079	-0.510	11.021	-7.339	8.909
95	128	AM 223	43.476	9.231	-0.460	11.139	-8.442	7.139
95	129	AM 224	43.551	7.997	0.075	10.613	-6.659	8.164
95	130	AM 225	42.543	9.079	0.132	10.162	-7.684	6.334
95	131	AM 226	42.859	7.756	0.639	9.805	-5.832	7.314
95	132	AM 227	42.121	8.810	0.713	9.482	-6.811	5.525
95	133	AM 228	42.700	7.492	1.184	9.160	-4.992	6.525
95	134	AM 229	42.181	8.590	1.283	8.798	-5.992	4.804
95	135	AM 230	42.953	7.300	1.713	8.415	-4.236	5.802
95	136	AM 231	42.598	8.426	1.841	8.009	-5.234	4.111
95	137	AM 232	43.549	7.121	2.227	7.624	-3.504	5.060
95	138	AM 233	43.388	8.232	2.389	7.259	-4.453	3.364
95	139	AM 234	44.584	6.875	2.729	6.952	-2.716	4.245
95	140	AM 235	44.703	7.953	2.925	6.684	-3.598	2.541
95	141	AM 236	46.230	6.545	3.221	6.472	-1.855	3.370

Z	N	A		ΔM	S_n	S_p	Q_α	Q_{β^-}	Q_{β^+}
95	142	AM	237	46.698	7.603	3.451	6.285	-2.684	1.684
95	143	AM	238	48.600	6.170	3.704	6.130	-0.960	2.490
95	144	AM	239	49.435	7.237	3.965	5.971	-1.766	0.843
95	145	AM	240	51.702	5.804	4.179	5.817	-0.086	1.647
95	146	AM	241	52.876	6.897	4.467	5.643	-0.890	0.046
95	147	AM	242	55.473	5.475	4.647	5.463	0.740	0.851
95	148	AM	243	56.952	6.592	4.959	5.265	-0.065	-0.719
95	149	AM	244	59.850	5.173	5.109	5.069	1.528	0.077
95	150	AM	245	61.622	6.300	5.440	4.870	0.732	-1.480
95	151	AM	246	64.824	4.869	5.567	4.688	2.307	-0.703
95	152	AM	247	66.906	5.989	5.909	4.518	1.530	-2.263
95	153	AM	248	70.438	4.540	6.020	4.373	3.101	-1.504
95	154	AM	249	72.863	5.646	6.367	4.246	2.341	-3.069
95	155	AM	250	76.752	4.183	6.470	4.139	3.910	-2.313
95	156	AM	251	79.540	5.284	6.815	4.044	3.154	-3.877
95	157	AM	252	83.791	3.820	6.915	3.954	4.714	-3.106
95	158	AM	253	86.936	4.927	7.251	3.863	3.944	-4.661
95	159	AM	254	91.530	3.478	7.356	3.764	5.487	-3.861
95	160	AM	255	95.005	4.597	7.675	3.658	4.688	-5.408
95	161	AM	256	99.909	3.167	7.792	3.539	6.217	-4.578
95	162	AM	257	103.688	4.293	8.089	3.418	5.388	-6.132
95	163	AM	258	108.885	2.874	8.224	3.291	6.918	-5.283
95	164	AM	259	112.965	3.991	8.492	3.179	6.068	-6.863
95	165	AM	260	118.467	2.569	8.650	3.076	7.620	-6.003
95	166	AM	261	122.877	3.662	8.883	3.002	6.760	-7.622
95	167	AM	262	128.718	2.230	9.069	2.945	8.345	-6.749
95	168	AM	263	133.493	3.297	9.263	2.920	7.472	-8.400
95	169	AM	264	139.701	1.863	9.481	2.900	9.086	-7.493
95	170	AM	265	144.851	2.921	9.632	2.895	8.179	-9.152
95	171	AM	266	151.409	1.514	9.883	2.870	9.799	-8.182
95	172	AM	267	156.890	2.591	9.990	2.831	8.829	-9.823
95	173	AM	268	163.727	1.234	10.275	2.747	10.431	-8.774
95	174	AM	269	169.453	2.346	10.337	2.635	9.381	-10.398
96	125	CM	221	53.769	9.066	-0.214	10.911	-10.552	9.126
96	126	CM	222	51.975	9.866	-0.042	11.158	-11.180	7.339
96	127	CM	223	51.917	8.129	0.007	11.750	-9.273	8.442
96	128	CM	224	50.209	9.779	0.555	11.493	-10.375	6.659
96	129	CM	225	50.228	8.053	0.612	10.966	-8.605	7.684
96	130	CM	226	48.690	9.609	1.142	10.539	-9.630	5.832
96	131	CM	227	48.932	7.830	1.216	10.170	-7.801	6.811
96	132	CM	228	47.692	9.311	1.717	9.881	-8.780	4.992
96	133	CM	229	48.173	7.591	1.816	9.539	-6.992	5.992
96	134	CM	230	47.189	9.056	2.282	9.219	-7.991	4.236
96	135	CM	231	47.832	7.428	2.410	8.812	-6.271	5.234
96	136	CM	232	47.053	8.851	2.835	8.453	-7.269	3.504
96	137	CM	233	47.842	7.283	2.996	8.040	-5.577	4.453
96	138	CM	234	47.301	8.612	3.377	7.725	-6.527	2.716
96	139	CM	235	48.301	7.071	3.572	7.389	-4.830	3.598
96	140	CM	236	48.085	8.287	3.907	7.172	-5.711	1.855
96	141	CM	237	49.382	6.774	4.137	6.932	-4.008	2.684
96	142	CM	238	49.560	7.893	4.427	6.796	-4.836	0.960
96	143	CM	239	51.201	6.431	4.688	6.614	-3.150	1.766
96	144	CM	240	51.788	7.484	4.935	6.504	-3.956	0.086
96	145	CM	241	53.767	6.093	5.224	6.327	-2.309	0.890
96	146	CM	242	54.733	7.106	5.433	6.198	-3.114	-0.740
96	147	CM	243	57.017	5.787	5.745	6.000	-1.512	0.065
96	148	CM	244	58.322	6.766	5.919	5.842	-2.317	-1.528
96	149	CM	245	60.890	5.504	6.249	5.634	-0.748	-0.732
96	150	CM	246	62.517	6.444	6.394	5.470	-1.544	-2.307
96	151	CM	247	65.377	5.211	6.736	5.282	0.014	-1.530

Z	N	A	ΔM	S_n	S_p	Q_α	Q_{β^-}	Q_{β^+}
96	152	CM 248	67.338	6.111	6.858	5.140	-0.763	-3.101
96	153	CM 249	70.523	4.887	7.205	4.996	0.797	-2.341
96	154	CM 250	72.842	5.752	7.310	4.891	0.037	-3.910
96	155	CM 251	76.386	4.528	7.655	4.791	1.603	-3.154
96	156	CM 252	79.077	5.380	7.752	4.710	0.847	-4.714
96	157	CM 253	82.993	4.156	8.088	4.635	2.411	-3.944
96	158	CM 254	86.043	5.021	8.182	4.552	1.640	-5.487
96	159	CM 255	90.317	3.797	8.502	4.475	3.194	-4.688
96	160	CM 256	93.692	4.696	8.602	4.370	2.395	-6.217
96	161	CM 257	98.300	3.464	8.898	4.278	3.942	-5.388
96	162	CM 258	101.967	4.404	9.010	4.151	3.112	-6.918
96	163	CM 259	106.897	3.142	9.277	4.060	4.666	-6.068
96	164	CM 260	110.848	4.121	9.407	3.935	3.816	-7.620
96	165	CM 261	116.117	2.802	9.640	3.872	5.397	-6.760
96	166	CM 262	120.373	3.815	9.792	3.781	4.537	-8.345
96	167	CM 263	126.021	2.424	9.986	3.768	6.156	-7.472
96	168	CM 264	130.615	3.477	10.167	3.720	5.283	-9.086
96	169	CM 265	136.672	2.015	10.318	3.749	6.934	-8.179
96	170	CM 266	141.610	3.133	10.530	3.718	6.027	-9.799
96	171	CM 267	148.061	1.621	10.637	3.743	7.686	-8.829
96	172	CM 268	153.296	2.837	10.883	3.676	6.715	-10.431
96	173	CM 269	160.072	1.296	10.944	3.643	8.357	-9.381
96	174	CM 270	165.518	2.625	11.224	3.502	7.307	-10.966
96	175	CM 271	172.532	1.057	11.241	3.394	8.931	-9.857
96	176	CM 272	178.124	2.480	11.554	3.199	7.822	-11.460
97	126	BK 223	61.190	10.036	-1.926	11.677	-10.367	9.273
97	127	BK 224	60.584	8.677	-1.378	11.893	-8.838	10.375
97	128	BK 225	58.833	9.823	-1.334	11.764	-9.940	8.605
97	129	BK 226	58.321	8.583	-0.804	11.261	-8.157	9.630
97	130	BK 227	56.733	9.660	-0.753	10.832	-9.182	7.801
97	131	BK 228	56.473	8.331	-0.252	10.497	-7.330	8.780
97	132	BK 229	55.165	9.379	-0.183	10.197	-8.310	6.992
97	133	BK 230	55.180	8.056	0.282	9.896	-6.491	7.991
97	134	BK 231	54.103	9.149	0.375	9.557	-7.490	6.271
97	135	BK 232	54.321	7.853	0.800	9.197	-5.734	7.269
97	136	BK 233	53.419	8.974	0.923	8.813	-6.732	5.577
97	137	BK 234	53.828	7.663	1.303	8.450	-5.002	6.527
97	138	BK 235	53.131	8.768	1.459	8.108	-5.951	4.830
97	139	BK 236	53.796	7.406	1.794	7.822	-4.215	5.711
97	140	BK 237	53.390	8.478	1.984	7.577	-5.096	4.008
97	141	BK 238	54.397	7.065	2.274	7.388	-3.353	4.836
97	142	BK 239	54.351	8.117	2.498	7.223	-4.182	3.150
97	143	BK 240	55.744	6.678	2.746	7.090	-2.459	3.956
97	144	BK 241	56.076	7.740	3.001	6.953	-3.265	2.309
97	145	BK 242	57.846	6.301	3.210	6.822	-1.584	3.114
97	146	BK 243	58.529	7.389	3.493	6.669	-2.389	1.512
97	147	BK 244	60.639	5.961	3.667	6.512	-0.758	2.317
97	148	BK 245	61.638	7.073	3.973	6.336	-1.563	0.748
97	149	BK 246	64.061	5.648	4.118	6.163	0.030	1.544
97	150	BK 247	65.363	6.769	4.443	5.986	-0.766	-0.014
97	151	BK 248	68.101	5.333	4.565	5.826	0.809	0.763
97	152	BK 249	69.726	6.447	4.901	5.679	0.031	-0.797
97	153	BK 250	72.805	4.992	5.007	5.556	1.602	-0.037
97	154	BK 251	74.783	6.093	5.348	5.452	0.843	-1.603
97	155	BK 252	78.230	4.624	5.445	5.367	2.412	-0.847
97	156	BK 253	80.582	5.720	5.784	5.294	1.656	-2.411
97	157	BK 254	84.403	4.250	5.879	5.226	3.216	-1.640
97	158	BK 255	87.123	5.352	6.209	5.158	2.445	-3.194
97	159	BK 256	91.297	3.897	6.309	5.081	3.989	-2.395
97	160	BK 257	94.358	5.011	6.623	4.997	3.189	-3.942

Z	N	A		ΔM	S_n	S_p	Q_α	Q_{β^-}	Q_{β^+}
97	161	BK	258	98.855	3.575	6.734	4.900	4.719	-3.112
97	162	BK	259	102.231	4.696	7.025	4.801	3.890	-4.666
97	163	BK	260	107.031	3.271	7.154	4.697	5.420	-3.816
97	164	BK	261	110.720	4.383	7.417	4.608	4.570	-5.397
97	165	BK	262	115.837	2.955	7.569	4.527	6.122	-4.537
97	166	BK	263	119.865	4.043	7.797	4.475	5.262	-6.156
97	167	BK	264	125.333	2.604	7.977	4.440	6.847	-5.283
97	168	BK	265	129.738	3.666	8.166	4.437	5.974	-6.934
97	169	BK	266	135.583	2.227	8.378	4.440	7.588	-6.027
97	170	BK	267	140.375	3.279	8.524	4.457	6.681	-7.686
97	171	BK	268	146.581	1.866	8.769	4.454	8.301	-6.715
97	172	BK	269	151.714	2.938	8.870	4.438	7.330	-8.357
97	173	BK	270	158.210	1.576	9.150	4.376	8.933	-7.307
97	174	BK	271	163.601	2.681	9.206	4.286	7.883	-8.931
97	175	BK	272	170.302	1.370	9.519	4.151	9.468	-7.822
97	176	BK	273	175.882	2.491	9.530	4.005	8.358	-9.461
97	177	BK	274	182.759	1.195	9.873	3.850	9.962	-8.339
97	178	BK	275	188.543	2.288	9.844	3.729	8.840	-10.029
98	126	CF	224	69.422	10.206	-0.943	12.234	-12.327	8.838
98	127	CF	225	68.772	8.721	-0.899	12.578	-10.673	9.940
98	128	CF	226	66.478	10.366	-0.356	12.078	-11.775	8.157
98	129	CF	227	65.915	8.634	-0.305	11.573	-10.005	9.182
98	130	CF	228	63.803	10.184	0.219	11.169	-11.031	7.330
98	131	CF	229	63.474	8.400	0.287	10.822	-9.201	8.310
98	132	CF	230	61.671	9.875	0.783	10.555	-10.181	6.491
98	133	CF	231	61.593	8.149	0.876	10.236	-8.392	7.490
98	134	CF	232	60.055	9.609	1.336	9.938	-9.391	5.734
98	135	CF	233	60.151	7.976	1.459	9.553	-7.671	6.732
98	136	CF	234	58.830	9.393	1.878	9.216	-8.669	5.002
98	137	CF	235	59.082	7.819	2.034	8.826	-6.978	5.951
98	138	CF	236	58.011	9.143	2.409	8.533	-7.927	4.215
98	139	CF	237	58.486	7.597	2.599	8.219	-6.230	5.096
98	140	CF	238	57.750	8.807	2.929	8.025	-7.111	3.353
98	141	CF	239	58.533	7.288	3.153	7.807	-5.408	4.182
98	142	CF	240	58.203	8.402	3.437	7.693	-6.237	2.459
98	143	CF	241	59.341	6.934	3.692	7.534	-4.550	3.265
98	144	CF	242	59.431	7.982	3.934	7.446	-5.356	1.584
98	145	CF	243	60.917	6.585	4.218	7.292	-3.709	2.389
98	146	CF	244	61.397	7.592	4.421	7.184	-4.514	0.758
98	147	CF	245	63.201	6.268	4.727	7.009	-2.912	1.563
98	148	CF	246	64.031	7.241	4.896	6.874	-3.717	-0.030
98	149	CF	247	66.129	5.973	5.220	6.688	-2.148	0.766
98	150	CF	248	67.293	6.908	5.359	6.546	-2.944	-0.809
98	151	CF	249	69.694	5.670	5.696	6.380	-1.386	-0.031
98	152	CF	250	71.202	6.563	5.812	6.261	-2.164	-1.602
98	153	CF	251	73.940	5.334	6.154	6.139	-0.603	-0.843
98	154	CF	252	75.818	6.194	6.254	6.056	-1.363	-2.412
98	155	CF	253	78.926	4.964	6.593	5.978	0.203	-1.656
98	156	CF	254	81.187	5.810	6.684	5.920	-0.553	-3.216
98	157	CF	255	84.677	4.581	7.014	5.867	1.011	-2.445
98	158	CF	256	87.308	5.441	7.103	5.807	0.240	-3.989
98	159	CF	257	91.169	4.211	7.417	5.752	1.794	-3.189
98	160	CF	258	94.136	5.104	7.511	5.668	0.994	-4.719
98	161	CF	259	98.341	3.866	7.803	5.600	2.541	-3.890
98	162	CF	260	101.611	4.801	7.908	5.495	1.712	-5.420
98	163	CF	261	106.150	3.533	8.170	5.425	3.266	-4.570
98	164	CF	262	109.715	4.506	8.294	5.323	2.416	-6.122
98	165	CF	263	114.604	3.183	8.522	5.282	3.997	-5.262
98	166	CF	264	118.486	4.190	8.669	5.213	3.136	-6.847
98	167	CF	265	123.764	2.793	8.857	5.223	4.755	-5.974

Z	N	A	ΔM	S_n	S_p	Q_α	Q_{β^-}	Q_{β^+}
98	168	CF 266	127.995	3.841	9.032	5.197	3.883	-7.588
98	169	CF 267	133.694	2.373	9.178	5.248	5.533	-6.681
98	170	CF 268	138.280	3.486	9.385	5.240	4.627	-8.301
98	171	CF 269	144.384	1.967	9.486	5.287	6.286	-7.330
98	172	CF 270	149.278	3.178	9.726	5.243	5.315	-8.933
98	173	CF 271	155.718	1.631	9.781	5.232	6.957	-7.883
98	174	CF 272	160.834	2.955	10.056	5.113	5.907	-9.468
98	175	CF 273	167.524	1.382	10.067	5.027	7.531	-8.358
98	176	CF 274	172.797	2.799	10.375	4.854	6.422	-9.962
98	177	CF 275	179.703	1.165	10.345	4.746	8.061	-8.840
98	178	CF 276	185.149	2.625	10.682	4.601	6.938	-10.500
98	179	CF 277	192.322	0.899	10.617	4.554	8.629	-9.387
98	180	CF 278	198.019	2.375	10.979	4.497	7.516	-11.077
99	126	ES 225	79.445	10.375	-2.734	12.700	-11.528	10.673
99	127	ES 226	78.253	9.264	-2.192	12.673	-10.248	11.775
99	128	ES 227	75.920	10.404	-2.153	12.305	-11.350	10.005
99	129	ES 228	74.833	9.158	-1.629	11.824	-9.567	11.031
99	130	ES 229	72.675	10.229	-1.584	11.418	-10.593	9.201
99	131	ES 230	71.851	8.896	-1.088	11.106	-8.740	10.181
99	132	ES 231	69.985	9.938	-1.025	10.827	-9.720	8.392
99	133	ES 232	69.447	8.609	-0.565	10.549	-7.901	9.391
99	134	ES 233	67.822	9.696	-0.477	10.232	-8.900	7.671
99	135	ES 234	67.499	8.395	-0.059	9.894	-7.144	8.669
99	136	ES 235	66.060	9.510	0.059	9.533	-8.142	6.978
99	137	ES 236	65.938	8.194	0.434	9.192	-6.412	7.927
99	138	ES 237	64.716	9.293	0.584	8.872	-7.362	6.230
99	139	ES 238	64.861	7.926	0.913	8.609	-5.625	7.111
99	140	ES 239	63.941	8.992	1.098	8.385	-6.506	5.408
99	141	ES 240	64.439	7.573	1.383	8.219	-4.764	6.237
99	142	ES 241	63.891	8.620	1.601	8.076	-5.592	4.550
99	143	ES 242	64.787	7.176	1.843	7.965	-3.869	5.356
99	144	ES 243	64.627	8.231	2.093	7.851	-4.675	3.709
99	145	ES 244	65.911	6.787	2.296	7.742	-2.995	4.514
99	146	ES 245	66.113	7.870	2.573	7.612	-3.799	2.912
99	147	ES 246	67.748	6.436	2.742	7.477	-2.168	3.717
99	148	ES 247	68.277	7.542	3.043	7.324	-2.973	2.148
99	149	ES 248	70.236	6.112	3.182	7.173	-1.381	2.944
99	150	ES 249	71.081	7.227	3.501	7.018	-2.177	1.386
99	151	ES 250	73.366	5.786	3.617	6.881	-0.602	2.164
99	152	ES 251	74.543	6.894	3.948	6.756	-1.379	0.603
99	153	ES 252	77.181	5.434	4.048	6.655	0.192	1.363
99	154	ES 253	78.723	6.529	4.384	6.573	-0.568	-0.203
99	155	ES 254	81.740	5.055	4.475	6.510	1.001	0.553
99	156	ES 255	83.667	6.144	4.809	6.459	0.246	-1.011
99	157	ES 256	87.069	4.670	4.898	6.414	1.806	-0.240
99	158	ES 257	89.375	5.765	5.223	6.368	1.035	-1.794
99	159	ES 258	93.141	4.305	5.317	6.314	2.579	-0.994
99	160	ES 259	95.800	5.413	5.625	6.252	1.779	-2.541
99	161	ES 260	99.899	3.972	5.731	6.177	3.309	-1.712
99	162	ES 261	102.884	5.087	6.016	6.101	2.479	-3.266
99	163	ES 262	107.299	3.657	6.140	6.019	4.010	-2.416
99	164	ES 263	110.607	4.763	6.397	5.952	3.160	-3.997
99	165	ES 264	115.349	3.330	6.544	5.893	4.711	-3.136
99	166	ES 265	119.009	4.412	6.766	5.864	3.851	-4.755
99	167	ES 266	124.113	2.968	6.941	5.851	5.437	-3.883
99	168	ES 267	128.161	4.024	7.124	5.871	4.564	-5.533
99	169	ES 268	133.653	2.579	7.330	5.896	6.178	-4.627
99	170	ES 269	138.098	3.626	7.470	5.935	5.271	-6.286
99	171	ES 270	143.963	2.207	7.710	5.955	6.890	-5.315
99	172	ES 271	148.761	3.273	7.806	5.961	5.920	-6.957

Z	N	A		ΔM	S_n	S_p	Q_α	Q_{β^-}	Q_{β^+}
99	173	ES	272	154.927	1.906	8.080	5.921	7.522	-5.907
99	174	ES	273	159.993	3.006	8.130	5.853	6.472	-7.531
99	175	ES	274	166.375	1.689	8.438	5.740	8.058	-6.422
99	176	ES	275	171.642	2.804	8.444	5.617	6.948	-8.061
99	177	ES	276	178.211	1.503	8.781	5.484	8.552	-6.938
99	178	ES	277	183.693	2.590	8.746	5.386	7.429	-8.629
99	179	ES	278	190.503	1.261	9.108	5.320	9.090	-7.516
99	180	ES	279	196.271	2.303	9.037	5.304	7.976	-9.229
99	181	ES	280	203.373	0.970	9.416	5.299	9.667	-8.058
99	182	ES	281	209.404	2.041	9.317	5.270	8.496	-9.691
100	126	FM	226	88.501	10.544	-1.767	13.183	-13.406	10.248
100	127	FM	227	87.270	9.302	-1.728	13.289	-11.997	11.350
100	128	FM	228	84.401	10.941	-1.191	12.554	-13.100	9.567
100	129	FM	229	83.268	9.204	-1.146	12.071	-11.329	10.593
100	130	FM	230	80.591	10.748	-0.627	11.689	-12.355	8.740
100	131	FM	231	79.704	8.958	-0.564	11.365	-10.525	9.720
100	132	FM	232	77.347	10.428	-0.074	11.120	-11.505	7.901
100	133	FM	233	76.722	8.697	0.014	10.823	-9.716	8.900
100	134	FM	234	74.643	10.151	0.468	10.547	-10.716	7.144
100	135	FM	235	74.202	8.512	0.585	10.185	-8.995	8.142
100	136	FM	236	72.350	9.923	0.999	9.870	-9.993	6.412
100	137	FM	237	72.077	8.344	1.149	9.502	-8.302	7.362
100	138	FM	238	70.486	9.662	1.518	9.232	-9.251	5.625
100	139	FM	239	70.447	8.111	1.703	8.940	-7.554	6.506
100	140	FM	240	69.203	9.315	2.027	8.768	-8.435	4.764
100	141	FM	241	69.483	7.791	2.245	8.573	-6.732	5.592
100	142	FM	242	68.656	8.899	2.524	8.481	-7.561	3.869
100	143	FM	243	69.302	7.425	2.774	8.344	-5.874	4.675
100	144	FM	244	68.906	8.468	3.010	8.278	-6.680	2.995
100	145	FM	245	69.912	7.065	3.288	8.146	-5.034	3.799
100	146	FM	246	69.917	8.067	3.485	8.061	-5.838	2.168
100	147	FM	247	71.251	6.737	3.786	7.909	-4.236	2.973
100	148	FM	248	71.617	7.705	3.949	7.795	-5.042	1.381
100	149	FM	249	73.257	6.431	4.268	7.632	-3.472	2.177
100	150	FM	250	73.968	7.361	4.402	7.512	-4.268	0.602
100	151	FM	251	75.922	6.117	4.733	7.368	-2.711	1.379
100	152	FM	252	76.989	7.005	4.843	7.272	-3.488	-0.192
100	153	FM	253	79.291	5.770	5.179	7.172	-1.927	0.568
100	154	FM	254	80.738	6.624	5.274	7.111	-2.687	-1.001
100	155	FM	255	83.421	5.389	5.608	7.056	-1.121	-0.246
100	156	FM	256	85.263	6.230	5.693	7.020	-1.877	-1.806
100	157	FM	257	88.340	4.994	6.018	6.989	-0.314	-1.035
100	158	FM	258	90.563	5.849	6.101	6.951	-1.084	-2.579
100	159	FM	259	94.021	4.613	6.410	6.919	0.470	-1.779
100	160	FM	260	96.591	5.501	6.498	6.858	-0.330	-3.309
100	161	FM	261	100.405	4.257	6.784	6.811	1.217	-2.479
100	162	FM	262	103.289	5.187	6.884	6.729	0.388	-4.010
100	163	FM	263	107.447	3.913	7.140	6.681	1.942	-3.160
100	164	FM	264	110.638	4.881	7.258	6.602	1.092	-4.711
100	165	FM	265	115.158	3.552	7.480	6.583	2.672	-3.851
100	166	FM	266	118.676	4.553	7.622	6.536	1.812	-5.437
100	167	FM	267	123.597	3.151	7.805	6.568	3.431	-4.564
100	168	FM	268	127.475	4.193	7.974	6.565	2.558	-6.178
100	169	FM	269	132.828	2.719	8.114	6.638	4.209	-5.271
100	170	FM	270	137.072	3.827	8.315	6.652	3.302	-6.890
100	171	FM	271	142.841	2.303	8.411	6.722	4.961	-5.920
100	172	FM	272	147.404	3.508	8.645	6.700	3.991	-7.522
100	173	FM	273	153.520	1.956	8.696	6.711	5.633	-6.472
100	174	FM	274	158.317	3.274	8.964	6.615	4.583	-8.058
100	175	FM	275	164.694	1.695	8.970	6.551	6.207	-6.948

Z	N	A	ΔM	S_n	S_p	Q_α	Q_{β^-}	Q_{β^+}
100	176	FM 276	169.659	3.106	9.272	6.401	5.097	-8.552
100	177	FM 277	176.263	1.467	9.237	6.315	6.736	-7.429
100	178	FM 278	181.413	2.921	9.568	6.192	5.614	-9.090
100	179	FM 279	188.295	1.190	9.497	6.167	7.305	-7.976
100	180	FM 280	193.706	2.660	9.854	6.132	6.191	-9.667
100	181	FM 281	200.907	0.870	9.754	6.161	7.905	-8.496
100	182	FM 282	206.565	2.414	10.128	6.121	6.734	-10.116
100	183	FM 283	213.959	0.677	10.010	6.034	8.366	-8.857
100	184	FM 284	219.714	2.316	10.391	5.858	7.108	
101	126	MD 227	99.268	10.711	-3.478	13.588	-12.609	11.997
101	127	MD 228	97.500	9.839	-2.941	13.326	-11.570	13.100
101	128	MD 229	94.597	10.974	-2.908	12.727	-12.672	11.329
101	129	MD 230	92.946	9.723	-2.389	12.268	-10.889	12.355
101	130	MD 231	90.230	10.788	-2.349	11.885	-11.915	10.525
101	131	MD 232	88.852	9.449	-1.859	11.594	-10.062	11.505
101	132	MD 233	86.438	10.486	-1.802	11.338	-11.042	9.716
101	133	MD 234	85.358	9.151	-1.347	11.082	-9.223	10.716
101	134	MD 235	83.197	10.233	-1.265	10.788	-10.223	8.995
101	135	MD 236	82.343	8.925	-0.852	10.472	-8.466	9.993
101	136	MD 237	80.379	10.035	-0.740	10.133	-9.464	8.302
101	137	MD 238	79.738	8.713	-0.371	9.814	-7.735	9.251
101	138	MD 239	78.002	9.807	-0.226	9.517	-8.684	7.554
101	139	MD 240	77.639	8.434	0.098	9.276	-6.947	8.435
101	140	MD 241	76.215	9.495	0.277	9.075	-7.828	6.732
101	141	MD 242	76.217	8.070	0.556	8.931	-6.086	7.561
101	142	MD 243	75.176	9.112	0.768	8.811	-6.915	5.874
101	143	MD 244	75.586	7.662	1.005	8.722	-5.191	6.680
101	144	MD 245	74.946	8.712	1.249	8.630	-5.997	5.034
101	145	MD 246	75.755	7.262	1.446	8.543	-4.317	5.838
101	146	MD 247	75.487	8.339	1.718	8.435	-5.121	4.236
101	147	MD 248	76.659	6.900	1.881	8.323	-3.491	5.042
101	148	MD 249	76.729	8.001	2.177	8.192	-4.296	3.472
101	149	MD 250	78.236	6.565	2.310	8.063	-2.703	4.268
101	150	MD 251	78.633	7.674	2.624	7.931	-3.499	2.711
101	151	MD 252	80.477	6.228	2.735	7.816	-1.924	3.488
101	152	MD 253	81.218	7.330	3.060	7.713	-2.701	1.927
101	153	MD 254	83.425	5.864	3.154	7.635	-1.130	2.687
101	154	MD 255	84.543	6.954	3.485	7.574	-1.890	1.121
101	155	MD 256	87.140	5.474	3.570	7.534	-0.321	1.877
101	156	MD 257	88.653	6.558	3.898	7.506	-1.077	0.314
101	157	MD 258	91.647	5.078	3.982	7.483	0.484	1.084
101	158	MD 259	93.551	6.168	4.301	7.459	-0.287	-0.470
101	159	MD 260	96.921	4.702	4.389	7.427	1.256	0.330
101	160	MD 261	99.188	5.804	4.692	7.388	0.457	-1.217
101	161	MD 262	102.901	4.358	4.792	7.335	1.986	-0.388
101	162	MD 263	105.506	5.467	5.072	7.281	1.157	-1.942
101	163	MD 264	109.546	4.031	5.190	7.222	2.687	-1.092
101	164	MD 265	112.485	5.132	5.441	7.177	1.838	-2.672
101	165	MD 266	116.864	3.693	5.583	7.140	3.389	-1.812
101	166	MD 267	120.166	4.770	5.799	7.134	2.529	-3.431
101	167	MD 268	124.917	3.320	5.969	7.143	4.114	-2.558
101	168	MD 269	128.618	4.370	6.146	7.185	3.241	-4.209
101	169	MD 270	133.770	2.920	6.347	7.232	4.855	-3.302
101	170	MD 271	137.879	3.962	6.482	7.294	3.949	-4.961
101	171	MD 272	143.414	2.537	6.716	7.336	5.568	-3.991
101	172	MD 273	147.887	3.598	6.806	7.364	4.598	-5.633
101	173	MD 274	153.734	2.224	7.075	7.347	6.200	-4.583
101	174	MD 275	158.487	3.319	7.119	7.301	5.150	-6.207
101	175	MD 276	164.562	1.997	7.421	7.210	6.736	-5.097
101	176	MD 277	169.527	3.107	7.421	7.109	5.626	-6.736

Z	N	A	ΔM	S_n	S_p	Q_α	Q_{β^-}	Q_{β^+}
101	177	MD 278	175.799	1.799	7.753	6.999	7.230	-5.614
101	178	MD 279	180.990	2.881	7.712	6.923	6.107	-7.305
101	179	MD 280	187.515	1.546	8.069	6.879	7.768	-6.191
101	180	MD 281	193.003	2.583	7.992	6.886	6.654	-7.905
101	181	MD 282	199.830	1.244	8.366	6.903	8.344	-6.734
101	182	MD 283	205.593	2.309	8.261	6.897	7.174	-8.366
101	183	MD 284	212.606	1.058	8.642	6.809	8.794	-7.108
101	184	MD 285	218.485	2.193	8.518	6.656	7.535	
102	126	NO 228	109.070	10.878	-2.513	13.997	-14.431	11.570
102	127	NO 229	107.270	9.872	-2.481	13.872	-13.259	12.672
102	128	NO 230	103.836	11.506	-1.949	12.910	-14.362	10.889
102	129	NO 231	102.145	9.763	-1.909	12.449	-12.591	11.915
102	130	NO 232	98.915	11.301	-1.396	12.089	-13.617	10.062
102	131	NO 233	97.480	9.506	-1.339	11.788	-11.787	11.042
102	132	NO 234	94.581	10.970	-0.854	11.565	-12.767	9.223
102	133	NO 235	93.420	9.233	-0.772	11.290	-10.978	10.223
102	134	NO 236	90.810	10.682	-0.323	11.037	-11.978	8.466
102	135	NO 237	89.844	9.037	-0.212	10.697	-10.257	9.464
102	136	NO 238	87.472	10.443	0.196	10.405	-11.255	7.735
102	137	NO 239	86.685	8.858	0.341	10.059	-9.564	8.684
102	138	NO 240	84.586	10.171	0.705	9.811	-10.513	6.947
102	139	NO 241	84.044	8.613	0.884	9.542	-8.816	7.828
102	140	NO 242	82.303	9.813	1.202	9.391	-9.698	6.086
102	141	NO 243	82.091	8.283	1.415	9.219	-7.994	6.915
102	142	NO 244	80.777	9.385	1.688	9.149	-8.823	5.191
102	143	NO 245	80.943	7.906	1.932	9.035	-7.136	5.997
102	144	NO 246	80.071	8.943	2.163	8.991	-7.943	4.317
102	145	NO 247	80.608	7.535	2.435	8.882	-6.296	5.121
102	146	NO 248	80.149	8.531	2.627	8.819	-7.100	3.491
102	147	NO 249	81.025	7.196	2.923	8.688	-5.498	4.296
102	148	NO 250	80.939	8.158	3.080	8.597	-6.304	2.703
102	149	NO 251	82.132	6.878	3.393	8.456	-4.734	3.499
102	150	NO 252	82.401	7.802	3.521	8.359	-5.530	1.924
102	151	NO 253	83.919	6.553	3.846	8.237	-3.973	2.701
102	152	NO 254	84.556	7.435	3.952	8.163	-4.750	1.130
102	153	NO 255	86.432	6.195	4.282	8.085	-3.189	1.890
102	154	NO 256	87.461	7.043	4.371	8.047	-3.949	0.321
102	155	NO 257	89.730	5.802	4.699	8.015	-2.384	1.077
102	156	NO 258	91.164	6.638	4.779	8.001	-3.139	-0.484
102	157	NO 259	93.838	5.397	5.098	7.992	-1.576	0.287
102	158	NO 260	95.664	6.246	5.176	7.977	-2.347	-1.256
102	159	NO 261	98.731	5.005	5.479	7.966	-0.792	-0.457
102	160	NO 262	100.915	5.887	5.562	7.928	-1.592	-1.986
102	161	NO 263	104.349	4.638	5.842	7.903	-0.045	-1.157
102	162	NO 264	106.859	5.562	5.936	7.843	-0.874	-2.687
102	163	NO 265	110.648	4.282	6.187	7.818	0.680	-1.838
102	164	NO 266	113.475	5.244	6.300	7.761	-0.170	-3.389
102	165	NO 267	117.637	3.909	6.516	7.765	1.410	-2.529
102	166	NO 268	120.803	4.905	6.652	7.740	0.550	-4.114
102	167	NO 269	125.377	3.497	6.829	7.794	2.169	-3.241
102	168	NO 270	128.914	4.534	6.993	7.813	1.296	-4.855
102	169	NO 271	133.931	3.055	7.128	7.909	2.947	-3.949
102	170	NO 272	137.845	4.157	7.323	7.945	2.040	-5.568
102	171	NO 273	143.289	2.627	7.413	8.037	3.699	-4.598
102	172	NO 274	147.534	3.827	7.642	8.038	2.729	-6.200
102	173	NO 275	153.337	2.269	7.687	8.071	4.371	-5.150
102	174	NO 276	157.826	3.582	7.950	7.997	3.321	-6.736
102	175	NO 277	163.901	1.997	7.950	7.956	4.945	-5.626
102	176	NO 278	168.569	3.403	8.246	7.827	3.835	-7.230
102	177	NO 279	174.882	1.758	8.205	7.764	5.474	-6.107

Z	N	A	ΔM	S_n	S_p	Q_α	Q_{β^-}	Q_{β^+}
102	178	NO 280	179.747	3.207	8.532	7.663	4.352	-7.768
102	179	NO 281	186.349	1.470	8.455	7.661	6.043	-6.654
102	180	NO 282	191.486	2.934	8.806	7.648	4.929	-8.344
102	181	NO 283	198.419	1.139	8.701	7.699	6.643	-7.174
102	182	NO 284	203.813	2.677	9.069	7.682	5.472	-8.794
102	183	NO 285	210.950	0.934	8.946	7.617	7.104	-7.535
102	184	NO 286	216.453	2.568	9.321	7.464	5.846	
103	126	LW 229	120.529	11.044	-4.170	14.354	-13.632	13.259
103	127	LW 230	118.197	10.403	-3.638	13.865	-12.826	14.362
103	128	LW 231	114.736	11.533	-3.611	13.043	-13.928	12.591
103	129	LW 232	112.532	10.276	-3.098	12.607	-12.145	13.617
103	130	LW 233	109.268	11.336	-3.064	12.245	-13.171	11.787
103	131	LW 234	107.348	9.991	-2.579	11.977	-11.318	12.767
103	132	LW 235	104.398	11.022	-2.527	11.744	-12.298	10.978
103	133	LW 236	102.787	9.682	-2.079	11.510	-10.479	11.978
103	134	LW 237	100.101	10.758	-2.002	11.238	-11.479	10.257
103	135	LW 238	98.727	9.445	-1.595	10.944	-9.722	11.255
103	136	LW 239	96.249	10.549	-1.488	10.628	-10.720	9.564
103	137	LW 240	95.099	9.222	-1.125	10.331	-8.991	10.513
103	138	LW 241	92.860	10.310	-0.985	10.056	-9.940	8.816
103	139	LW 242	92.000	8.932	-0.667	9.838	-8.203	9.698
103	140	LW 243	90.085	9.986	-0.494	9.659	-9.084	7.994
103	141	LW 244	89.600	8.556	-0.220	9.537	-7.342	8.823
103	142	LW 245	88.079	9.592	-0.013	9.439	-8.171	7.136
103	143	LW 246	88.014	8.137	0.218	9.373	-6.447	7.943
103	144	LW 247	86.904	9.181	0.456	9.303	-7.253	6.296
103	145	LW 248	87.249	7.726	0.648	9.238	-5.573	7.100
103	146	LW 249	86.523	8.797	0.915	9.153	-6.377	5.498
103	147	LW 250	87.242	7.353	1.072	9.063	-4.747	6.304
103	148	LW 251	86.866	8.448	1.362	8.954	-5.552	4.734
103	149	LW 252	87.931	7.006	1.490	8.848	-3.959	5.530
103	150	LW 253	87.892	8.110	1.798	8.738	-4.755	3.973
103	151	LW 254	89.305	6.658	1.903	8.645	-3.180	4.750
103	152	LW 255	89.622	7.755	2.223	8.564	-3.957	3.189
103	153	LW 256	91.410	6.283	2.312	8.508	-2.386	3.949
103	154	LW 257	92.114	7.368	2.636	8.471	-3.146	2.384
103	155	LW 258	94.303	5.882	2.716	8.453	-1.577	3.139
103	156	LW 259	95.414	6.961	3.039	8.447	-2.332	1.576
103	157	LW 260	98.011	5.475	3.117	8.446	-0.772	2.347
103	158	LW 261	99.523	6.559	3.430	8.445	-1.543	0.792
103	159	LW 262	102.507	5.088	3.513	8.435	0.000	1.592
103	160	LW 263	104.394	6.185	3.810	8.418	-0.799	0.045
103	161	LW 264	107.733	4.732	3.905	8.388	0.731	0.874
103	162	LW 265	109.968	5.836	4.179	8.356	-0.099	-0.680
103	163	LW 266	113.645	4.395	4.292	8.319	1.431	0.170
103	164	LW 267	116.227	5.490	4.537	8.296	0.582	-1.410
103	165	LW 268	120.253	4.045	4.673	8.282	2.133	-0.550
103	166	LW 269	123.208	5.116	4.884	8.298	1.273	-2.169
103	167	LW 270	127.618	3.661	5.048	8.329	2.858	-1.296
103	168	LW 271	130.984	4.706	5.220	8.393	1.986	-2.947
103	169	LW 272	135.805	3.250	5.415	8.463	3.599	-2.040
103	170	LW 273	139.590	4.286	5.544	8.547	2.693	-3.699
103	171	LW 274	144.806	2.856	5.773	8.611	4.312	-2.729
103	172	LW 275	148.966	3.911	5.857	8.662	3.342	-4.371
103	173	LW 276	154.505	2.532	6.120	8.667	4.944	-3.321
103	174	LW 277	158.956	3.621	6.159	8.644	3.894	-4.945
103	175	LW 278	164.734	2.293	6.456	8.575	5.480	-3.835
103	176	LW 279	169.408	3.398	6.450	8.496	4.370	-5.474
103	177	LW 280	175.395	2.085	6.777	8.408	5.974	-4.352
103	178	LW 281	180.306	3.161	6.730	8.354	4.851	-6.043

Z	N	A	ΔM	S_n	S_p	Q_α	Q_{β^-}	Q_{β^+}
103	179	LW 282	186.557	1.821	7.081	8.333	6.512	-4.929
103	180	LW 283	191.776	2.852	6.999	8.362	5.398	-6.643
103	181	LW 284	198.341	1.507	7.367	8.401	7.089	-5.472
103	182	LW 285	203.845	2.567	7.256	8.418	5.918	-7.104
103	183	LW 286	210.607	1.310	7.632	8.352	7.538	-5.846
103	184	LW 287	216.239	2.439	7.503	8.222	6.279	
104	126	230	131.023	11.209	-3.205	14.711	-15.433	12.826
104	127	231	128.664	10.430	-3.178	14.363	-14.490	13.928
104	128	232	124.677	12.059	-2.652	13.182	-15.593	12.145
104	129	233	122.438	10.310	-2.618	12.744	-13.822	13.171
104	130	234	118.667	11.843	-2.110	12.406	-14.848	11.318
104	131	235	116.696	10.042	-2.059	12.127	-13.018	12.298
104	132	236	113.266	11.501	-1.579	11.927	-13.998	10.479
104	133	237	111.579	9.758	-1.503	11.674	-12.209	11.479
104	134	238	108.450	11.201	-1.060	11.443	-13.209	9.722
104	135	239	106.970	9.551	-0.953	11.125	-11.488	10.720
104	136	240	104.090	10.952	-0.551	10.855	-12.486	8.991
104	137	241	102.800	9.361	-0.412	10.532	-10.795	9.940
104	138	242	100.203	10.668	-0.054	10.306	-11.744	8.203
104	139	243	99.170	9.105	0.120	10.059	-10.047	9.084
104	140	244	96.942	10.299	0.432	9.931	-10.929	7.342
104	141	245	96.250	8.764	0.639	9.781	-9.225	8.171
104	142	246	94.461	9.860	0.907	9.734	-10.054	6.447
104	143	247	94.157	8.375	1.146	9.642	-8.368	7.253
104	144	248	92.822	9.407	1.371	9.620	-9.174	5.573
104	145	249	92.901	7.993	1.638	9.533	-7.527	6.377
104	146	250	91.989	8.983	1.824	9.493	-8.331	4.747
104	147	251	92.418	7.643	2.114	9.385	-6.729	5.552
104	148	252	91.890	8.599	2.265	9.316	-7.535	3.959
104	149	253	92.647	7.314	2.573	9.197	-5.965	4.755
104	150	254	92.485	8.233	2.696	9.122	-6.761	3.180
104	151	255	93.579	6.978	3.015	9.023	-5.204	3.957
104	152	256	93.796	7.854	3.115	8.971	-5.981	2.386
104	153	257	95.259	6.608	3.440	8.915	-4.421	3.146
104	154	258	95.880	7.451	3.523	8.899	-5.180	1.577
104	155	259	97.746	6.205	3.846	8.889	-3.615	2.332
104	156	260	98.783	7.035	3.920	8.897	-4.370	0.772
104	157	261	101.066	5.788	4.233	8.911	-2.807	1.543
104	158	262	102.506	6.631	4.306	8.918	-3.578	-0.000
104	159	263	105.193	5.385	4.603	8.930	-2.023	0.799
104	160	264	107.002	6.262	4.680	8.914	-2.823	-0.731
104	161	265	110.067	5.007	4.955	8.912	-1.276	0.099
104	162	266	112.214	5.925	5.044	8.874	-2.105	-1.431
104	163	267	115.645	4.640	5.289	8.871	-0.552	-0.582
104	164	268	118.119	5.597	5.396	8.836	-1.401	-2.133
104	165	269	121.935	4.256	5.607	8.862	0.179	-1.273
104	166	270	124.760	5.247	5.737	8.860	-0.681	-2.858
104	167	271	128.998	3.833	5.909	8.937	0.938	-1.986
104	168	272	132.205	4.864	6.067	8.978	0.065	-3.599
104	169	273	136.898	3.379	6.196	9.096	1.716	-2.693
104	170	274	140.493	4.476	6.386	9.154	0.809	-4.312
104	171	275	145.624	2.941	6.470	9.269	2.468	-3.342
104	172	276	149.561	4.134	6.694	9.291	1.498	-4.944
104	173	277	155.062	2.571	6.733	9.347	3.140	-3.894
104	174	278	159.255	3.878	6.990	9.295	2.090	-5.480
104	175	279	165.038	2.288	6.985	9.277	3.714	-4.370
104	176	280	169.421	3.688	7.276	9.170	2.604	-5.974
104	177	281	175.454	2.038	7.229	9.129	4.243	-4.851
104	178	282	180.045	3.481	7.550	9.051	3.121	-6.512
104	179	283	186.378	1.738	7.468	9.071	4.812	-5.398

Z	N	A	ΔM	S_n	S_p	Q_α	Q_{β^-}	Q_{β^+}
104	180	284	191.252	3.197	7.813	9.080	3.698	-7.089
104	181	285	197.927	1.396	7.702	9.154	5.411	-5.918
104	182	286	203.069	2.929	8.065	9.159	4.241	-7.538
104	183	287	209.960	1.181	7.936	9.117	5.873	-6.279
104	184	288	215.222	2.809	8.306	8.985	4.615	
105	129	234	133.515	10.818	-3.787	12.893	-13.371	14.848
105	130	235	129.714	11.872	-3.759	12.553	-14.396	13.018
105	131	236	127.264	10.521	-3.279	12.308	-12.544	13.998
105	132	237	123.789	11.547	-3.233	12.096	-13.524	12.209
105	133	238	121.658	10.202	-2.790	11.885	-11.705	13.209
105	134	239	118.458	11.272	-2.719	11.635	-12.704	11.488
105	135	240	116.576	9.953	-2.317	11.364	-10.948	12.486
105	136	241	113.595	11.052	-2.216	11.070	-11.946	10.795
105	137	242	111.948	9.719	-1.858	10.796	-10.216	11.744
105	138	243	109.217	10.802	-1.725	10.543	-11.165	10.047
105	139	244	107.871	9.418	-1.412	10.347	-9.429	10.929
105	140	245	105.475	10.467	-1.244	10.190	-10.310	9.225
105	141	246	104.515	9.031	-0.976	10.090	-8.567	10.054
105	142	247	102.525	10.062	-0.775	10.015	-9.396	8.368
105	143	248	101.996	8.601	-0.549	9.971	-7.673	9.174
105	144	249	100.427	9.640	-0.316	9.923	-8.479	7.527
105	145	250	100.320	8.179	-0.130	9.881	-6.798	8.331
105	146	251	99.147	9.244	0.131	9.818	-7.603	6.729
105	147	252	99.424	7.794	0.282	9.750	-5.972	7.535
105	148	253	98.612	8.884	0.567	9.664	-6.777	5.965
105	149	254	99.247	7.437	0.689	9.580	-5.184	6.761
105	150	255	98.783	8.535	0.992	9.492	-5.980	5.204
105	151	256	99.777	7.077	1.091	9.421	-4.405	5.981
105	152	257	99.680	8.169	1.405	9.363	-5.183	4.421
105	153	258	101.060	6.692	1.489	9.330	-3.612	5.180
105	154	259	101.361	7.770	1.808	9.314	-4.371	3.615
105	155	260	103.153	6.279	1.882	9.319	-2.802	4.370
105	156	261	103.873	7.352	2.199	9.335	-3.558	2.807
105	157	262	106.084	5.860	2.271	9.356	-1.998	3.578
105	158	263	107.216	6.939	2.579	9.378	-2.769	2.023
105	159	264	109.825	5.462	2.656	9.390	-1.225	2.823
105	160	265	111.343	6.554	2.948	9.395	-2.025	1.276
105	161	266	114.319	5.096	3.037	9.387	-0.495	2.105
105	162	267	116.196	6.194	3.306	9.378	-1.324	0.552
105	163	268	119.521	4.747	3.413	9.363	0.206	1.401
105	164	269	121.756	5.837	3.653	9.363	-0.644	-0.179
105	165	270	125.440	4.386	3.783	9.371	0.908	0.681
105	166	271	128.060	5.452	3.988	9.409	0.048	-0.938
105	167	272	132.140	3.991	4.147	9.463	1.633	-0.065
105	168	273	135.182	5.030	4.313	9.549	0.760	-1.716
105	169	274	139.684	3.569	4.503	9.641	2.374	-0.809
105	170	275	143.156	4.599	4.626	9.748	1.467	-2.468
105	171	276	148.064	3.164	4.850	9.834	3.087	-1.498
105	172	277	151.922	4.213	4.928	9.907	2.116	-3.140
105	173	278	157.165	2.829	5.186	9.934	3.719	-2.090
105	174	279	161.324	3.912	5.219	9.933	2.669	-3.714
105	175	280	166.817	2.579	5.510	9.887	4.254	-2.604
105	176	281	171.211	3.677	5.499	9.831	3.144	-4.243
105	177	282	176.924	2.359	5.820	9.765	4.748	-3.121
105	178	283	181.566	3.429	5.768	9.733	3.626	-4.812
105	179	284	187.554	2.084	6.113	9.734	5.286	-3.698
105	180	285	192.516	3.109	6.025	9.785	4.173	-5.411
105	181	286	198.828	1.759	6.388	9.847	5.863	-4.241
105	182	287	204.087	2.813	6.272	9.886	4.693	-5.873
105	183	288	210.607	1.551	6.641	9.842	6.312	-4.615

Z	N	A	ΔM	S_n	S_p	Q_α	Q_{β^-}	Q_{β^+}
105	184	289	216.004	2.674	6.507	9.734	5.054	
106	130	236	139.808	12.374	-2.805	12.706	-16.087	12.544
106	131	237	137.312	10.567	-2.759	12.449	-14.257	13.524
106	132	238	133.363	12.021	-2.285	12.272	-15.237	11.705
106	133	239	131.162	10.272	-2.215	12.041	-13.448	12.704
106	134	240	127.524	11.710	-1.777	11.833	-14.448	10.948
106	135	241	125.541	10.054	-1.676	11.537	-12.727	11.946
106	136	242	122.164	11.449	-1.280	11.289	-13.725	10.216
106	137	243	120.382	9.853	-1.146	10.988	-12.034	11.165
106	138	244	117.299	11.154	-0.793	10.785	-12.984	9.429
106	139	245	115.785	9.586	-0.625	10.560	-11.287	10.310
106	140	246	113.082	10.774	-0.318	10.454	-12.168	8.567
106	141	247	111.921	9.233	-0.117	10.327	-10.464	9.396
106	142	248	109.668	10.324	0.145	10.301	-11.293	7.673
106	143	249	108.906	8.834	0.379	10.232	-9.607	8.479
106	144	250	107.118	9.859	0.598	10.232	-10.413	6.798
106	145	251	106.750	8.440	0.859	10.168	-8.766	7.603
106	146	252	105.396	9.425	1.040	10.149	-9.570	5.972
106	147	253	105.389	8.079	1.324	10.064	-7.969	6.777
106	148	254	104.431	9.030	1.470	10.017	-8.774	5.184
106	149	255	104.763	7.739	1.772	9.921	-7.204	5.980
106	150	256	104.182	8.652	1.889	9.868	-8.000	4.405
106	151	257	104.863	7.391	2.203	9.791	-6.443	5.183
106	152	258	104.672	8.263	2.297	9.761	-7.220	3.612
106	153	259	105.732	7.011	2.617	9.728	-5.660	4.371
106	154	260	105.956	7.848	2.694	9.735	-6.419	2.802
106	155	261	107.431	6.596	3.011	9.747	-4.854	3.558
106	156	262	108.082	7.421	3.080	9.777	-5.610	1.998
106	157	263	109.985	6.168	3.388	9.814	-4.046	2.769
106	158	264	111.050	7.006	3.455	9.843	-4.817	1.225
106	159	265	113.368	5.754	3.747	9.877	-3.263	2.025
106	160	266	114.814	6.625	3.818	9.883	-4.062	0.495
106	161	267	117.521	5.365	4.087	9.903	-2.515	1.324
106	162	268	119.315	6.277	4.171	9.888	-3.345	-0.206
106	163	269	122.399	4.987	4.410	9.907	-1.791	0.644
106	164	270	124.533	5.938	4.512	9.895	-2.641	-0.908
106	165	271	128.012	4.592	4.717	9.943	-1.060	-0.048
106	166	272	130.507	5.577	4.842	9.963	-1.920	-1.633
106	167	273	134.422	4.157	5.008	10.062	-0.301	-0.760
106	168	274	137.310	5.183	5.161	10.126	-1.174	-2.374
106	169	275	141.689	3.693	5.284	10.266	0.477	-1.467
106	170	276	144.977	4.784	5.468	10.347	-0.430	-3.087
106	171	277	149.806	3.243	5.547	10.483	1.229	-2.116
106	172	278	153.446	4.431	5.765	10.528	0.259	-3.719
106	173	279	158.655	2.862	5.798	10.607	1.900	-2.669
106	174	280	162.563	4.164	6.050	10.577	0.851	-4.254
106	175	281	168.067	2.568	6.039	10.580	2.475	-3.144
106	176	282	172.176	3.962	6.324	10.496	1.365	-4.748
106	177	283	177.940	2.307	6.273	10.477	3.004	-3.626
106	178	284	182.267	3.744	6.588	10.421	1.882	-5.286
106	179	285	188.343	1.996	6.500	10.464	3.573	-4.173
106	180	286	192.965	3.449	6.839	10.496	2.459	-5.863
106	181	287	199.394	1.643	6.723	10.591	4.172	-4.693
106	182	288	204.295	3.170	7.080	10.619	3.002	-6.312
106	183	289	210.951	1.416	6.946	10.599	4.634	-5.054
106	184	290	215.984	3.039	7.310	10.490	3.376	
107	132	239	144.610	12.061	-3.959	12.471	-14.758	13.448
107	133	240	141.972	10.710	-3.521	12.283	-12.939	14.448
107	134	241	138.268	11.775	-3.456	12.055	-13.938	12.727

Z	N	A	ΔM	S_n	S_p	Q_α	Q_{β^-}	Q_{β^+}
107	135	242	135.889	10.451	-3.059	11.806	-12.182	13.725
107	136	243	132.416	11.544	-2.964	11.534	-13.180	12.034
107	137	244	130.283	10.205	-2.612	11.282	-11.450	12.984
107	138	245	127.072	11.283	-2.483	11.052	-12.400	11.287
107	139	246	125.250	9.893	-2.176	10.878	-10.663	12.168
107	140	247	122.385	10.936	-2.014	10.744	-11.544	10.464
107	141	248	120.961	9.495	-1.752	10.666	-9.802	11.293
107	142	249	118.513	10.520	-1.556	10.613	-10.630	9.607
107	143	250	117.531	9.053	-1.336	10.591	-8.907	10.413
107	144	251	115.516	10.087	-1.108	10.566	-9.713	8.766
107	145	252	114.967	8.621	-0.928	10.546	-8.033	9.570
107	146	253	113.358	9.680	-0.673	10.506	-8.837	7.969
107	147	254	113.205	8.225	-0.527	10.460	-7.206	8.774
107	148	255	111.968	9.309	-0.248	10.396	-8.011	7.204
107	149	256	112.183	7.856	-0.131	10.334	-6.418	8.000
107	150	257	111.306	8.949	0.166	10.269	-7.214	6.443
107	151	258	111.892	7.485	0.260	10.220	-5.640	7.220
107	152	259	111.392	8.571	0.568	10.184	-6.417	5.660
107	153	260	112.375	7.088	0.646	10.173	-4.846	6.419
107	154	261	112.285	8.162	0.960	10.180	-5.606	4.854
107	155	262	113.691	6.665	1.028	10.207	-4.036	5.610
107	156	263	114.031	7.732	1.340	10.245	-4.792	4.046
107	157	264	115.867	6.235	1.407	10.289	-3.232	4.817
107	158	265	116.630	7.308	1.709	10.333	-4.003	3.263
107	159	266	118.876	5.826	1.781	10.367	-2.459	4.062
107	160	267	120.036	6.912	2.067	10.395	-3.259	2.515
107	161	268	122.659	5.448	2.150	10.409	-1.729	3.345
107	162	269	124.190	6.541	2.414	10.422	-2.559	1.791
107	163	270	127.173	5.088	2.515	10.430	-1.028	2.641
107	164	271	129.073	6.172	2.749	10.451	-1.878	1.060
107	165	272	132.427	4.717	2.874	10.482	-0.327	1.920
107	166	273	134.723	5.776	3.074	10.542	-1.187	0.301
107	167	274	138.484	4.310	3.226	10.619	0.399	1.174
107	168	275	141.212	5.344	3.387	10.727	-0.474	-0.477
107	169	276	145.407	3.877	3.571	10.842	1.140	0.430
107	170	277	148.577	4.901	3.689	10.970	0.233	-1.229
107	171	278	153.188	3.460	3.907	11.079	1.853	-0.259
107	172	279	156.755	4.504	3.980	11.174	0.882	-1.900
107	173	280	161.712	3.114	4.232	11.224	2.484	-0.851
107	174	281	165.592	4.192	4.260	11.245	1.435	-2.475
107	175	282	170.811	2.853	4.545	11.221	3.020	-1.365
107	176	283	174.936	3.946	4.529	11.187	1.910	-3.004
107	177	284	180.386	2.622	4.844	11.144	3.514	-1.882
107	178	285	184.770	3.687	4.786	11.135	2.392	-3.573
107	179	286	190.506	2.336	5.126	11.158	4.052	-2.459
107	180	287	195.222	3.356	5.032	11.231	2.938	-4.172
107	181	288	201.294	2.000	5.389	11.315	4.629	-3.002
107	182	289	206.317	3.048	5.268	11.376	3.458	-4.634
107	183	290	212.608	1.780	5.632	11.355	5.078	-3.376
107	184	291	217.781	2.898	5.492	11.270	3.820	
108	133	241	152.207	10.775	-2.946	12.470	-14.732	13.938
108	134	242	148.071	12.207	-2.514	12.283	-15.731	12.182
108	135	243	145.597	10.546	-2.419	12.010	-14.011	13.180
108	136	244	141.733	11.935	-2.028	11.785	-15.009	11.450
108	137	245	139.471	10.333	-1.899	11.505	-13.317	12.400
108	138	246	135.913	11.629	-1.553	11.325	-14.267	10.663
108	139	247	133.929	10.055	-1.390	11.122	-12.570	11.544
108	140	248	130.763	11.238	-1.089	11.039	-13.451	9.802
108	141	249	129.143	9.691	-0.893	10.933	-11.748	10.630
108	142	250	126.438	10.777	-0.636	10.931	-12.576	8.907

Z	N	A	ΔM	S_n	S_p	Q_α	Q_{β^-}	Q_{β^+}
108	143	251	125.229	9.281	-0.409	10.883	-10.890	9.713
108	144	252	122.999	10.301	-0.194	10.906	-11.696	8.033
108	145	253	122.195	8.876	0.061	10.864	-10.049	8.837
108	146	254	120.411	9.855	0.236	10.868	-10.854	7.206
108	147	255	119.979	8.503	0.515	10.804	-9.252	8.011
108	148	256	118.601	9.449	0.655	10.780	-10.057	6.418
108	149	257	118.520	8.153	0.952	10.706	-8.488	7.214
108	150	258	117.531	9.060	1.063	10.676	-9.284	5.640
108	151	259	117.809	7.794	1.372	10.621	-7.726	6.417
108	152	260	117.221	8.659	1.460	10.614	-8.503	4.846
108	153	261	117.890	7.402	1.774	10.603	-6.943	5.606
108	154	262	117.728	8.234	1.846	10.632	-7.703	4.036
108	155	263	118.823	6.976	2.157	10.666	-6.137	4.792
108	156	264	119.099	7.795	2.221	10.719	-6.893	3.232
108	157	265	120.633	6.537	2.523	10.778	-5.329	4.003
108	158	266	121.335	7.369	2.584	10.829	-6.100	2.459
108	159	267	123.295	6.112	2.870	10.885	-4.546	3.259
108	160	268	124.389	6.978	2.936	10.913	-5.345	1.729
108	161	269	126.749	5.711	3.200	10.956	-3.798	2.559
108	162	270	128.202	6.619	3.278	10.963	-4.628	1.028
108	163	271	130.951	5.322	3.512	11.005	-3.074	1.878
108	164	272	132.754	6.268	3.608	11.014	-3.924	0.327
108	165	273	135.909	4.916	3.807	11.085	-2.343	1.187
108	166	274	138.085	5.895	3.926	11.128	-3.203	-0.399
108	167	275	141.686	4.471	4.087	11.249	-1.584	0.474
108	168	276	144.267	5.491	4.234	11.335	-2.457	-1.140
108	169	277	148.344	3.995	4.352	11.497	-0.806	-0.233
108	170	278	151.335	5.080	4.531	11.600	-1.713	-1.853
108	171	279	155.873	3.534	4.604	11.759	-0.054	-0.882
108	172	280	159.228	4.716	4.816	11.827	-1.025	-2.484
108	173	281	164.157	3.142	4.844	11.927	0.617	-1.435
108	174	282	167.791	4.438	5.090	11.920	-0.433	-3.020
108	175	283	173.026	2.836	5.074	11.946	1.191	-1.910
108	176	284	176.872	4.225	5.353	11.884	0.082	-3.514
108	177	285	182.379	2.564	5.296	11.887	1.721	-2.392
108	178	286	186.454	3.996	5.605	11.854	0.599	-4.052
108	179	287	192.283	2.242	5.512	11.918	2.290	-2.938
108	180	288	196.665	3.690	5.846	11.972	1.176	-4.629
108	181	289	202.858	1.878	5.724	12.090	2.889	-3.458
108	182	290	207.530	3.400	6.076	12.140	1.719	-5.078
108	183	291	213.961	1.640	5.936	12.143	3.351	-3.820
108	184	292	218.776	3.257	6.294	12.056	2.092	
109	135	244	156.742	10.937	-3.856	12.345	-13.456	15.009
109	136	245	152.789	12.025	-3.766	12.095	-14.454	13.317
109	137	246	150.180	10.680	-3.420	11.866	-12.724	14.267
109	138	247	146.499	11.752	-3.297	11.658	-13.674	12.570
109	139	248	144.214	10.357	-2.996	11.506	-11.937	13.451
109	140	249	140.891	11.395	-2.839	11.394	-12.818	11.748
109	141	250	139.014	9.948	-2.582	11.339	-11.076	12.576
109	142	251	136.119	10.967	-2.392	11.308	-11.904	10.890
109	143	252	134.695	9.495	-2.178	11.309	-10.181	11.696
109	144	253	132.244	10.523	-1.956	11.306	-10.987	10.049
109	145	254	131.264	9.051	-1.781	11.309	-9.307	10.854
109	146	255	129.231	10.105	-1.531	11.290	-10.111	9.252
109	147	256	128.658	8.644	-1.391	11.267	-8.480	10.057
109	148	257	127.008	9.722	-1.117	11.225	-9.285	8.488
109	149	258	126.815	8.264	-1.006	11.185	-7.692	9.284
109	150	259	125.535	9.351	-0.715	11.143	-8.488	7.726
109	151	260	125.724	7.882	-0.626	11.117	-6.914	8.503
109	152	261	124.833	8.962	-0.323	11.103	-7.691	6.943

Z	N	A	ΔM	S_n	S_p	Q_α	Q_{β^-}	Q_{β^+}
109	153	262	125.430	7.474	-0.251	11.114	-6.120	7.703
109	154	263	124.960	8.542	0.057	11.143	-6.880	6.137
109	155	264	125.992	7.039	0.120	11.192	-5.310	6.893
109	156	265	125.962	8.101	0.426	11.253	-6.066	5.329
109	157	266	127.435	6.599	0.487	11.319	-4.506	6.100
109	158	267	127.840	7.666	0.784	11.385	-5.277	4.546
109	159	268	129.734	6.178	0.850	11.442	-3.733	5.345
109	160	269	130.547	7.258	1.131	11.492	-4.533	3.798
109	161	270	132.829	5.789	1.208	11.529	-3.003	4.628
109	162	271	134.024	6.876	1.466	11.564	-3.833	3.074
109	163	272	136.678	5.418	1.562	11.594	-2.302	3.924
109	164	273	138.252	6.497	1.791	11.638	-3.152	2.343
109	165	274	141.289	5.035	1.910	11.690	-1.601	3.203
109	166	275	143.270	6.090	2.104	11.773	-2.461	1.584
109	167	276	146.724	4.618	2.251	11.872	-0.875	2.457
109	168	277	149.150	5.646	2.406	12.003	-1.748	0.806
109	169	278	153.048	4.173	2.585	12.139	-0.134	1.713
109	170	279	155.927	5.192	2.697	12.290	-1.041	0.054
109	171	280	160.253	3.746	2.909	12.421	0.579	1.025
109	172	281	163.540	4.784	2.977	12.539	-0.392	-0.617
109	173	282	168.223	3.388	3.223	12.611	1.210	0.433
109	174	283	171.834	4.460	3.245	12.655	0.161	-1.191
109	175	284	176.790	3.116	3.525	12.653	1.746	-0.082
109	176	285	180.658	4.204	3.503	12.641	0.636	-1.721
109	177	286	185.855	2.874	3.812	12.620	2.240	-0.599
109	178	287	189.994	3.933	3.749	12.633	1.118	-2.290
109	179	288	195.489	2.576	4.083	12.678	2.778	-1.176
109	180	289	199.969	3.591	3.984	12.774	1.664	-2.889
109	181	290	205.811	2.229	4.336	12.880	3.355	-1.719
109	182	291	210.610	3.272	4.209	12.964	2.184	-3.351
109	183	292	216.683	1.999	4.567	12.965	3.804	-2.092
109	184	293	221.643	3.111	4.421	12.902	2.545	
110	137	247	160.173	10.803	-2.704	12.151	-14.666	13.674
110	138	248	156.151	12.093	-2.363	11.993	-15.616	11.937
110	139	249	153.709	10.513	-2.206	11.813	-13.919	12.818
110	140	250	150.090	11.690	-1.910	11.752	-14.800	11.076
110	141	251	148.023	10.138	-1.720	11.669	-13.097	11.904
110	142	252	144.876	11.218	-1.469	11.688	-13.925	10.181
110	143	253	143.231	9.717	-1.247	11.663	-12.239	10.987
110	144	254	140.571	10.731	-1.038	11.708	-13.045	9.307
110	145	255	139.342	9.301	-0.788	11.688	-11.398	10.111
110	146	256	137.139	10.274	-0.619	11.715	-12.203	8.480
110	147	257	136.293	8.917	-0.346	11.674	-10.601	9.285
110	148	258	134.507	9.857	-0.211	11.672	-11.406	7.692
110	149	259	134.023	8.555	0.080	11.620	-9.837	8.488
110	150	260	132.638	9.457	0.186	11.612	-10.633	6.914
110	151	261	132.524	8.185	0.489	11.579	-9.075	7.691
110	152	262	131.550	9.045	0.572	11.594	-9.852	6.120
110	153	263	131.840	7.782	0.880	11.606	-8.292	6.880
110	154	264	131.302	8.609	0.947	11.657	-9.052	5.310
110	155	265	132.029	7.345	1.252	11.713	-7.486	6.066
110	156	266	131.941	8.159	1.310	11.789	-8.242	4.506
110	157	267	133.117	6.895	1.607	11.870	-6.678	5.277
110	158	268	133.467	7.722	1.662	11.943	-7.449	3.733
110	159	269	135.080	6.459	1.943	12.022	-5.895	4.533
110	160	270	135.833	7.319	2.003	12.073	-6.694	3.003
110	161	271	137.857	6.047	2.261	12.138	-5.147	3.833
110	162	272	138.980	6.949	2.333	12.167	-5.977	2.302
110	163	273	141.405	5.647	2.562	12.231	-4.423	3.152
110	164	274	142.889	6.587	2.652	12.263	-5.273	1.601

Z	N	A	ΔM	S_n	S_p	Q_α	Q_{β^-}	Q_{β^+}
110	165	275	145.731	5.229	2.846	12.356	-3.692	2.461
110	166	276	147.599	6.203	2.960	12.421	-4.552	0.875
110	167	277	150.898	4.773	3.115	12.564	-2.933	1.748
110	168	278	153.182	5.787	3.257	12.672	-3.806	0.134
110	169	279	156.968	4.286	3.369	12.857	-2.155	1.041
110	170	280	159.674	5.365	3.542	12.982	-3.062	-0.579
110	171	281	163.932	3.813	3.610	13.164	-1.403	0.392
110	172	282	167.013	4.990	3.816	13.253	-2.374	-1.210
110	173	283	171.674	3.411	3.838	13.376	-0.732	-0.161
110	174	284	175.044	4.701	4.079	13.391	-1.782	-1.746
110	175	285	180.022	3.094	4.057	13.439	-0.158	-0.636
110	176	286	183.616	4.477	4.331	13.400	-1.267	-2.240
110	177	287	188.876	2.811	4.268	13.426	0.372	-1.118
110	178	288	192.711	4.237	4.572	13.414	-0.750	-2.778
110	179	289	198.305	2.477	4.473	13.501	0.941	-1.664
110	180	290	202.457	3.920	4.802	13.578	-0.173	-3.355
110	181	291	208.426	2.102	4.674	13.718	1.540	-2.184
110	182	292	212.879	3.618	5.020	13.790	0.370	-3.804
110	183	293	219.098	1.853	4.874	13.815	2.002	-2.545
110	184	294	223.705	3.464	5.227	13.750	0.744	
111	138	249	167.628	12.210	-4.188	12.414	-15.001	13.919
111	139	250	164.890	10.809	-3.892	12.285	-13.265	14.800
111	140	251	161.120	11.842	-3.741	12.196	-14.146	13.097
111	141	252	158.801	10.390	-3.490	12.163	-12.403	13.925
111	142	253	155.470	11.403	-3.305	12.154	-13.232	12.239
111	143	254	153.616	9.925	-3.096	12.177	-11.509	13.045
111	144	255	150.740	10.948	-2.880	12.197	-12.315	11.398
111	145	256	149.341	9.470	-2.711	12.221	-10.634	12.203
111	146	257	146.894	10.519	-2.466	12.225	-11.439	10.601
111	147	258	145.913	9.052	-2.331	12.224	-9.808	11.406
111	148	259	143.860	10.125	-2.064	12.205	-10.613	9.837
111	149	260	143.270	8.661	-1.958	12.187	-9.020	10.633
111	150	261	141.599	9.743	-1.672	12.167	-9.816	9.075
111	151	262	141.403	8.268	-1.590	12.163	-8.241	9.852
111	152	263	140.131	9.343	-1.292	12.172	-9.019	8.292
111	153	264	140.354	7.849	-1.225	12.205	-7.448	9.052
111	154	265	139.514	8.911	-0.923	12.257	-8.207	7.486
111	155	266	140.183	7.403	-0.866	12.328	-6.638	8.242
111	156	267	139.796	8.459	-0.565	12.411	-7.394	6.678
111	157	268	140.916	6.951	-0.510	12.499	-5.834	7.449
111	158	269	140.975	8.013	-0.218	12.588	-6.605	5.895
111	159	270	142.527	6.519	-0.158	12.667	-5.061	6.694
111	160	271	143.004	7.594	0.117	12.739	-5.861	5.147
111	161	272	144.957	6.119	0.189	12.798	-4.331	5.977
111	162	273	145.827	7.201	0.442	12.856	-5.160	4.423
111	163	274	148.162	5.737	0.532	12.908	-3.630	5.273
111	164	275	149.423	6.810	0.755	12.974	-4.480	3.692
111	165	276	152.152	5.343	0.868	13.049	-2.928	4.552
111	166	277	153.831	6.392	1.057	13.154	-3.788	2.933
111	167	278	156.989	4.914	1.199	13.275	-2.203	3.806
111	168	279	159.123	5.937	1.348	13.428	-3.076	2.155
111	169	280	162.736	4.459	1.521	13.587	-1.462	3.062
111	170	281	165.335	5.472	1.628	13.761	-2.369	1.403
111	171	282	169.387	4.020	1.834	13.914	-0.749	2.374
111	172	283	172.406	5.053	1.896	14.054	-1.719	0.732
111	173	284	176.826	3.651	2.137	14.148	-0.117	1.782
111	174	285	180.179	4.718	2.154	14.214	-1.167	0.158
111	175	286	184.883	3.368	2.428	14.235	0.418	1.267
111	176	287	188.504	4.450	2.400	14.245	-0.691	-0.372
111	177	288	193.461	3.115	2.704	14.246	0.912	0.750

Z	N	A	ΔM	S_n	S_p	Q_α	Q_{β^-}	Q_{β^+}
111	178	289	197.364	4.168	2.635	14.282	-0.210	-0.941
111	179	290	202.630	2.806	2.964	14.349	1.450	0.173
111	180	291	206.886	3.815	2.860	14.467	0.337	-1.540
111	181	292	212.510	2.448	3.205	14.596	2.027	-0.370
111	182	293	217.096	3.485	3.072	14.702	0.857	-2.002
111	183	294	222.961	2.206	3.425	14.725	2.476	-0.744
111	184	295	227.720	3.313	3.274	14.684	1.218	
112	140	252	171.205	12.132	-2.796	12.629	-16.215	12.403
112	141	253	168.702	10.574	-2.611	12.568	-14.511	13.232
112	142	254	165.124	11.649	-2.366	12.610	-15.340	11.509
112	143	255	163.054	10.142	-2.149	12.607	-13.654	12.315
112	144	256	159.975	11.150	-1.947	12.675	-14.460	10.634
112	145	257	158.332	9.714	-1.702	12.677	-12.813	11.439
112	146	258	155.721	10.683	-1.538	12.726	-13.617	9.808
112	147	259	154.473	9.320	-1.271	12.707	-12.015	10.613
112	148	260	152.291	10.254	-1.142	12.727	-12.821	9.020
112	149	261	151.415	8.947	-0.856	12.698	-11.251	9.816
112	150	262	149.644	9.843	-0.756	12.712	-12.047	8.241
112	151	263	149.150	8.565	-0.458	12.702	-10.490	9.019
112	152	264	147.802	9.420	-0.381	12.739	-11.267	7.448
112	153	265	147.722	8.151	-0.079	12.773	-9.707	8.207
112	154	266	146.821	8.972	-0.018	12.846	-10.466	6.638
112	155	267	147.189	7.703	0.283	12.925	-8.901	7.394
112	156	268	146.750	8.511	0.335	13.023	-9.656	5.834
112	157	269	147.579	7.242	0.626	13.126	-8.093	6.605
112	158	270	147.588	8.063	0.676	13.222	-8.864	5.061
112	159	271	148.865	6.794	0.951	13.323	-7.309	5.861
112	160	272	149.288	7.649	1.006	13.396	-8.109	4.331
112	161	273	150.988	6.371	1.258	13.483	-6.562	5.160
112	162	274	151.792	7.267	1.325	13.534	-7.391	3.630
112	163	275	153.903	5.960	1.548	13.621	-5.838	4.480
112	164	276	155.080	6.895	1.632	13.675	-6.687	2.928
112	165	277	157.620	5.532	1.821	13.790	-5.107	3.788
112	166	278	159.191	6.500	1.929	13.878	-5.967	2.203
112	167	279	162.199	5.064	2.078	14.043	-4.348	3.076
112	168	280	164.198	6.073	2.214	14.174	-5.221	1.462
112	169	281	167.704	4.565	2.321	14.381	-3.570	2.369
112	170	282	170.136	5.640	2.489	14.529	-4.477	0.749
112	171	283	174.125	4.082	2.551	14.732	-2.818	1.719
112	172	284	176.943	5.254	2.752	14.844	-3.788	0.117
112	173	285	181.346	3.668	2.768	14.989	-2.146	1.167
112	174	286	184.465	4.953	3.004	15.027	-3.196	-0.418
112	175	287	189.196	3.340	2.976	15.097	-1.572	0.691
112	176	288	192.549	4.718	3.244	15.080	-2.682	-0.912
112	177	289	197.574	3.046	3.176	15.128	-1.043	0.210
112	178	290	201.179	4.467	3.474	15.139	-2.165	-1.450
112	179	291	206.549	2.701	3.369	15.248	-0.474	-0.337
112	180	292	210.483	4.138	3.692	15.347	-1.588	-2.027
112	181	293	216.239	2.315	3.559	15.510	0.126	-0.857
112	182	294	220.485	3.826	3.900	15.604	-1.045	-2.476
112	183	295	226.502	2.055	3.749	15.651	0.587	-1.218
112	184	296	230.913	3.661	4.096	15.609	-0.671	
113	141	254	180.464	10.820	-4.474	13.150	-13.775	15.340
113	142	255	176.708	11.828	-4.294	13.164	-14.604	13.654
113	143	256	174.435	10.344	-4.092	13.209	-12.880	14.460
113	144	257	171.145	11.361	-3.881	13.251	-13.686	12.813
113	145	258	169.338	9.878	-3.717	13.298	-12.006	13.617
113	146	259	166.489	10.921	-3.478	13.324	-12.810	12.015
113	147	260	165.111	9.449	-3.349	13.345	-11.179	12.821

Z	N	A	ΔM	S_n	S_p	Q_α	Q_{β^-}	Q_{β^+}
113	148	261	162.667	10.516	-3.087	13.348	-11.985	11.251
113	149	262	161.691	9.047	-2.987	13.353	-10.392	12.047
113	150	263	159.640	10.123	-2.707	13.355	-11.188	10.490
113	151	264	159.069	8.643	-2.630	13.373	-9.613	11.267
113	152	265	157.428	9.712	-2.338	13.404	-10.390	9.707
113	153	266	157.287	8.212	-2.277	13.460	-8.819	10.466
113	154	267	156.090	9.269	-1.980	13.534	-9.579	8.901
113	155	268	156.406	7.755	-1.928	13.627	-8.010	9.656
113	156	269	155.672	8.806	-1.633	13.733	-8.765	8.093
113	157	270	156.451	7.292	-1.583	13.844	-7.205	8.864
113	158	271	156.174	8.349	-1.297	13.954	-7.976	7.309
113	159	272	157.397	6.849	-1.243	14.056	-6.432	8.109
113	160	273	157.550	7.918	-0.973	14.150	-7.232	6.562
113	161	274	159.183	6.438	-0.906	14.232	-5.702	7.391
113	162	275	159.740	7.514	-0.660	14.311	-6.532	5.838
113	163	276	161.767	6.045	-0.575	14.386	-5.001	6.687
113	164	277	162.727	7.112	-0.358	14.474	-5.851	5.107
113	165	278	165.158	5.640	-0.250	14.572	-4.300	5.967
113	166	279	166.547	6.683	-0.067	14.699	-5.160	4.348
113	167	280	169.419	5.200	0.069	14.843	-3.574	5.221
113	168	281	171.274	6.216	0.213	15.018	-4.447	3.570
113	169	282	174.612	4.733	0.381	15.199	-2.833	4.477
113	170	283	176.943	5.741	0.482	15.395	-3.740	2.818
113	171	284	180.731	4.283	0.683	15.570	-2.121	3.788
113	172	285	183.493	5.310	0.739	15.733	-3.091	2.146
113	173	286	187.661	3.903	0.975	15.849	-1.489	3.196
113	174	287	190.768	4.964	0.986	15.937	-2.539	1.572
113	175	288	195.231	3.609	1.254	15.980	-0.953	2.682
113	176	289	198.617	4.685	1.221	16.013	-2.063	1.043
113	177	290	203.344	3.344	1.519	16.037	-0.459	2.165
113	178	291	207.023	4.392	1.445	16.094	-1.582	0.474
113	179	292	212.070	3.025	1.768	16.184	0.079	1.588
113	180	293	216.114	4.028	1.658	16.325	-1.035	-0.126
113	181	294	221.530	2.655	1.998	16.476	0.656	1.045
113	182	295	225.914	3.687	1.860	16.604	-0.515	-0.587
113	183	296	231.584	2.402	2.207	16.649	1.105	0.671
113	184	297	236.151	3.504	2.050	16.631	-0.154	
114	143	257	184.831	10.555	-3.107	13.705	-15.108	13.686
114	144	258	181.344	11.559	-2.910	13.795	-15.915	12.006
114	145	259	179.299	10.117	-2.671	13.819	-14.268	12.810
114	146	260	176.291	11.079	-2.513	13.891	-15.072	11.179
114	147	261	174.651	9.711	-2.251	13.894	-13.470	11.985
114	148	262	172.083	10.640	-2.127	13.937	-14.276	10.392
114	149	263	170.827	9.327	-1.847	13.930	-12.706	11.188
114	150	264	168.681	10.217	-1.753	13.966	-13.502	9.613
114	151	265	167.818	8.934	-1.461	13.978	-11.945	10.390
114	152	266	166.106	9.783	-1.389	14.038	-12.722	8.819
114	153	267	165.669	8.509	-1.092	14.094	-11.161	9.579
114	154	268	164.416	9.324	-1.037	14.189	-11.921	8.010
114	155	269	164.437	8.050	-0.742	14.291	-10.355	8.765
114	156	270	163.657	8.852	-0.696	14.411	-11.111	7.205
114	157	271	164.150	7.578	-0.410	14.536	-9.548	7.976
114	158	272	163.829	8.393	-0.366	14.654	-10.319	6.432
114	159	273	164.782	7.119	-0.096	14.778	-8.764	7.232
114	160	274	164.886	7.968	-0.047	14.873	-9.564	5.702
114	161	275	166.272	6.685	0.200	14.983	-8.017	6.532
114	162	276	166.769	7.575	0.261	15.056	-8.846	5.001
114	163	277	168.578	6.262	0.478	15.165	-7.292	5.851
114	164	278	169.458	7.191	0.557	15.242	-8.142	4.300
114	165	279	171.707	5.823	0.740	15.379	-6.562	5.160

Z	N	A	ΔM	S_n	S_p	Q_α	Q_{β^-}	Q_{β^+}
114	166	280	172.993	6.785	0.843	15.489	-7.422	3.574
114	167	281	175.721	5.343	0.987	15.677	-5.803	4.447
114	168	282	177.446	6.347	1.117	15.830	-6.676	2.833
114	169	283	180.683	4.834	1.218	16.059	-5.025	3.740
114	170	284	182.852	5.903	1.380	16.229	-5.932	2.121
114	171	285	186.584	4.340	1.437	16.455	-4.273	3.091
114	172	286	189.150	5.505	1.632	16.589	-5.243	1.489
114	173	287	193.306	3.915	1.643	16.757	-3.601	2.539
114	174	288	196.184	5.194	1.873	16.816	-4.651	0.953
114	175	289	200.680	3.576	1.840	16.909	-3.027	2.063
114	176	290	203.804	4.948	2.102	16.914	-4.137	0.459
114	177	291	208.605	3.270	2.028	16.985	-2.498	1.582
114	178	292	211.991	4.685	2.321	17.018	-3.620	-0.079
114	179	293	217.148	2.914	2.211	17.149	-1.929	1.035
114	180	294	220.874	4.345	2.528	17.270	-3.043	-0.656
114	181	295	226.429	2.517	2.390	17.455	-1.329	0.515
114	182	296	230.479	4.022	2.724	17.572	-2.500	-1.105
114	183	297	236.305	2.245	2.568	17.641	-0.868	0.154
114	184	298	240.531	3.846	2.909	17.621	-2.126	
115	145	260	191.363	10.275	-4.775	14.503	-13.388	15.072
115	146	261	188.121	11.313	-4.542	14.552	-14.192	13.470
115	147	262	186.358	9.835	-4.418	14.595	-12.562	14.276
115	148	263	183.533	10.896	-4.162	14.620	-13.367	12.706
115	149	264	182.183	9.421	-4.067	14.648	-11.774	13.502
115	150	265	179.763	10.492	-3.793	14.672	-12.570	11.945
115	151	266	178.828	9.006	-3.721	14.712	-10.995	12.722
115	152	267	176.830	10.070	-3.435	14.766	-11.772	11.161
115	153	268	176.337	8.565	-3.379	14.844	-10.201	11.921
115	154	269	174.793	9.616	-3.088	14.940	-10.961	10.355
115	155	270	174.768	8.096	-3.042	15.056	-9.392	11.111
115	156	271	173.698	9.141	-2.752	15.183	-10.148	9.548
115	157	272	174.147	7.622	-2.708	15.316	-8.588	10.319
115	158	273	173.546	8.673	-2.428	15.449	-9.359	8.764
115	159	274	174.449	7.168	-2.379	15.573	-7.815	9.564
115	160	275	174.289	8.232	-2.115	15.690	-8.614	8.017
115	161	276	175.615	6.746	-2.054	15.794	-7.085	8.846
115	162	277	175.870	7.816	-1.813	15.896	-7.914	7.292
115	163	278	177.600	6.341	-1.734	15.992	-6.384	8.142
115	164	279	178.269	7.403	-1.522	16.103	-7.234	6.562
115	165	280	180.415	5.925	-1.419	16.223	-5.682	7.422
115	166	281	181.524	6.962	-1.242	16.373	-6.542	5.803
115	167	282	184.122	5.474	-1.111	16.539	-4.957	6.676
115	168	283	185.708	6.485	-0.973	16.736	-5.830	5.025
115	169	284	188.783	4.996	-0.811	16.940	-4.216	5.932
115	170	285	190.856	5.998	-0.716	17.158	-5.123	4.273
115	171	286	194.393	4.535	-0.520	17.356	-3.503	5.243
115	172	287	196.908	5.556	-0.469	17.540	-4.473	3.601
115	173	288	200.835	4.144	-0.240	17.679	-2.871	4.651
115	174	289	203.707	5.199	-0.234	17.790	-3.921	3.027
115	175	290	207.940	3.838	0.029	17.855	-2.336	4.137
115	176	291	211.102	4.909	-0.010	17.910	-3.445	2.498
115	177	292	215.611	3.563	0.283	17.956	-1.842	3.620
115	178	293	219.077	4.605	0.203	18.036	-2.964	1.929
115	179	294	223.917	3.232	0.520	18.148	-1.304	3.043
115	180	295	227.759	4.230	0.405	18.311	-2.417	1.329
115	181	296	232.979	2.851	0.739	18.484	-0.727	2.500
115	182	297	237.173	3.878	0.595	18.634	-1.897	0.868
115	183	298	242.657	2.587	0.937	18.702	-0.278	2.126
115	184	299	247.045	3.683	0.775	18.706	-1.536	

Z	N	A	ΔM	S_n	S_p	Q_α	Q_{β^-}	Q_{β^+}
116	146	262	198.920	11.465	-3.510	15.151	-16.521	12.562
116	147	263	196.900	10.091	-3.253	15.177	-14.919	13.367
116	148	264	193.958	11.014	-3.135	15.242	-15.724	11.774
116	149	265	192.333	9.696	-2.861	15.257	-14.155	12.570
116	150	266	189.824	10.581	-2.772	15.316	-14.951	10.995
116	151	267	188.603	9.292	-2.485	15.351	-13.393	11.772
116	152	268	186.538	10.136	-2.419	15.432	-14.170	10.201
116	153	269	185.754	8.856	-2.128	15.511	-12.610	10.961
116	154	270	184.160	9.666	-2.078	15.629	-13.370	9.392
116	155	271	183.846	8.386	-1.789	15.752	-11.804	10.148
116	156	272	182.735	9.182	-1.748	15.895	-12.560	8.588
116	157	273	182.904	7.902	-1.468	16.042	-10.996	9.359
116	158	274	182.264	8.712	-1.429	16.183	-11.767	7.815
116	159	275	182.904	7.432	-1.165	16.328	-10.213	8.614
116	160	276	182.700	8.275	-1.122	16.446	-11.012	7.085
116	161	277	183.784	6.987	-0.880	16.578	-9.465	7.914
116	162	278	183.984	7.872	-0.825	16.674	-10.295	6.384
116	163	279	185.502	6.553	-0.613	16.805	-8.741	7.234
116	164	280	186.097	7.476	-0.540	16.904	-9.591	5.682
116	165	281	188.066	6.102	-0.362	17.064	-8.010	6.542
116	166	282	189.078	7.059	-0.265	17.196	-8.870	4.957
116	167	283	191.538	5.612	-0.127	17.406	-7.251	5.830
116	168	284	192.999	6.610	-0.002	17.581	-8.124	4.216
116	169	285	195.979	5.092	0.093	17.833	-6.473	5.123
116	170	286	197.896	6.155	0.250	18.025	-7.380	3.503
116	171	287	201.381	4.586	0.301	18.273	-5.721	4.473
116	172	288	203.706	5.746	0.490	18.430	-6.692	2.871
116	173	289	207.628	4.150	0.496	18.620	-5.050	3.921
116	174	290	210.276	5.424	0.720	18.702	-6.100	2.336
116	175	291	214.548	3.800	0.681	18.817	-4.476	3.445
116	176	292	217.453	5.166	0.939	18.844	-5.585	1.842
116	177	293	222.041	3.483	0.859	18.937	-3.946	2.964
116	178	294	225.221	4.892	1.146	18.992	-5.068	1.304
116	179	295	230.176	3.116	1.030	19.146	-3.377	2.417
116	180	296	233.706	4.542	1.342	19.290	-4.491	0.727
116	181	297	239.070	2.707	1.198	19.497	-2.778	1.897
116	182	298	242.935	4.207	1.527	19.635	-3.948	0.278
116	183	299	248.581	2.425	1.365	19.727	-2.316	1.536
116	184	300	252.633	4.019	1.701	19.730	-3.574	
117	148	265	206.488	11.265	-5.241	15.941	-14.712	14.155
117	149	266	204.774	9.785	-5.152	15.991	-13.119	14.951
117	150	267	201.996	10.850	-4.883	16.037	-13.915	13.393
117	151	268	200.709	9.358	-4.817	16.101	-12.340	14.170
117	152	269	198.364	10.416	-4.536	16.176	-13.117	12.610
117	153	270	197.530	8.906	-4.487	16.276	-11.546	13.370
117	154	271	195.650	9.951	-4.201	16.395	-12.306	11.804
117	155	272	195.295	8.426	-4.160	16.533	-10.737	12.560
117	156	273	193.901	9.466	-3.876	16.683	-11.493	10.996
117	157	274	194.031	7.941	-3.838	16.838	-9.932	11.767
117	158	275	193.116	8.986	-3.563	16.994	-10.703	10.213
117	159	276	193.712	7.476	-3.519	17.140	-9.160	11.012
117	160	277	193.250	8.534	-3.261	17.279	-9.959	9.465
117	161	278	194.279	7.042	-3.206	17.405	-8.430	10.295
117	162	279	194.243	8.107	-2.970	17.529	-9.259	8.741
117	163	280	195.688	6.627	-2.897	17.648	-7.729	9.591
117	164	281	196.077	7.683	-2.690	17.782	-8.578	8.010
117	165	282	197.949	6.199	-2.593	17.924	-7.027	8.870
117	166	283	198.789	7.231	-2.422	18.096	-7.887	7.251
117	167	284	201.123	5.737	-2.297	18.284	-6.302	8.124
117	168	285	202.452	6.743	-2.164	18.503	-7.175	6.473

Z	N	A	ΔM	S_n	S_p	Q_α	Q_{β^-}	Q_{β^+}
117	169	286	205.276	5.248	-2.008	18.729	-5.561	7.380
117	170	287	207.102	6.245	-1.918	18.970	-6.467	5.721
117	171	288	210.398	4.776	-1.728	19.190	-4.848	6.692
117	172	289	212.678	5.792	-1.683	19.397	-5.818	5.050
117	173	290	216.375	4.374	-1.458	19.558	-4.216	6.100
117	174	291	219.023	5.424	-1.458	19.691	-5.266	4.476
117	175	292	223.038	4.057	-1.201	19.778	-3.681	5.585
117	176	293	225.987	5.122	-1.246	19.856	-4.790	3.946
117	177	294	230.289	3.770	-0.958	19.924	-3.187	5.068
117	178	295	233.553	4.807	-1.044	20.026	-4.309	3.377
117	179	296	238.197	3.428	-0.732	20.161	-2.648	4.491
117	180	297	241.848	4.420	-0.853	20.346	-3.762	2.778
117	181	298	246.883	3.036	-0.524	20.541	-2.072	3.948
117	182	299	250.897	4.057	-0.674	20.714	-3.242	2.316
117	183	300	256.208	2.761	-0.337	20.804	-1.622	3.574
117	184	301	260.428	3.851	-0.505	20.830	-2.881	
118	149	267	215.911	10.054	-3.847	16.585	-15.541	13.915
118	150	268	213.049	10.933	-3.764	16.667	-16.337	12.340
118	151	269	211.481	9.639	-3.483	16.723	-14.780	13.117
118	152	270	209.076	10.477	-3.423	16.828	-15.557	11.546
118	153	271	207.956	9.191	-3.137	16.928	-13.997	12.306
118	154	272	206.032	9.996	-3.093	17.068	-14.756	10.737
118	155	273	205.393	8.710	-2.809	17.214	-13.191	11.493
118	156	274	203.964	9.501	-2.774	17.379	-13.946	9.932
118	157	275	203.820	8.215	-2.500	17.549	-12.383	10.703
118	158	276	202.872	9.019	-2.466	17.712	-13.154	9.160
118	159	277	203.209	7.734	-2.208	17.880	-11.599	9.959
118	160	278	202.709	8.572	-2.170	18.020	-12.399	8.430
118	161	279	203.502	7.278	-1.934	18.174	-10.852	9.259
118	162	280	203.417	8.157	-1.884	18.292	-11.682	7.729
118	163	281	204.655	6.833	-1.678	18.446	-10.128	8.578
118	164	282	204.976	7.751	-1.610	18.567	-10.977	7.027
118	165	283	206.676	6.371	-1.438	18.749	-9.397	7.887
118	166	284	207.425	7.322	-1.347	18.903	-10.257	6.302
118	167	285	209.627	5.870	-1.214	19.136	-8.638	7.175
118	168	286	210.836	6.862	-1.095	19.333	-9.511	5.561
118	169	287	213.570	5.338	-1.005	19.607	-7.860	6.467
118	170	288	215.246	6.396	-0.854	19.822	-8.767	4.848
118	171	289	218.496	4.821	-0.809	20.092	-7.108	5.818
118	172	290	220.592	5.976	-0.625	20.271	-8.078	4.216
118	173	291	224.289	4.374	-0.625	20.483	-6.437	5.266
118	174	292	226.719	5.642	-0.406	20.588	-7.486	3.681
118	175	293	230.778	4.012	-0.450	20.725	-5.862	4.790
118	176	294	233.475	5.374	-0.199	20.775	-6.972	3.187
118	177	295	237.862	3.685	-0.284	20.890	-5.333	4.309
118	178	296	240.845	5.088	-0.003	20.967	-6.455	2.648
118	179	297	245.610	3.307	-0.124	21.144	-4.764	3.762
118	180	298	248.955	4.727	0.182	21.309	-5.878	2.072
118	181	299	254.139	2.887	0.033	21.539	-4.165	3.242
118	182	300	257.830	4.381	0.356	21.700	-5.335	1.622
118	183	301	263.309	2.593	0.188	21.814	-3.703	2.881
118	184	302	267.198	4.182	0.519	21.839	-4.961	
119	151	270	224.633	9.700	-5.863	17.434	-13.602	15.557
119	152	271	221.952	10.752	-5.588	17.532	-14.379	13.997
119	153	272	220.788	9.236	-5.543	17.654	-12.808	14.756
119	154	273	218.584	10.276	-5.263	17.795	-13.568	13.191
119	155	274	217.910	8.745	-5.228	17.956	-11.999	13.946
119	156	275	216.202	9.779	-4.950	18.128	-12.754	12.383
119	157	276	216.025	8.249	-4.917	18.306	-11.194	13.154

Z	N	A	ΔM	S_n	S_p	Q_α	Q_{β^-}	Q_{β^+}
119	158	277	214.808	9.288	-4.648	18.483	-11.965	11.599
119	159	278	215.108	7.772	-4.610	18.652	-10.421	12.399
119	160	279	214.354	8.825	-4.357	18.813	-11.221	10.852
119	161	280	215.098	7.328	-4.307	18.961	-9.691	11.682
119	162	281	214.783	8.387	-4.077	19.108	-10.521	10.128
119	163	282	215.953	6.901	-4.009	19.249	-8.990	10.977
119	164	283	216.073	7.952	-3.808	19.405	-9.840	9.397
119	165	284	217.682	6.462	-3.717	19.569	-8.289	10.257
119	166	285	218.265	7.489	-3.551	19.764	-9.149	8.638
119	167	286	220.347	5.989	-3.432	19.974	-7.563	9.511
119	168	287	221.430	6.989	-3.304	20.216	-8.436	7.860
119	169	288	224.013	5.489	-3.154	20.464	-6.822	8.767
119	170	289	225.604	6.480	-3.069	20.727	-7.729	7.108
119	171	290	228.670	5.006	-2.885	20.969	-6.110	8.078
119	172	291	230.726	6.016	-2.845	21.199	-7.080	6.437
119	173	292	234.205	4.592	-2.627	21.382	-5.478	7.486
119	174	293	236.640	5.636	-2.632	21.537	-6.528	5.862
119	175	294	240.447	4.264	-2.381	21.647	-4.942	6.972
119	176	295	243.195	5.324	-2.431	21.747	-6.052	5.333
119	177	296	247.300	3.966	-2.149	21.837	-4.448	6.455
119	178	297	250.374	4.998	-2.240	21.962	-5.571	4.764
119	179	298	254.832	3.613	-1.934	22.119	-3.910	5.878
119	180	299	258.304	4.600	-2.061	22.326	-5.024	4.165
119	181	300	263.165	3.210	-1.737	22.544	-3.333	5.335
119	182	301	267.011	4.225	-1.892	22.739	-4.504	3.703
119	183	302	272.159	2.924	-1.561	22.851	-2.884	4.961
119	184	303	276.222	4.009	-1.735	22.900	-4.143	
120	153	273	232.152	9.516	-4.075	18.246	-15.282	13.568
120	154	274	229.909	10.314	-4.036	18.408	-16.042	11.999
120	155	275	228.957	9.023	-3.758	18.576	-14.476	12.754
120	156	276	227.220	9.809	-3.728	18.763	-15.232	11.194
120	157	277	226.774	8.518	-3.459	18.956	-13.668	11.965
120	158	278	225.529	9.316	-3.432	19.141	-14.439	10.421
120	159	279	225.575	8.025	-3.179	19.331	-12.885	11.221
120	160	280	224.790	8.857	-3.146	19.493	-13.684	9.691
120	161	281	225.303	7.558	-2.916	19.670	-12.137	10.521
120	162	282	224.944	8.431	-2.872	19.810	-12.967	8.990
120	163	283	225.913	7.102	-2.671	19.986	-11.413	9.840
120	164	284	225.971	8.014	-2.609	20.129	-12.263	8.289
120	165	285	227.414	6.629	-2.443	20.334	-10.682	9.149
120	166	286	227.911	7.574	-2.357	20.510	-11.542	7.563
120	167	287	229.866	6.116	-2.230	20.765	-9.923	8.436
120	168	288	230.835	7.103	-2.116	20.985	-10.796	6.822
120	169	289	233.333	5.573	-2.032	21.282	-9.145	7.729
120	170	290	234.779	6.625	-1.887	21.518	-10.052	6.110
120	171	291	237.806	5.045	-1.847	21.811	-8.393	7.080
120	172	292	239.683	6.194	-1.668	22.012	-9.364	5.478
120	173	293	243.168	4.587	-1.674	22.247	-7.722	6.528
120	174	294	245.390	5.849	-1.461	22.373	-8.771	4.942
120	175	295	249.247	4.214	-1.511	22.533	-7.147	6.052
120	176	296	251.748	5.570	-1.265	22.605	-8.257	4.448
120	177	297	255.945	3.875	-1.356	22.742	-6.618	5.571
120	178	298	258.743	5.274	-1.080	22.842	-7.740	3.910
120	179	299	263.328	3.486	-1.206	23.041	-6.049	5.024
120	180	300	266.499	4.901	-0.906	23.229	-7.163	3.333
120	181	301	271.515	3.055	-1.061	23.481	-5.450	4.504
120	182	302	275.043	4.543	-0.743	23.664	-6.620	2.884
120	183	303	280.365	2.750	-0.917	23.801	-4.988	4.143
120	184	304	284.102	4.334	-0.591	23.847	-6.246	

Z	N	A	ΔM	S_n	S_p	Q_α	Q_{β^-}	Q_{β^+}
121	154	275	243.433	10.589	-6.235	19.056	-14.735	14.476
121	155	276	242.451	9.053	-6.205	19.239	-13.165	15.232
121	156	277	240.442	10.081	-5.933	19.433	-13.921	13.668
121	157	278	239.968	8.545	-5.905	19.633	-12.361	14.439
121	158	279	238.460	9.579	-5.642	19.833	-13.132	12.885
121	159	280	238.474	8.058	-5.609	20.024	-11.588	13.684
121	160	281	237.441	9.104	-5.362	20.208	-12.388	12.137
121	161	282	237.910	7.602	-5.318	20.378	-10.858	12.967
121	162	283	237.326	8.656	-5.094	20.547	-11.688	11.413
121	163	284	238.233	7.164	-5.031	20.711	-10.157	12.263
121	164	285	238.096	8.209	-4.836	20.889	-11.007	10.682
121	165	286	239.453	6.714	-4.750	21.075	-9.455	11.542
121	166	287	239.789	7.735	-4.590	21.292	-10.316	9.923
121	167	288	241.631	6.230	-4.476	21.524	-8.730	10.796
121	168	289	242.478	7.224	-4.354	21.789	-9.603	9.145
121	169	290	244.831	5.718	-4.209	22.059	-7.989	10.052
121	170	291	246.199	6.704	-4.130	22.344	-8.896	8.393
121	171	292	249.046	5.224	-3.952	22.609	-7.276	9.364
121	172	293	250.889	6.229	-3.917	22.861	-8.247	7.722
121	173	294	254.161	4.800	-3.705	23.066	-6.645	8.771
121	174	295	256.394	5.838	-3.716	23.244	-7.694	7.147
121	175	296	260.006	4.460	-3.470	23.376	-6.109	8.257
121	176	297	262.563	5.514	-3.525	23.498	-7.219	6.618
121	177	298	266.483	4.151	-3.249	23.611	-5.615	7.740
121	178	299	269.377	5.177	-3.346	23.758	-6.737	6.049
121	179	300	273.662	3.787	-3.045	23.937	-5.077	7.163
121	180	301	276.965	4.768	-3.177	24.166	-6.190	5.450
121	181	302	281.664	3.373	-2.859	24.407	-4.500	6.620
121	182	303	285.353	4.382	-3.020	24.624	-5.671	4.988
121	183	304	290.349	3.075	-2.695	24.759	-4.051	6.246
121	184	305	294.266	4.155	-2.874	24.830	-5.309	
122	156	278	252.329	10.105	-4.598	19.995	-16.429	12.361
122	157	279	251.592	8.808	-4.335	20.210	-14.865	13.132
122	158	280	250.062	9.601	-4.313	20.418	-15.636	11.588
122	159	281	249.828	8.305	-4.066	20.630	-14.082	12.388
122	160	282	248.768	9.132	-4.039	20.815	-14.881	10.858
122	161	283	249.014	7.826	-3.814	21.014	-13.334	11.688
122	162	284	248.391	8.694	-3.776	21.176	-14.164	10.157
122	163	285	249.103	7.359	-3.580	21.375	-12.610	11.007
122	164	286	248.909	8.266	-3.524	21.540	-13.460	9.455
122	165	287	250.105	6.875	-3.363	21.767	-11.879	10.316
122	166	288	250.361	7.815	-3.283	21.966	-12.739	8.730
122	167	289	252.082	6.351	-3.161	22.243	-11.120	9.603
122	168	290	252.821	7.332	-3.053	22.485	-11.993	7.989
122	169	291	255.095	5.797	-2.974	22.804	-10.342	8.896
122	170	292	256.323	6.844	-2.835	23.063	-11.249	7.276
122	171	293	259.136	5.258	-2.801	23.378	-9.590	8.247
122	172	294	260.806	6.402	-2.627	23.601	-10.561	6.645
122	173	295	264.089	4.788	-2.639	23.858	-8.919	7.694
122	174	296	266.115	6.046	-2.431	24.007	-9.968	6.109
122	175	297	269.781	4.405	-2.487	24.189	-8.344	7.219
122	176	298	272.098	5.755	-2.246	24.284	-9.454	5.615
122	177	299	276.115	4.055	-2.343	24.443	-7.815	6.737
122	178	300	278.739	5.447	-2.072	24.565	-8.937	5.077
122	179	301	283.156	3.654	-2.205	24.786	-7.246	6.190
122	180	302	286.164	5.063	-1.910	24.997	-8.360	4.500
122	181	303	291.023	3.212	-2.071	25.271	-6.647	5.671
122	182	304	294.400	4.695	-1.758	25.476	-7.817	4.051
122	183	305	299.575	2.896	-1.937	25.635	-6.185	5.309
122	184	306	303.173	4.474	-1.618	25.704	-7.443	

Z	N	A	ΔM	S_n	S_p	Q_α	Q_{β^-}	Q_{β^+}
123	157	280	265.698	8.831	-6.817	20.822	-13.499	15.636
123	158	281	263.910	9.859	-6.559	21.044	-14.270	14.082
123	159	282	263.650	8.332	-6.532	21.257	-12.726	14.881
123	160	283	262.348	9.373	-6.290	21.463	-13.526	13.334
123	161	284	262.554	7.865	-6.252	21.656	-11.996	14.164
123	162	285	261.713	8.913	-6.033	21.847	-12.825	12.610
123	163	286	262.368	7.416	-5.976	22.033	-11.295	13.460
123	164	287	261.984	8.455	-5.787	22.233	-12.145	11.879
123	165	288	263.100	6.955	-5.706	22.442	-10.593	12.739
123	166	289	263.202	7.970	-5.551	22.681	-11.453	11.120
123	167	290	264.814	6.459	-5.443	22.936	-9.868	11.993
123	168	291	265.437	7.448	-5.327	23.223	-10.741	10.342
123	169	292	267.572	5.937	-5.188	23.516	-9.127	11.249
123	170	293	268.726	6.917	-5.114	23.823	-10.034	9.590
123	171	294	271.366	5.431	-4.941	24.110	-8.414	10.561
123	172	295	273.007	6.430	-4.913	24.384	-9.385	8.919
123	173	296	276.083	4.996	-4.705	24.612	-7.783	9.968
123	174	297	278.126	6.029	-4.722	24.812	-8.832	8.344
123	175	298	281.552	4.645	-4.482	24.966	-7.247	9.454
123	176	299	283.930	5.694	-4.543	25.110	-8.357	7.815
123	177	300	287.676	4.325	-4.272	25.246	-6.753	8.937
123	178	301	290.402	5.345	-4.374	25.415	-7.875	7.246
123	179	302	294.524	3.950	-4.079	25.616	-6.215	8.360
123	180	303	297.670	4.925	-4.217	25.868	-7.328	6.647
123	181	304	302.217	3.524	-3.905	26.131	-5.638	7.817
123	182	305	305.760	4.528	-4.071	26.370	-6.809	6.185
123	183	306	310.616	3.216	-3.752	26.527	-5.189	7.443
123	184	307	314.398	4.289	-3.936	26.620	-6.447	
124	159	283	275.873	8.574	-4.935	21.857	-15.310	13.526
124	160	284	274.550	9.395	-4.914	22.064	-16.109	11.996
124	161	285	274.538	8.084	-4.695	22.285	-14.562	12.825
124	162	286	273.663	8.946	-4.662	22.470	-15.392	11.295
124	163	287	274.129	7.606	-4.472	22.691	-13.838	12.145
124	164	288	273.694	8.507	-4.421	22.878	-14.688	10.593
124	165	289	274.655	7.110	-4.266	23.128	-13.107	11.453
124	166	290	274.682	8.045	-4.191	23.349	-13.967	9.868
124	167	291	276.178	6.575	-4.075	23.648	-12.348	10.741
124	168	292	276.699	7.551	-3.973	23.913	-13.221	9.127
124	169	293	278.760	6.010	-3.899	24.254	-11.570	10.034
124	170	294	279.780	7.051	-3.765	24.535	-12.477	8.414
124	171	295	282.392	5.460	-3.737	24.872	-10.818	9.385
124	172	296	283.866	6.598	-3.569	25.118	-11.788	7.783
124	173	297	286.958	4.979	-3.586	25.397	-10.147	8.832
124	174	298	288.799	6.231	-3.384	25.568	-11.196	7.247
124	175	299	292.286	4.584	-3.445	25.773	-9.572	8.357
124	176	300	294.429	5.929	-3.210	25.889	-10.682	6.753
124	177	301	298.277	4.223	-3.312	26.071	-9.043	7.875
124	178	302	300.739	5.610	-3.048	26.216	-10.165	6.215
124	179	303	304.999	3.812	-3.186	26.459	-8.474	7.328
124	180	304	307.855	5.215	-2.896	26.692	-9.588	5.638
124	181	305	312.569	3.358	-3.062	26.988	-7.875	6.809
124	182	306	315.805	4.835	-2.756	27.216	-9.045	5.189
124	183	307	320.845	3.031	-2.940	27.397	-7.413	6.447
124	184	308	324.313	4.603	-2.626	27.489	-8.671	
125	158	283	291.183	10.128	-7.518	22.301	-15.585	15.310
125	159	284	290.659	8.595	-7.497	22.537	-14.041	16.109
125	160	285	289.100	9.631	-7.261	22.765	-14.841	14.562
125	161	286	289.055	8.117	-7.228	22.980	-13.311	15.392

Z	N	A	ΔM	S_n	S_p	Q_α	Q_{β^-}	Q_{β^+}
125	162	287	287.967	9.160	-7.015	23.194	-14.141	13.838
125	163	288	288.381	7.657	-6.963	23.402	-12.610	14.688
125	164	289	287.762	8.691	-6.779	23.625	-13.460	13.107
125	165	290	288.649	7.185	-6.705	23.856	-11.909	13.967
125	166	291	288.526	8.194	-6.555	24.117	-12.769	12.348
125	167	292	289.920	6.678	-6.453	24.395	-11.183	13.221
125	168	293	290.330	7.661	-6.342	24.704	-12.056	11.570
125	169	294	292.257	6.144	-6.208	25.019	-10.442	12.477
125	170	295	293.210	7.119	-6.141	25.348	-11.349	10.818
125	171	296	295.654	5.627	-5.973	25.658	-9.730	11.788
125	172	297	297.105	6.621	-5.950	25.954	-10.700	10.147
125	173	298	299.995	5.181	-5.748	26.204	-9.098	11.196
125	174	299	301.858	6.208	-5.771	26.426	-10.148	9.572
125	175	300	305.111	4.819	-5.536	26.603	-8.562	10.682
125	176	301	307.320	5.862	-5.602	26.770	-9.672	9.043
125	177	302	310.904	4.488	-5.338	26.927	-8.068	10.165
125	178	303	313.473	5.502	-5.445	27.119	-9.191	8.474
125	179	304	317.443	4.101	-5.156	27.342	-7.530	9.588
125	180	305	320.443	5.071	-5.299	27.617	-8.644	7.875
125	181	306	324.850	3.665	-4.992	27.901	-6.953	9.045
125	182	307	328.258	4.663	-5.164	28.163	-8.124	7.413
125	183	308	332.985	3.345	-4.850	28.343	-6.504	8.671
125	184	309	336.643	4.413	-5.041	28.458	-7.763	
126	160	286	302.366	9.647	-5.977	23.566		13.311
126	161	287	302.107	8.330	-5.764	23.809		14.141
126	162	288	300.992	9.187	-5.736	24.017		12.610
126	163	289	301.222	7.841	-5.552	24.260		13.460
126	164	290	300.558	8.736	-5.506	24.470		11.909
126	165	291	301.295	7.334	-5.357	24.741		12.769
126	166	292	301.103	8.263	-5.288	24.985		11.183
126	167	293	302.386	6.788	-5.178	25.306		12.056
126	168	294	302.700	7.758	-5.081	25.593		10.442
126	169	295	304.559	6.212	-5.013	25.956		11.349
126	170	296	305.384	7.247	-4.885	26.260		9.730
126	171	297	307.804	5.650	-4.862	26.620		10.700
126	172	298	309.093	6.783	-4.700	26.888		9.098
126	173	299	312.006	5.158	-4.722	27.189		10.148
126	174	300	313.673	6.404	-4.526	27.383		8.562
126	175	301	316.992	4.753	-4.592	27.609		9.672
126	176	302	318.972	6.091	-4.363	27.748		8.068
126	177	303	322.663	4.380	-4.471	27.953		9.191
126	178	304	324.973	5.762	-4.211	28.120		7.530
126	179	305	329.087	3.958	-4.355	28.385		8.644
126	180	306	331.803	5.355	-4.071	28.640		6.953
126	181	307	336.382	3.493	-4.243	28.959		8.124
126	182	308	339.489	4.965	-3.942	29.209		6.504
126	183	309	344.406	3.155	-4.132	29.412		7.763
126	184	310	347.756	4.721	-3.824	29.526		

TABLE A (continued): Masses and separation energies calculated from the coefficients of the heavier regions.

Z	N	A	$\Delta M(8)$	$S_p(8)$
20	28	CA 48	−44.274	
21	28	SC 49	−46.559	9.574
22	28	TI 50	−51.302	12.032
23	28	V 51	−52.162	8.149
24	28	CR 52	−55.417	10.544
25	28	MN 53	−54.727	6.599
26	28	FE 54	−56.369	8.931
27	28	CO 55	−54.004	4.924
28	28	NI 56	−53.904	7.189

Z	N	A	$\Delta M(9)$	$S_n(9)$
28	28	NI 56	−53.892	
28	29	NI 57	−55.898	10.077
28	30	NI 58	−60.235	12.408
28	31	NI 59	−61.080	8.916
28	32	NI 60	−64.463	11.454
28	33	NI 61	−64.249	7.857
28	34	NI 62	−66.741	10.563
28	35	NI 63	−65.566	6.896
28	36	NI 64	−67.231	9.736
28	37	NI 65	−65.196	6.036
28	38	NI 66	−66.097	8.972
28	39	NI 67	−63.302	5.276
28	40	NI 68	−63.503	8.272
28	41	NI 69	−60.049	4.617
28	42	NI 70	−59.612	7.634
28	43	NI 71	−55.598	4.057
28	44	NI 72	−54.587	7.060

Z	N	A	$\Delta M(12)$	$S_n(12)$
50	50	SN 100	−55.870	
50	51	SN 101	−59.138	11.339
50	52	SN 102	−64.131	13.064
50	53	SN 103	−66.700	10.640
50	54	SN 104	−71.184	12.555
50	55	SN 105	−73.097	9.984
50	56	SN 106	−77.090	12.064
50	57	SN 107	−78.388	9.369
50	58	SN 108	−81.906	11.589
50	59	SN 109	−82.631	8.796
50	60	SN 110	−85.692	11.132
50	61	SN 111	−85.885	8.264
50	62	SN 112	−88.504	10.690
50	63	SN 113	−88.208	7.775
50	64	SN 114	−90.403	10.266
50	65	SN 115	−89.660	7.328
50	66	SN 116	−91.447	9.858
50	67	SN 117	−90.297	6.921
50	68	SN 118	−91.693	9.467
50	69	SN 119	−90.180	6.558
50	70	SN 120	−91.201	9.092
50	71	SN 121	−89.365	6.235
50	72	SN 122	−90.029	8.735
50	73	SN 123	−87.913	5.955
50	74	SN 124	−88.236	8.394
50	75	SN 125	−85.882	5.717
50	76	SN 126	−85.880	8.069
50	77	SN 127	−83.329	5.520
50	78	SN 128	−83.020	7.762
50	79	SN 129	−80.314	5.365
50	80	SN 130	−79.714	7.471
50	81	SN 131	−76.895	5.252
50	82	SN 132	−76.020	7.196

Z	N	A	$\Delta M(13)$	$S_p(13)$
50	82	SN 132	−77.209	
51	82	SB 133	−78.984	9.064
52	82	TE 134	−82.916	11.221
53	82	I 135	−83.720	8.093
54	82	XE 136	−86.655	10.224
55	82	CS 137	−86.500	7.134
56	82	BA 138	−88.425	9.214
57	82	LA 139	−87.320	6.184
58	82	CE 140	−88.228	8.197
59	82	PR 141	−86.177	5.238
60	82	ND 142	−86.062	7.174
61	82	PM 143	−83.068	4.295
62	82	SM 144	−81.928	6.149
63	82	EU 145	−77.991	3.352
64	82	GD 146	−75.825	5.123
65	82	TB 147	−70.942	2.406
66	82	DY 148	−67.755	4.102

Z	N	A	$\Delta M(14)$	$S_n(14)$
66	82	DY 148	−65.876	
66	83	DY 149	−66.166	8.361
66	84	DY 150	−68.229	10.134
66	85	DY 151	−67.958	7.800
66	86	DY 152	−69.825	9.938
66	87	DY 153	−69.102	7.348

TABLE A (continued).

Z	N	A	$\Delta M(14)$	$S_n(14)$
66	88	DY 154	– 70.692	9.661
66	89	DY 155	– 69.640	7.019
66	90	DY 156	– 70.924	9.355
66	91	DY 157	– 69.644	6.791
66	92	DY 158	– 70.596	9.023
66	93	DY 159	– 69.131	6.606
66	94	DY 160	– 69.707	8.647
66	95	DY 161	– 68.042	6.406
66	96	DY 162	– 68.181	8.210
66	97	DY 163	– 66.266	6.156
66	98	DY 164	– 65.913	7.718
66	99	DY 165	– 63.683	5.841
66	100	DY 166	– 62.805	7.193
66	101	DY 167	– 60.204	5.470
66	102	DY 168	– 58.799	6.666
66	103	DY 169	– 55.788	5.060
66	104	DY 170	– 53.879	6.162
66	105	DY 171	– 50.435	4.627
66	106	DY 172	– 48.069	5.705
66	107	DY 173	– 44.186	4.188
66	108	DY 174	– 41.423	5.308
66	109	DY 175	– 37.107	3.755
66	110	DY 176	– 34.014	4.978
66	111	DY 177	– 29.286	3.343
66	112	DY 178	– 25.925	4.710

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