^{158}Gd(^{40}Ar,4nγ) 1993Me12

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Jun Chen and Balraj Singh	NDS 177, 1 (2021)	3-Sep-2021

1993Me12: E=178 MeV ^{40}Ar beam was produced from the VICKSI accelerator of the HMI Berlin. Target was 400 μg/cm^2 self-supporting foil of 98% enriched ^{158}Gd. γ rays were detected with the OSIRIS array consisting of 12 Compton-suppressed Ge detectors and an inner-ball of 48 BGO scintillators. Measured Eγ, $\gamma\gamma$-coin. Deduced levels, band structures.

Others: SD band: 1990Hu10, 1990Th01. See data in (HI,xnγ):SD dataset.

Level scheme proposed by 1993Me12 is partly different from that in Adopted dataset, which is adopted by evaluators from that of 2009Ku03 in (^{30}Si,4nγ) because of higher statistics and completeness.

^{194}Pb Levels

E(level)†	Jπ‡	E(level)†	Jπ‡	E(level)†	Jπ‡	E(level)†	Jπ‡
0.0@	0^+	3838.9 *7*	13^-	4819.5[b] *10*	19^+	5928.5? *10*	20
965.1@ *3*	2^+	3848.9# *7*	13^-	4963.2& *8*	16^-	5936.4[a] *9*	(17,18)
1540.1@ *5*	4^+	4002.7[c] *8*	15^-	5053.5# *9*	17^-	5938.6[b] *11*	(22)
1820.2@ *5*	5^-	4135.8[b] *8*	16^+	5082.8& *9*	17^-	5982.3 *9*	
2135.2 *5*	6^+	4235.3 *7*	(12^+)	5090.3[c] *9*	17^-	6021.9& *11*	21^-
2241.2@ *6*	7^-	4264.8# *7*	14^-	5108.7 *8*	(17^-)	6136.9? *10*	21
2407.4 *6*	9^-	4298.4?[b] *9*	17^+	5167.3[b] *10*	20^+	6197.3?[a] *9*	(18,19)
2419.6# *6*	8^-	4332.9[a] *7*	(12,13)	5196.3[a] *9*	(15,16)	6204.1[c] *10*	(21^-)
2437.8 *6*	8^+	4365.2 *8*	14^-	5228.0?& *9*	18^-	6327.7?[a] *10*	(19,20)
2581.0 *7*	10^+	4375.3[c] *9*	16^-	5256.0 *9*	20^+	6330.6 *10*	
2628.4 *7*	12^+	4408.4# *8*	15^-	5327.3[c] *9*	19^-	6398.0& *11*	22^-
2644.8 *7*		4448.2 *8*	15^-	5425.1& *10*	19^-	6464.7[a] *10*	(20,21)
2931.0 *7*		4477.3 *8*	(15^-)	5462.3? *9*	17	6677.3[a] *11*	(21,22)
2933.0 *7*	11^-	4531.5[b] *9*	18^+	5541.6[b] *11*	21^+	6814.6& *12*	(23)
3207.2# *7*	10^-	4599.7[c] *9*	17^-	5550.1[c] *9*	19^-	6905.0[a] *11*	(22,23)
3271.3# *7*	11^-	4635.9?[a] *8*	(13,14)	5550.4 *9*	20^+	7172.4[a] *12*	(23,24)
3282.3 *6*	(10^+)	4692.5# *8*	16^-	5572.7[a] *9*	(16,17)	7238.7& *12*	(24)
3474.5 *7*	12^-	4701.5[c] *9*	18^-	5685.5& *10*	20^-	7479.6[a] *12*	(24,25)
3561.2 *8*	14^+	4794.9 *9*	18^+	5730.5[c] *10*	(20^-)	7841.2[a] *12*	(25,26)
3726.7# *7*	12^-	4799.2[a] *8*	(14,15)	5732.5? *9*	18	8234.8[a] *13*	(26,27)

† From a least-squares fit to γ-ray energies, assuming $\Delta E\gamma$=0.3 keV for energies quoted to tenth keV and 1 keV for those quoted to keV.

‡ Proposed by 1993Me12 based on band assignments and γ-decay patterns.

Seq.(D): Sequence based on 8^- .

@ Seq.(E): Sequence based on g.s.

& Band(A): Band based on 16^-.

[a] Band(B): Band based on J=(12,13).

[b] Band(C): Band based on 16^+.

[c] Seq.(F): Sequence based on 15^-.

^{158}Gd(^{40}Ar,4nγ) 1993Me12 (continued)

$\gamma(^{194}Pb)$

Some transitions are placed differently from those in Adopted Level, Gammas, as noted.

E_γ [†]	E_i(level)	J_i^π	E_f	J_f^π	Comments
47	2628.4	12^+	2581.0	10^+	
64[‡]	2644.8		2581.0	10^+	
98[#]	4332.9	(12,13)	4235.3	(12^+)	E_γ: placement from 1993Me12 only; γ not reported in 2009Ku03.
119.6[‡]	5082.8	17^-	4963.2	16^-	E_γ: 5109 in Fig.1 of 1993Me12 is a typo.
130.4[‡#]	6327.7?	(19,20)	6197.3?	(18,19)	
137.0[‡]	6464.7	(20,21)	6327.7?	(19,20)	
143.6	4408.4	15^-	4264.8	14^-	
145.2[‡#]	5228.0?	18^-	5082.8	17^-	E_γ: 5306 in Fig.1 of 1993Me12 is a typo.
162.6[‡#]	4298.4?	17^+	4135.8	16^+	
163.3[‡#]	4799.2	(14,15)	4635.9?	(13,14)	
166.2	2407.4	9^-	2241.2	7^-	
173.7	2581.0	10^+	2407.4	9^-	
178.5	2419.6	8^-	2241.2	7^-	
196.0[‡#]	5928.5?	20	5732.5?	18	
197	2437.8	8^+	2241.2	7^-	
197.1[‡]	5425.1	19^-	5228.0?	18^-	
208.4[‡#]	6136.9?	21	5928.5?	20	
212.6[‡]	6677.3	(21,22)	6464.7	(20,21)	
227.7[‡]	6905.0	(22,23)	6677.3	(21,22)	
233.1[‡]	4531.5	18^+	4298.4?	17^+	
260.4[‡]	5685.5	20^-	5425.1	19^-	
260.9[‡#]	6197.3?	(18,19)	5936.4	(17,18)	
267.4[‡]	7172.4	(23,24)	6905.0	(22,23)	
270.2[‡#]	5732.5?	18	5462.3?	17	
280.2	1820.2	5^-	1540.1	4^+	
284.1	4692.5	16^-	4408.4	15^-	
288.0[‡]	4819.5	19^+	4531.5	18^+	
302.5	2437.8	8^+	2135.2	6^+	
303.0[‡#]	4635.9?	(13,14)	4332.9	(12,13)	
304.9	2933.0	11^-	2628.4	12^+	
307.2[‡]	7479.6	(24,25)	7172.4	(23,24)	
326.3	4701.5	18^-	4375.3	16^-	
336.4[‡]	6021.9	21^-	5685.5	20^-	
347.8[‡]	5167.3	20^+	4819.5	19^+	
348.3[‡#]	6330.6		5982.3		
351	3282.3	(10^+)	2931.0		
352.0	2933.0	11^-	2581.0	10^+	
361.0	5053.5	17^-	4692.5	16^-	
361.6[‡]	7841.2	(25,26)	7479.6	(24,25)	
363.8[‡]	5936.4	(17,18)	5572.7	(16,17)	
364.4	3838.9	13^-	3474.5	12^-	
372.6	4375.3	16^-	4002.7	15^-	
374.3[‡]	5541.6	21^+	5167.3	20^+	
376.1[‡]	6398.0	22^-	6021.9	21^-	
376.6[‡]	5572.7	(16,17)	5196.3	(15,16)	

Continued on next page (footnotes at end of table)

^{158}Gd(^{40}Ar,4nγ) 1993Me12 (continued)

$\gamma(^{194}Pb)$ (continued)

E_γ †	E_i(level)	J_i^π	E_f	J_f^π	E_γ †	E_i(level)	J_i^π	E_f	J_f^π
393.6‡	8234.8	(26,27)	7841.2	(25,26)	628.4	4477.3	(15^-)	3848.9	13^-
397.0‡	5938.6	(22)	5541.6	21^+	631.4	5108.7	(17^-)	4477.3	(15^-)
397.2‡	5196.3	(15,16)	4799.2	(14,15)	654.0	6204.1	(21^-)	5550.1	19^-
409.6‡	5982.3		5572.7	(16,17)	659.1	4794.9	18^+	4135.8	16^+
416.0	4264.8	14^-	3848.9	13^-	714.8	5090.3	17^-	4375.3	16^-
416.6‡	6814.6	(23)	6398.0	22^-	727.5	5327.3	19^-	4599.7	17^-
421.0	2241.2	7^-	1820.2	5^-	740.0‡	5936.4	(17,18)	5196.3	(15,16)
424.1‡	7238.7	(24)	6814.6	(23)	755.4	5550.4	20^+	4794.9	18^+
441.5	4002.7	15^-	3561.2	14^+	773.4‡	5572.7	(16,17)	4799.2	(14,15)
455.0	3726.7	12^-	3271.3	11^-	787.6	3207.2	10^-	2419.6	8^-
459.7	5550.1	19^-	5090.3	17^-	800.0	3207.2	10^-	2407.4	9^-
461.1	5256.0	20^+	4794.9	18^+	844.5	3282.3	(10^+)	2437.8	8^+
493.2	2931.0		2437.8	8^+	848.7	5550.1	19^-	4701.5	18^-
499.1‡#	5462.3?	17	4963.2	16^-	858.5	4332.9	(12,13)	3474.5	12^-
515.0	4963.2	16^-	4448.2	15^-	863.7	3271.3	11^-	2407.4	9^-
519.7	3726.7	12^-	3207.2	10^-	906.0	3838.9	13^-	2933.0	11^-
526.3	4365.2	14^-	3838.9	13^-	932.8	3561.2	14^+	2628.4	12^+
538.0	4264.8	14^-	3726.7	12^-	953.0	4235.3	(12^+)	3282.3	(10^+)
541.6	3474.5	12^-	2933.0	11^-	965.1	965.1	2^+	0.0	0^+
574.6	4135.8	16^+	3561.2	14^+	1029.0	5730.5	(20^-)	4701.5	18^-
575.0	1540.1	4^+	965.1	2^+	1302.4	4235.3	(12^+)	2933.0	11^-
577.8	3848.9	13^-	3271.3	11^-	1400.1	4332.9	(12,13)	2933.0	11^-
595.0	2135.2	6^+	1540.1	4^+	1688.1‡	4332.9	(12,13)	2644.8	
597.0	4599.7	17^-	4002.7	15^-	1704.0	4332.9	(12,13)	2628.4	12^+
609.3	4448.2	15^-	3838.9	13^-					

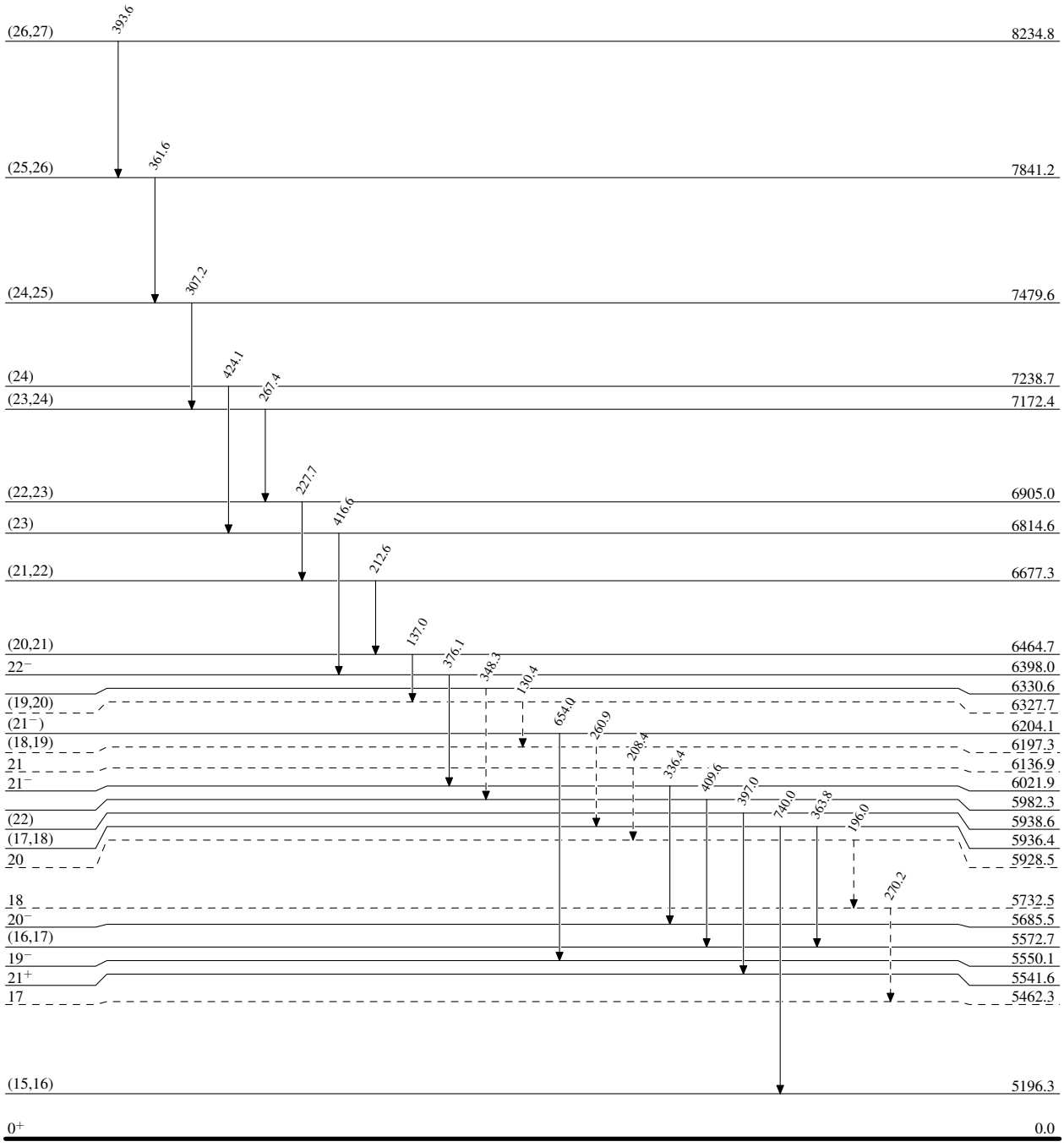
† From 1993Me12, unless otherwise noted.
‡ Placed from a different level in Adopted Levels, Gammas.
# Placement of transition in the level scheme is uncertain.

Legend

^{158}Gd(^{40}Ar,4nγ) 1993Me12

Level Scheme

γ Decay (Uncertain)



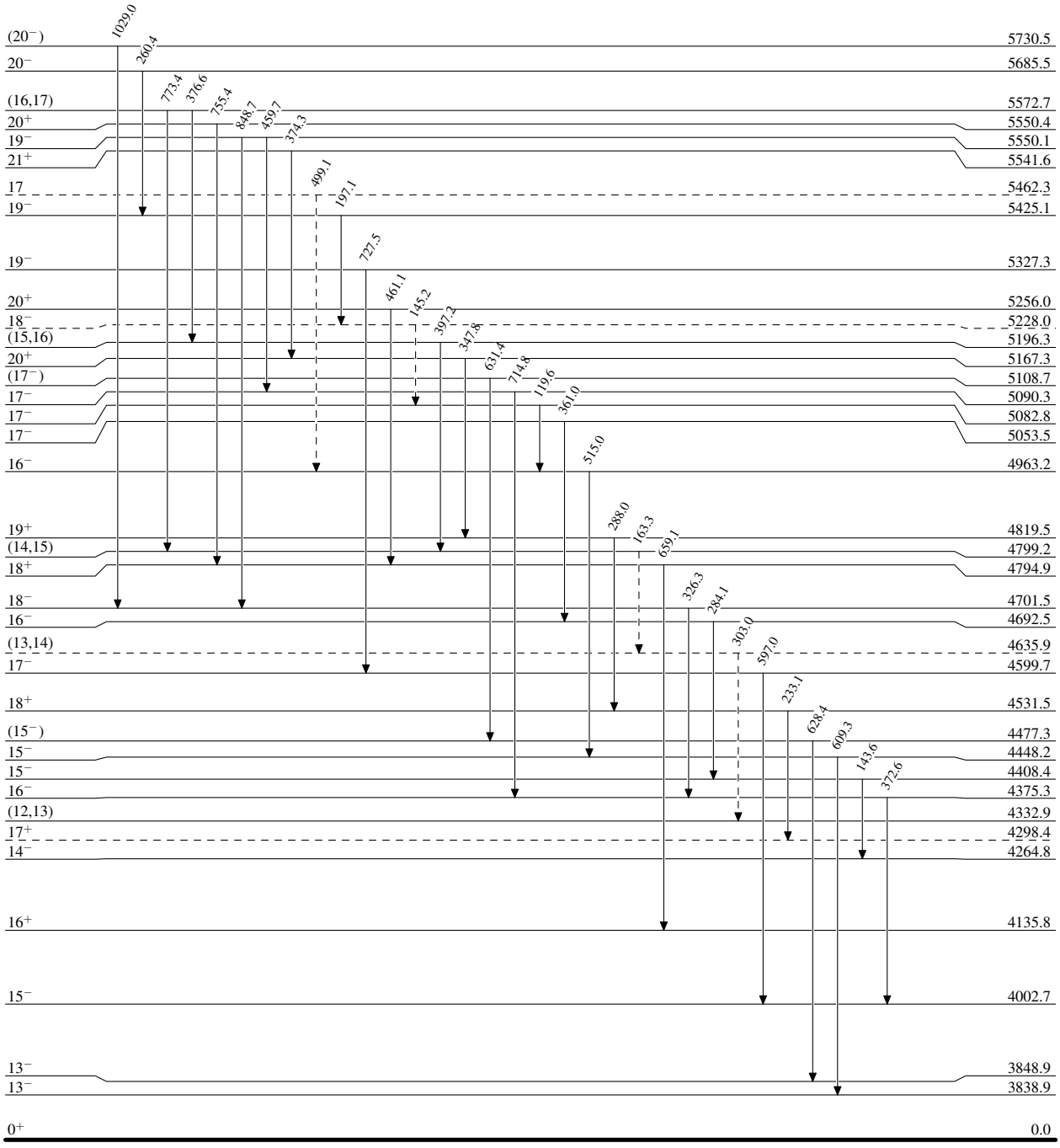
$^{194}_{82}Pb_{112}$

Legend

^{158}Gd(^{40}Ar,4nγ) **1993Me12**

Level Scheme (continued)

γ Decay (Uncertain)



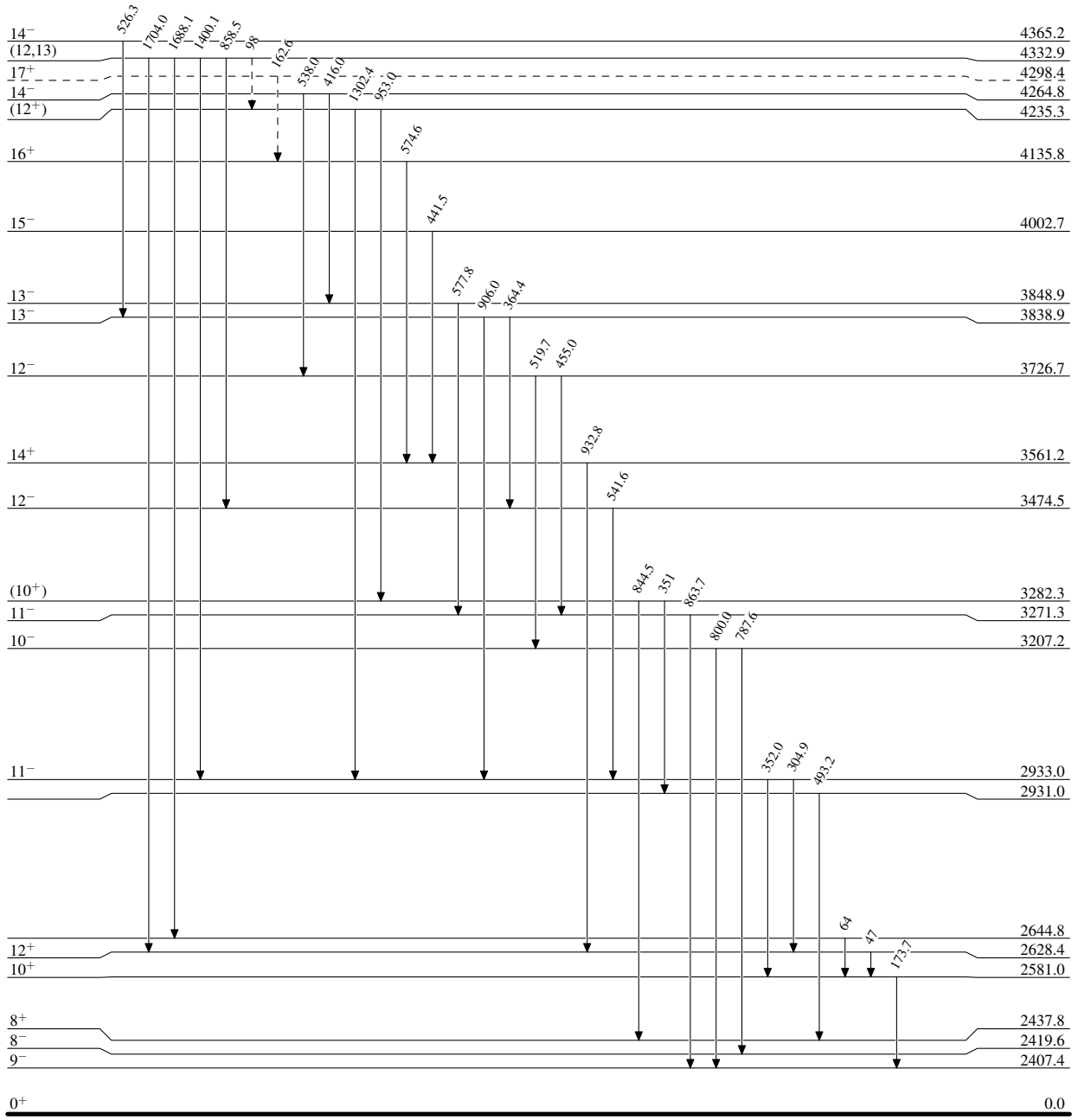
$^{194}_{82}Pb_{112}$

Legend

^{158}Gd(^{40}Ar,4nγ) 1993Me12

Level Scheme (continued)

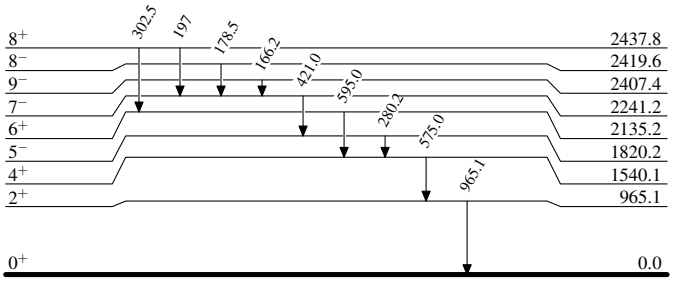
γ Decay (Uncertain)



$^{194}_{82}Pb_{112}$

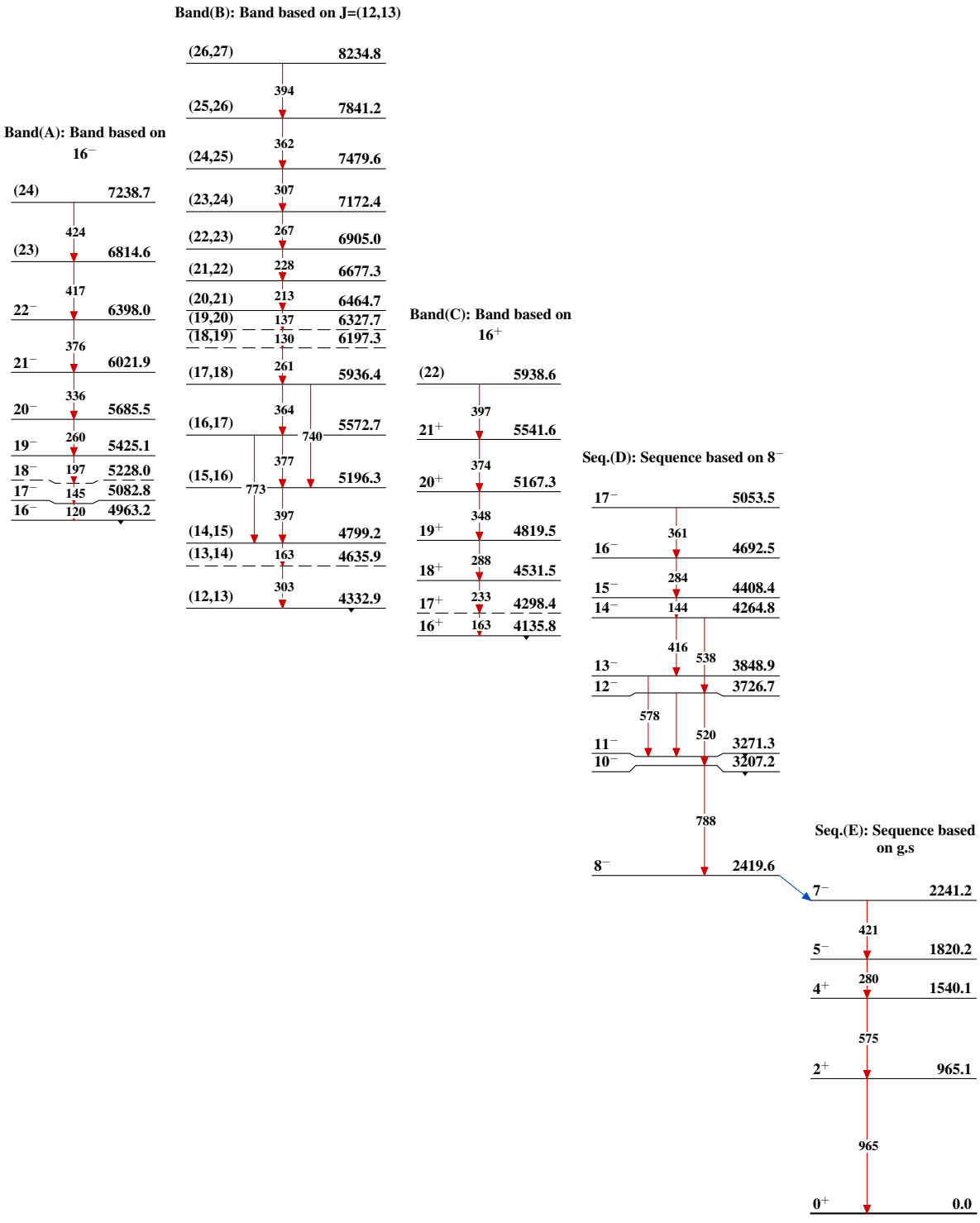
^{158}Gd(^{40}Ar,4nγ) 1993Me12

Level Scheme (continued)



$^{194}_{82}Pb_{112}$

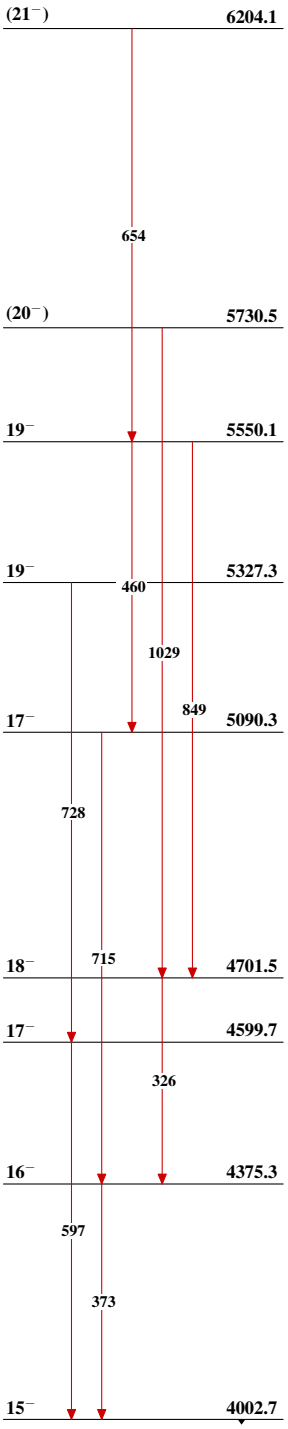
^{158}Gd(^{40}Ar,4nγ) 1993Me12



$^{194}_{82}Pb_{112}$

^{158}Gd(^{40}Ar,4nγ) 1993Me12 (continued)

Seq.(F): Sequence based on 15$^-$



$^{194}_{82}Pb_{112}$