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# Nuclear States from Charged Particle Reactions

Subvolume B

Tables of Excitations from Reactions  
with Charged Particles

Part 3

$Z = 63 - 99$

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## Preface

Nuclear level schemes and resonance parameters are of great interest for nuclear spectroscopy, for astrophysical models, thermonuclear calculations and for other applications. Parameters for nuclear levels of stable nuclei have been published in the Volumes I/16B, I/18A, B, C, and in I/19A1, A2. In the Volumes I/19A, B further data obtained from transfer reactions are presented. Volume I/19C contains the data of unstable nuclei far from the stability region which have been deduced from reactions other than transfer reactions (e.g. beta decay, spallation reactions, or inverse reactions). The data in these volumes should be considered as the most complete data collection for nuclear levels.

The contents of the various volumes can be characterized in the following way:

### Data for unbound states (resonances)

- |          |   |
|----------|---|
| I/16B, C | Low lying levels, neutron-induced resonances<br>(I/16A contains general information on neutron physics)   |
| I/19A    | Highly excited levels above the low lying states, unbound states from charged-particle reactions ( $Z = 2$ to 18 in I/19A1, $Z = 19$ to 83 in I/19A2) |

### Data for bound states (stable nuclei)

- |             |   |
|-------------|---|
| I/18A, B, C | Low lying levels ( $Z = 2$ to 36 in I/18A, $Z = 37$ to 62 in I/18B, $Z = 63$ to 100 in I/18C)<br>In I/18A the theoretical methods of treating nuclei are summarized, in particular those for deformed nuclei. |
| I/19B       | Excited levels from charged-particle reactions ( $Z = 3$ to 36 in I/19B1, $Z = 37$ to 62 in I/19B2, $Z = 63$ to 99 in I/19B3)   |

For the two Volumes I/18 and I/19B the distributions of the  $Z$  values to the respective subvolumes are the same. However, Volume I/19B contains data for many more isotopes than Volume I/18. In addition for some of the isotopes listed in Volume I/18 new data became available since its publishing and these have also been included in Volume I/19B, however, duplication of data was avoided.

Table 1 in Volume I/19B provides the number of levels registered for each isotope of the various volumes. This should make it easy for the user to find the data of the isotope he or she is looking for.

### Data for unstable nuclei far from the stability line

- |       |  |
|-------|--|
| I/19C | Excited levels for proton-rich and neutron-rich nuclei derived from reactions other than transfer reactions, e.g. beta-decay, spallation reactions or inverse reactions. |
|-------|--|

In agreement with the Publisher's general effort to make the data available to users by modern methods each subvolume is delivered with a CD ROM which contains all the data of the printed volume but in view of the large amount of data some of the information is given on the CD ROM only.

The compilation was as usual prepared by eminent experts in the fields. One of the characteristics of Landolt-Börnstein is that data are evaluated before they are accepted for the compilation. The idea is to present 'best values' which can be used with confidence by non-experts. Preparing such best values also implied making corrections necessary because of different energy calibrations in various publications.

I would like to thank the authors for their careful work and their flexibility to comply with the wishes of the editor and publisher. Thanks are also due to the members of the Landolt-Börnstein editorial staff who have made major contributions to the successful production of this volume.

Geneva, November 2006

**The Editor**

# Contents

1	Introduction . . . . .	1
1.1	General remarks . . . . .	1
1.2	List of notations . . . . .	19
1.3	Data presentation . . . . .	22
1.4	Interpretation of data of nuclear excitations . . . . .	23
1.5	Conclusions . . . . .	25
1.6	Acknowledgments . . . . .	25
2	Tables . . . . .	26

## 63-Europium

Eu-145 . . . . .	26
Eu-146 . . . . .	26
Eu-147 . . . . .	27
Eu-148 . . . . .	27
Eu-149 . . . . .	28
Eu-150 . . . . .	29
Eu-151 . . . . .	29
Eu-152 . . . . .	31
Eu-153 . . . . .	34
Eu-154 . . . . .	36
Eu-155 . . . . .	38
Eu-156 . . . . .	39
Eu-157 . . . . .	40
Eu-159 . . . . .	40
Eu-160 . . . . .	40

## 64-Gadolinium

Gd-146 . . . . .	41
Gd-147 . . . . .	42
Gd-148 . . . . .	42
Gd-149 . . . . .	42
Gd-150 . . . . .	43
Gd-151 . . . . .	43
Gd-152 . . . . .	44
Gd-153 . . . . .	45
Gd-154 . . . . .	47
Gd-155 . . . . .	48
Gd-156 . . . . .	52
Gd-157 . . . . .	55
Gd-158 . . . . .	59
Gd-159 . . . . .	60
Gd-160 . . . . .	65
Gd-161 . . . . .	66
Gd-162 . . . . .	66

## 65-Terbium

Tb-149 . . . . .	67
Tb-150 . . . . .	67
Tb-151 . . . . .	67
Tb-152 . . . . .	68
Tb-153 . . . . .	68
Tb-154 . . . . .	69
Tb-155 . . . . .	69
Tb-156 . . . . .	71
Tb-157 . . . . .	71
Tb-158 . . . . .	72
Tb-159 . . . . .	74
Tb-160 . . . . .	76
Tb-161 . . . . .	78
Tb-162 . . . . .	80
Tb-163 . . . . .	80

## 66-Dysprosium

Dy-154 . . . . .	81
Dy-155 . . . . .	81
Dy-156 . . . . .	82
Dy-157 . . . . .	84
Dy-158 . . . . .	85
Dy-159 . . . . .	86
Dy-160 . . . . .	87
Dy-161 . . . . .	88
Dy-162 . . . . .	91
Dy-163 . . . . .	96
Dy-164 . . . . .	101
Dy-165 . . . . .	104
Dy-166 . . . . .	106

## 67-Holmium

Ho-157 . . . . .	107
Ho-158 . . . . .	108
Ho-159 . . . . .	108
Ho-160 . . . . .	110
Ho-161 . . . . .	110
Ho-162 . . . . .	111
Ho-163 . . . . .	112
Ho-164 . . . . .	114
Ho-165 . . . . .	115
Ho-166 . . . . .	117
Ho-167 . . . . .	120
Ho-168 . . . . .	121
Ho-169 . . . . .	122
Ho-170 . . . . .	122

## 68-Erbium

Er-161 . . . . .	123
Er-162 . . . . .	123
Er-163 . . . . .	124
Er-164 . . . . .	125
Er-165 . . . . .	128
Er-166 . . . . .	130
Er-167 . . . . .	134
Er-168 . . . . .	136
Er-169 . . . . .	146
Er-170 . . . . .	149
Er-171 . . . . .	151
Er-172 . . . . .	152

## 69-Thulium

Tm-165 . . . . .	153
Tm-166 . . . . .	153
Tm-167 . . . . .	154
Tm-168 . . . . .	154
Tm-169 . . . . .	156
Tm-170 . . . . .	157
Tm-171 . . . . .	160
Tm-172 . . . . .	161
Tm-173 . . . . .	161
Tm-174 . . . . .	162
Tm-175 . . . . .	162

## 70-Ytterbium

Yb-166 . . . . .	163
Yb-167 . . . . .	163
Yb-168 . . . . .	164
Yb-169 . . . . .	166
Yb-170 . . . . .	168
Yb-171 . . . . .	170
Yb-172 . . . . .	173
Yb-173 . . . . .	178
Yb-174 . . . . .	180
Yb-175 . . . . .	184
Yb-176 . . . . .	185
Yb-177 . . . . .	187
Yb-178 . . . . .	188

## 71-Lutetium

Lu-171 . . . . .	189
Lu-172 . . . . .	189
Lu-173 . . . . .	190
Lu-174 . . . . .	191
Lu-175 . . . . .	194
Lu-176 . . . . .	196
Lu-177 . . . . .	197
Lu-178 . . . . .	199
Lu-179 . . . . .	200
Lu-180 . . . . .	200

## 72-Hafnium

Hf-173 . . . . .	201
Hf-174 . . . . .	201
Hf-175 . . . . .	201
Hf-176 . . . . .	202
Hf-177 . . . . .	203
Hf-178 . . . . .	204
Hf-179 . . . . .	207
Hf-180 . . . . .	210
Hf-181 . . . . .	214
Hf-182 . . . . .	217
Hf-183 . . . . .	217

## 73-Tantalum

Ta-179 . . . . .	218
Ta-180 . . . . .	219
Ta-181 . . . . .	220
Ta-182 . . . . .	221
Ta-183 . . . . .	221
Ta-184 . . . . .	222
Ta-185 . . . . .	222

## 74-Tungsten

W-178 . . . . .	223
W-179 . . . . .	223
W-180 . . . . .	224
W-181 . . . . .	224
W-182 . . . . .	225
W-183 . . . . .	228
W-184 . . . . .	231
W-185 . . . . .	233
W-186 . . . . .	238
W-187 . . . . .	240
W-188 . . . . .	242

## 75-Rhenium

Re-181 . . . . .	243
Re-182 . . . . .	244
Re-183 . . . . .	244
Re-184 . . . . .	246
Re-185 . . . . .	246
Re-186 . . . . .	248
Re-187 . . . . .	248
Re-188 . . . . .	250
Re-189 . . . . .	251
Re-190 . . . . .	251
Re-191 . . . . .	251

## 76-Osmium

Os-184 . . . . .	252
Os-185 . . . . .	252
Os-186 . . . . .	255
Os-187 . . . . .	255
Os-188 . . . . .	257
Os-189 . . . . .	258
Os-190 . . . . .	260
Os-191 . . . . .	262
Os-192 . . . . .	264
Os-193 . . . . .	266
Os-194 . . . . .	266

## 77-Iridium

Ir-183 . . . . .	267
Ir-184 . . . . .	267
Ir-185 . . . . .	267
Ir-186 . . . . .	268
Ir-187 . . . . .	268
Ir-188 . . . . .	268
Ir-189 . . . . .	269
Ir-190 . . . . .	269
Ir-191 . . . . .	272
Ir-192 . . . . .	273
Ir-193 . . . . .	275
Ir-194 . . . . .	276
Ir-195 . . . . .	278

## 78-Platinum

Pt-180 . . . . .	279
Pt-181 . . . . .	279
Pt-182 . . . . .	280
Pt-183 . . . . .	281
Pt-184 . . . . .	281
Pt-185 . . . . .	282
Pt-186 . . . . .	284
Pt-187 . . . . .	284
Pt-188 . . . . .	284
Pt-189 . . . . .	285
Pt-190 . . . . .	285
Pt-191 . . . . .	286
Pt-192 . . . . .	288
Pt-193 . . . . .	290
Pt-194 . . . . .	292
Pt-195 . . . . .	294
Pt-196 . . . . .	296
Pt-197 . . . . .	299
Pt-198 . . . . .	301
Pt-199 . . . . .	302
Pt-200 . . . . .	303

## 79-Gold

Au-186 . . . . .	304
Au-187 . . . . .	304
Au-188 . . . . .	304
Au-189 . . . . .	305
Au-190 . . . . .	305
Au-191 . . . . .	306
Au-192 . . . . .	306
Au-193 . . . . .	306
Au-194 . . . . .	307
Au-195 . . . . .	307
Au-196 . . . . .	308
Au-197 . . . . .	310
Au-198 . . . . .	312
Au-199 . . . . .	315

## 80-Mercury

Hg-184 . . . . .	317
Hg-185 . . . . .	317
Hg-186 . . . . .	318
Hg-187 . . . . .	318
Hg-188 . . . . .	318
Hg-189 . . . . .	319
Hg-190 . . . . .	319
Hg-191 . . . . .	319
Hg-192 . . . . .	320
Hg-193 . . . . .	320
Hg-194 . . . . .	320
Hg-195 . . . . .	321
Hg-196 . . . . .	321
Hg-197 . . . . .	322
Hg-198 . . . . .	323
Hg-199 . . . . .	324
Hg-200 . . . . .	325
Hg-201 . . . . .	326
Hg-202 . . . . .	328
Hg-203 . . . . .	329
Hg-204 . . . . .	330
Hg-205 . . . . .	330
Hg-206 . . . . .	331

## 81-Thallium

Tl-195 . . . . .	332
Tl-196 . . . . .	332
Tl-197 . . . . .	332
Tl-198 . . . . .	333
Tl-199 . . . . .	333
Tl-200 . . . . .	333
Tl-201 . . . . .	333
Tl-202 . . . . .	334
Tl-203 . . . . .	334
Tl-204 . . . . .	336
Tl-205 . . . . .	338
Tl-206 . . . . .	341
Tl-207 . . . . .	342
Tl-208 . . . . .	343
Tl-209 . . . . .	343

## 82-Lead

Pb-196 . . . . .	344
Pb-197 . . . . .	344
Pb-198 . . . . .	344
Pb-199 . . . . .	345
Pb-200 . . . . .	345
Pb-201 . . . . .	345
Pb-202 . . . . .	346
Pb-203 . . . . .	347
Pb-204 . . . . .	347
Pb-205 . . . . .	350
Pb-206 . . . . .	352
Pb-207 . . . . .	355
Pb-208 . . . . .	359
Pb-209 . . . . .	365
Pb-210 . . . . .	368
Pb-211 . . . . .	369
Pb-212 . . . . .	370
Pb-214 . . . . .	370

## 83-Bismuth

Bi-201 . . . . .	371
Bi-202 . . . . .	371
Bi-203 . . . . .	371
Bi-204 . . . . .	372
Bi-205 . . . . .	372
Bi-206 . . . . .	373
Bi-207 . . . . .	375
Bi-208 . . . . .	376
Bi-209 . . . . .	379
Bi-210 . . . . .	382
Bi-211 . . . . .	384
Bi-212 . . . . .	385
Bi-213 . . . . .	386
Bi-214 . . . . .	386
Bi-215 . . . . .	386

## 84-Polonium

Po-196 . . . . .	387
Po-197 . . . . .	387
Po-198 . . . . .	387
Po-199 . . . . .	387
Po-200 . . . . .	388
Po-201 . . . . .	388
Po-202 . . . . .	388
Po-203 . . . . .	388
Po-204 . . . . .	389
Po-205 . . . . .	389
Po-206 . . . . .	389
Po-207 . . . . .	389
Po-208 . . . . .	390
Po-209 . . . . .	390
Po-210 . . . . .	391
Po-211 . . . . .	392
Po-212 . . . . .	393
Po-213 . . . . .	394
Po-214 . . . . .	394
Po-215 . . . . .	394
Po-216 . . . . .	394

## 85-Astatine

At-203 . . . . .	395
At-204 . . . . .	395
At-205 . . . . .	395
At-206 . . . . .	395
At-207 . . . . .	396
At-208 . . . . .	396
At-209 . . . . .	396

## 86-Radon

Rn-208 . . . . .	397
Rn-209 . . . . .	397
Rn-210 . . . . .	397
Rn-211 . . . . .	398
Rn-212 . . . . .	398
Rn-213 . . . . .	398
Rn-214 . . . . .	398
Rn-215 . . . . .	399
Rn-216 . . . . .	399
Rn-217 . . . . .	399
Rn-218 . . . . .	399
Rn-219 . . . . .	400
Rn-220 . . . . .	400
Rn-222 . . . . .	400



87-Francium		90-Thorium		94-Plutonium	
Fr-213 . . . . .	401	Th-217 . . . . .	421	Pu-235 . . . . .	459
Fr-214 . . . . .	401	Th-218 . . . . .	421	Pu-236 . . . . .	459
Fr-215 . . . . .	401	Th-220 . . . . .	421	Pu-237 . . . . .	459
Fr-216 . . . . .	401	Th-221 . . . . .	421	Pu-238 . . . . .	460
Fr-217 . . . . .	402	Th-222 . . . . .	422	Pu-239 . . . . .	461
Fr-218 . . . . .	402	Th-223 . . . . .	422	Pu-240 . . . . .	463
Fr-219 . . . . .	402	Th-224 . . . . .	422	Pu-241 . . . . .	464
Fr-220 . . . . .	403	Th-225 . . . . .	422	Pu-242 . . . . .	466
Fr-221 . . . . .	403	Th-226 . . . . .	423	Pu-243 . . . . .	467
Fr-222 . . . . .	404	Th-227 . . . . .	423	Pu-244 . . . . .	469
Fr-223 . . . . .	404	Th-228 . . . . .	423	Pu-245 . . . . .	469
Fr-225 . . . . .	405	Th-229 . . . . .	424	Pu-246 . . . . .	469
		Th-230 . . . . .	425		
88-Radium		Th-231 . . . . .	427	95-Americium	
Ra-212 . . . . .	406	Th-232 . . . . .	429	Am-239 . . . . .	470
Ra-213 . . . . .	406	Th-233 . . . . .	430	Am-240 . . . . .	470
Ra-214 . . . . .	406	Th-234 . . . . .	431	Am-241 . . . . .	471
Ra-215 . . . . .	406			Am-242 . . . . .	471
Ra-216 . . . . .	407	91-Protactinium		Am-243 . . . . .	472
Ra-217 . . . . .	407	Pa-229 . . . . .	432	Am-244 . . . . .	473
Ra-218 . . . . .	407	Pa-230 . . . . .	434	Am-245 . . . . .	473
Ra-219 . . . . .	408	Pa-231 . . . . .	434		
Ra-220 . . . . .	409	Pa-232 . . . . .	435	96-Curium	
Ra-221 . . . . .	409	Pa-233 . . . . .	435	Cm-242 . . . . .	474
Ra-222 . . . . .	409	Pa-234 . . . . .	436	Cm-243 . . . . .	474
Ra-223 . . . . .	410	Pa-235 . . . . .	437	Cm-244 . . . . .	474
Ra-224 . . . . .	410	Pa-236 . . . . .	437	Cm-245 . . . . .	475
Ra-225 . . . . .	411	Pa-237 . . . . .	437	Cm-246 . . . . .	475
Ra-226 . . . . .	412			Cm-247 . . . . .	476
Ra-227 . . . . .	413	92-Uranium		Cm-248 . . . . .	477
Ra-228 . . . . .	415	U-230 . . . . .	438	Cm-249 . . . . .	478
		U-231 . . . . .	438	Cm-250 . . . . .	478
89-Actinium		U-232 . . . . .	438		
Ac-219 . . . . .	416	U-233 . . . . .	439	97-Berkelium	
Ac-220 . . . . .	416	U-234 . . . . .	440	Bk-247 . . . . .	479
Ac-221 . . . . .	416	U-235 . . . . .	443	Bk-248 . . . . .	479
Ac-222 . . . . .	416	U-236 . . . . .	447	Bk-249 . . . . .	479
Ac-223 . . . . .	417	U-237 . . . . .	449	Bk-250 . . . . .	480
Ac-224 . . . . .	417	U-238 . . . . .	451	Bk-251 . . . . .	480
Ac-225 . . . . .	417	U-239 . . . . .	452		
Ac-226 . . . . .	417	U-240 . . . . .	453	98-Californium	
Ac-227 . . . . .	418			Cf-246 . . . . .	481
Ac-228 . . . . .	419	93-Neptunium		Cf-247 . . . . .	481
Ac-229 . . . . .	419	Np-233 . . . . .	454	Cf-248 . . . . .	481
Ac-230 . . . . .	420	Np-234 . . . . .	454	Cf-249 . . . . .	481
Ac-231 . . . . .	420	Np-235 . . . . .	454	Cf-250 . . . . .	482
Ac-232 . . . . .	420	Np-236 . . . . .	455	Cf-251 . . . . .	482
		Np-237 . . . . .	455	Cf-252 . . . . .	482
		Np-238 . . . . .	456	Cf-253 . . . . .	482
		Np-239 . . . . .	457		
		Np-240 . . . . .	458	99-Einsteinium	
		Np-242 . . . . .	458	Es-251 . . . . .	483
				Es-252 . . . . .	483
				Es-253 . . . . .	483
				Es-254 . . . . .	483
3 References . . . . .	484				
Supplement (complete sets of data) . . . . .	CD-ROM				