^{137}Ba(n,γ) E=thermal 1995Bo05,1990Is07

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Jun Chen	NDS 146, 1 (2017)	30-Sep-2017

Neutron separation energy S(n)=8611.72 *4* (2017Wa10).

1995Bo05: Thermal neutrons were produced from the 5 MW light-water research reactor of the former Institute of Physics of the Latvian Academy of Sciences. Target was 2 g $BaCO_3$ with 82.2% in ^{137}Ba. γ rays were detected with HPGe and Ge(Li) detectors (FWHM=2 keV at 1332 and 5.9 keV at 5730, respectively). Measured Eγ, Iγ, $\gamma\gamma$-coin, Deduced levels, J, π, γ-ray branching ratios. Comparisons with available data and interacting boson-fermion-fermion model calculations.

1990Is07: Thermal neutrons were produced from the McMaster University 2 MW reactor. Target was 4.0 g sample 99.999% pure $BaCO_3$. γ rays were detected by a pair spectrometer consisting of a HPGe detector (FWHM=2.1-5.0 keV at 2500-8300 keV) surrounded by a quadrisected NaI(Tl) annulus. Measured Eγ, Iγ. Deduced levels, absolute γ intensities determined using value for ^{14}N cross section, transition strengths, neutron separation energy. Comparisons with available data.

1968Ma35: Measured Eγ, Iγ, $\gamma\gamma$-coin. Deduced levels.

1968Bu20: Measured Eγ, Iγ. Deduced levels. Values quoted here from 1968Bu20 are those listed in the compilation by 1968Gr32.

1978Bo41: Measured γ(circ pol) using enriched targets and NaI(Tl) detectors. Deduced levels, J, π, γ-ray multipolarities.

Others: 1952Po29, 1969Ra10, 1970Gr21, 1976BoYP, 2001Ac04.

Level scheme is as given by 1995Bo05 based upon earlier schemes by 1990Is07, 1968Ma35, 1968Bu20.

^{138}Ba Levels

E(level)[†]	J$^\pi$[‡]	E(level)[†]	J$^\pi$[‡]	E(level)[†]	J$^\pi$[‡]	E(level)[†]	J$^\pi$[‡]
0.0	0^+	2931.30 *8*	2^+	3693.62 *12*		4359.44 *10*	$(1^+,2,3)$
1435.78 *4*	2^+	2991.29 *10*	3^+	3837.87 *13*	(2^+)	4445.46 *5*	1^-
1898.58 *4*	4^+	3049.78 *6*	2^+	3922.07 *5*	$(3)^-$	4508.09 *12*	$(2^+,3)$
2090.36 *8*	6^+	3085?[@]		3934.16 *18*	2^+	4536.01 *6*	1^-
2190.01 *5*	$(1,2^+)$	3154.59 *13*	4^+	4002.15 *9*	$2^{(+)}$	4564.74 *10*	$(2,3)^-$
2203.21 *15*	6^+	3163.06 *10*	$(2)^+$	4012.93 *23*	$(1,2^+)$	4579.81 *11*	(1,2,3)
2217.83 *6*	2^+	3242.31 *7*	3	4025.99 *11*	1^-	4585.88 *12*	$(1)^-$
2307.58 *6*	4^+	3257.42 *12*	3	4079.93 *8*	$(1)^-$	4645.67 *10*	$(1,2,3)^-$
2415.41 *9*	5^+	3338.65 *4*	2^+	4083.4 *4*	$(1,2^+)$	4665.69 *11*	$(1^-,2^+)$
2445.55 *6*	3^+	3366.80 *7*	2^+	4115.32 *8*	$(1,2^+)$	4707.41 *9*	1^-
2583.07 *5*	1^+	3376.02 *8*	3	4130.63 *19*		4743.28 *11*	$(2,3)^-$
2639.26 *4*	2^+	3436.45 *22*	$(1,2^+)$	4142.85 *20*	$(1)^-$	4795.87 *19*	$(2,3)^-$
2779.59 *10*	4^+	3442.41 *10*	$2^{(+)}$	4197.99 *10*	(1,2,3)	4855.25 *12*	$1^{(-)}$
2794.84 *14*	$(1,2^+)$	3504.01 *14*	2^-	4242.09 *6*	$(1,2^+)$	4871.71 *15*	$(2,3)^-$
2851.40 *10*	4^+	3600.70 *7*	1	4279.34 *11*	$(1,2)^-$	5027.74 *16*	$(2^-,3)$
2880.72 *4*	3^-	3643.61 *3*	2^+	4323.51 *7*	1^-	8611.72[#] *4*	2^+[&]
2916.84 *18*	$(1,2^+)$	3646.55 *19*	$(3)^-$	4331.52 *9*	$(1,2^+)$		

[†] From a least-squares fit to γ-ray energies, unless otherwise noted.

[‡] From Adopted Levels, unless otherwise noted.

[#] From S(n) in 2017Wa10.

[@] Level proposed in 1990Is07 only.

[&] From circular pol of 8600γ (1976BoYP).

^{137}Ba(n,γ) E=thermal 1995Bo05,1990Is07 (continued)

$\gamma(^{138}Ba)$

E_γ †‡	I_γ †‡i	E_i(level)	J_i^π	E_f	J_f^π	Comments
112.84 *17*	0.75 *4*	2203.21	6^+	2090.36	6^+	
191.94 *9*	9.4 *5*	2090.36	6^+	1898.58	4^+	
193& *2*	2.9&	2639.26	2^+	2445.55	3^+	
212.20a *19*	1.9a *1*	2415.41	5^+	2203.21	6^+	
227.7 *3*	1.0 *1*	2445.55	3^+	2217.83	2^+	
325.16 *8*	5.0 *3*	2415.41	5^+	2090.36	6^+	
334.01 *12*	1.5 *8*	2779.59	4^+	2445.55	3^+	
362#		3242.31	3	2880.72	3^-	
364.65jh *7*	5.6j *3*	2583.07	1^+	2217.83	2^+	
364.65j *7*	5.6j *3*	2779.59	4^+	2415.41	5^+	
393l *2*		2583.07	1^+	2190.01	$(1,2^+)$	E_γ: very weak (1968Ma35).
409.02 *6*	13.08 *7*	2307.58	4^+	1898.58	4^+	
x414.6@ *20*	5.8@					
421.87h *13*	1.6 *2*	2639.26	2^+	2217.83	2^+	
462.87 *13*	93 *5*	1898.58	4^+	1435.78	2^+	
516.71 *12*	11.4 *7*	2415.41	5^+	1898.58	4^+	
546.89 *8*	8.0 *4*	2445.55	3^+	1898.58	4^+	
x554.7@ *20*	3.0@					
x565.7@ *20*	2.3@					
x570.6@ *20*	2.7@					
575.7@ *20*	2.3@	2991.29	3^+	2415.41	5^+	
x584.1@ *20*	12@					E_γ: doublet(1968Bu20).
x635.2@ *20*	3.0@					
x648.0@l *20*	2.3@					
683.69 *15*	1.1 *1*	2991.29	3^+	2307.58	4^+	
x690.3@ *20*	5.5@					
x697.6@l *20*	1.5@					
708.74 *18*	0.74 *4*	3154.59	4^+	2445.55	3^+	
717.56 *13*	1.3 *1*	3163.06	$(2)^+$	2445.55	3^+	
x723.4@ *20*	4.3@					
739.0 *3*	0.83 *21*	3154.59	4^+	2415.41	5^+	
749.38h *24*	1.3 *3*	4115.32	$(1,2^+)$	3366.80	2^+	
754.12 *8*	9.1 *5*	2190.01	$(1,2^+)$	1435.78	2^+	
x761.6@l *20*	2.5@					
766.09 *21*	2.1 *2*	3646.55	$(3)^-$	2880.72	3^-	
773.42 *15*	3.2 *2*	2991.29	3^+	2217.83	2^+	
782.8 *4*	1.8 *1*	2217.83	2^+	1435.78	2^+	
813.2 *4*	0.46 *8*	3693.62		2880.72	3^-	
x822.5@ *20*	4.0@					
x826.3@ *20*	3.5@					
x834.84 *17*	1.3 *1*					
842.8 *3*	0.60 *6*	3693.62		2851.40	4^+	
855.6 *4*	0.71 *6*	3163.06	$(2)^+$	2307.58	4^+	
862.3#@ *20*	4.5@	3049.78	2^+	2190.01	$(1,2^+)$	
871.74 *9*	17.0 *9*	2307.58	4^+	1435.78	2^+	
880.62 *23*	1.1 *2*	2779.59	4^+	1898.58	4^+	
893.3j *3*	0.58j *4*	3338.65	2^+	2445.55	3^+	
893.3j *3*	0.58j *4*	4536.01	1^-	3643.61	2^+	
x907.3@ *20*	9.7@					E_γ: doublet(1968Bu20).

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^{137}Ba(n,γ) E=thermal 1995Bo05,1990Is07 (continued)

γ(^{138}Ba) (continued)

E_γ †‡	I_γ †‡i	E_i(level)	J_i^π	E_f	J_f^π	Comments
921.43j 22	1.3j 1	3366.80	2+	2445.55	3+	
921.43j 22	1.3j 1	4564.74	(2,3)−	3643.61	2+	
921.43j 22	1.3j 1	4855.25	1(−)	3934.16	2+	
934.81 12	3.1 2	3242.31	3	2307.58	4+	
945.3 3	0.97 5	3163.06	(2)+	2217.83	2+	
952.87 17	1.3 1	2851.40	4+	1898.58	4+	
957.6j 4	1.3j 1	3837.87	(2+)	2880.72	3−	
957.6j 4	1.3j 1	4323.51	1−	3366.80	2+	
957.6j 4	1.3j 1	4795.87	(2,3)−	3837.87	(2+)	
x968.9@l 20	2.5@					
x978.5@ 20	3.5@					
982.14 2	1.5 2	2880.72	3−	1898.58	4+	
1004.3 5	2.1 2	3643.61	2+	2639.26	2+	
1009.80 8	22.8 12	2445.55	3+	1435.78	2+	
x1016.7@l 20	3.2@					
x1020.9@l 20	2.3@					
x1028.4@ 20	4.2@					
x1031.7@ 20	2.2@					
x1038.2@l 20	1.7@					
1041.51 11	5.6 3	3922.07	(3)−	2880.72	3−	
x1044.9@l 20	2.8@					
1054.9h 3	1.1 1	3934.16	2+	2880.72	3−	
1064.5j 3	1.5j 1	3154.59	4+	2090.36	6+	
1064.5jh 3	1.5j 1	4115.32	(1,2+)	3049.78	2+	
1064.5j 3	1.5j 1	4707.41	1−	3643.61	2+	
1069.1# 4	1.1 1	3376.02	3	2307.58	4+	
x1096.7 2	2.2 2					
1116.4 3	2.5 2	4359.44	(1+,2,3)	3242.31	3	
1120.7	0.60d 10	3338.65	2+	2217.83	2+	
1147.20 13	21.1 11	2583.07	1+	1435.78	2+	
1151#		3049.78	2+	1898.58	4+	
1158.7j 5	1.1j 1	3376.02	3	2217.83	2+	
1158.7jh 5	1.1j 1	4323.51	1−	3163.06	(2)+	
1199#		4079.93	(1)−	2880.72	3−	
1203.1#@ 20	2.5@	2639.26	2+	1435.78	2+	
1256.3 3	2.4 2	3154.59	4+	1898.58	4+	
1264.29 25	4.9 3	3163.06	(2)+	1898.58	4+	
x1284.9 3	1.0 1					
1337.65 24	1.7 2	4579.81	(1,2,3)	3242.31	3	
1343.43jh 10	11.8j 7	2779.59	4+	1435.78	2+	
1343.43j# 10	11.8j 7	3242.31	3	1898.58	4+	
1359.4j 3	1.4j 1	2794.84	(1,2+)	1435.78	2+	
1359.4j 3	1.4j 1	3257.42	3	1898.58	4+	
x1375.3@ 20	5.3@					
x1381.47 25	1.9 4					
1398.46 22	2.7 3	4279.34	(1,2)−	2880.72	3−	
1415.66 11	8.6 4	2851.40	4+	1435.78	2+	
1435.87 7	399 10	1435.78	2+	0.0	0+	E_γ: weighted average of 1435.88 4 from 1990Is07 and 1435.82 7 from 1995Bo05.

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^{137}Ba(n,γ) E=thermal 1995Bo05,1990Is07 (continued)

γ(^{138}Ba) (continued)

E_γ [†‡]	I_γ [†‡i]	E_i(level)	J_i^π	E_f	J_f^π	Comments
						I_γ: from 1990Is07. 1995Bo05 normalize their Iγ with respect to 1436γ, 5730γ of 1990Is07 and get Iγ(1436γ)=417 *23*.
1444.97[g] *6*	98 *13*	2880.72	3^-	1435.78	2^+	E_γ: weighted average of 1444.99 *6* from 1990Is07 and 1444.90 *12* from 1995Bo05. I_γ: unweighted average of 85 *4* from 1990Is07 and 111 *7* from 1995Bo05.
x1456.9[@] *20*	8.2[@]					E_γ: doublet(1968Bu20).
1479.2[h] *4*	1.8 *2*	2916.84	$(1,2^+)$	1435.78	2^+	
x1485.9[@l] *20*	2.8[@]					
1495.69 *11*	17 *6*	2931.30	2^+	1435.78	2^+	E_γ: weighted average of 1495.82 *15* from 1990Is07 and 1495.62 *11* from 1995Bo05. I_γ: unweighted average of 23 *5* from 1990Is07 and 11.3 *6* from 1995Bo05.
1501.0 *3*	1.2 *1*	4743.28	$(2,3)^-$	3242.31	3	
1555.54 *18*	6.0 *3*	2991.29	3^+	1435.78	2^+	
x1561.6 *4*	1.2 *1*					
x1605.8 *2*	2.3 *2*					
1614.26[jh] *12*	20.0[j] *10*	3049.78	2^+	1435.78	2^+	
1614.26[j] *12*	20.0[j] *10*	3922.07	$(3)^-$	2307.58	4^+	
1620.10 *23*	4.5 *3*	3837.87	(2^+)	2217.83	2^+	
x1637.0[@] *20*	3.7[@]					
x1657.7[@]	27[@]					E_γ: doublet(1968Bu20).
1695.9 *2*	3.7 *2*	4279.34	$(1,2)^-$	2583.07	1^+	
x1701.3 *4*	2.2 *2*					
x1708.1[&] *3*	4.1[&] *13*					
1719.2[l] *3*	3.9 *3*	3154.59	4^+	1435.78	2^+	E_γ: placement indicated in Table 1 of 1995Bo05, but not placed by authors into the level scheme in Table 2.
1727.2 *2*	7.7 *5*	3163.06	$(2)^+$	1435.78	2^+	
1744.6 *2*	4.7 *3*	3643.61	2^+	1898.58	4^+	
1749[#]	[d]	3646.55	$(3)^-$	1898.58	4^+	
1766.2[h] *3*	1.0 *1*	4645.67	$(1,2,3)^-$	2880.72	3^-	
x1773.10 *25*	1.9 *2*					
x1778.60[&] *13*	16[&] *8*					
1784.7 *3*	1.7 *2*	4665.69	$(1^-,2^+)$	2880.72	3^-	
x1796.1[@] *20*	4.3[@]					
1807.1 *2*	3.3 *3*	3242.31	3	1435.78	2^+	
1821.4[j] *2*	2.8[j] *3*	3257.42	3	1435.78	2^+	
1821.4[j] *2*	2.8[j] *3*	4871.71	$(2,3)^-$	3049.78	2^+	
x1832.7[a] *3*	2.3[a] *2*					
1850.1[l] *2*	2.8 *2*	4645.67	$(1,2,3)^-$	2794.84	$(1,2^+)$	
x1886.8 *2*	0.89 *16*					
x1892.0 *4*	0.6 *1*					
1902.6 *2*	2.0 *2*	3338.65	2^+	1435.78	2^+	
x1907.8 *2*	1.7 *2*					
1913.9 *1*	2.4 *2*	4359.44	$(1^+,2,3)$	2445.55	3^+	
x1924.2 *2*	1.3 *1*					
1931.2	0.35[d] *6*	3366.80	2^+	1435.78	2^+	
1940.67[j] *19*	3.4[j] *5*	3376.02	3	1435.78	2^+	
1940.67[j] *19*	3.4[j] *5*	4130.63		2190.01	$(1,2^+)$	
x1965.39 *23*	0.75 *11*					
1981.55 *15*	1.6 *2*	4564.74	$(2,3)^-$	2583.07	1^+	

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^{137}Ba(n,γ) E=thermal 1995Bo05,1990Is07 (continued)

γ(^{138}Ba) (continued)

E_γ †‡	I_γ †‡i	E_i(level)	J_i^π	E_f	J_f^π	Comments
x2001.1@ 20	10@					
2023.59 7	15.0 13	3922.07	$(3)^-$	1898.58	4^+	E_γ: weighted average of 2023.55 7 from 1990Is07 and 2023.70 11 from 1995Bo05. I_γ: weighted average of 15.7 13 from 1990Is07 and 13.9 17 from 1995Bo05.
x2029.2 8	1.5 2					
2061.5jg 4	3.2j 4	4279.34	$(1,2)^-$	2217.83	2^+	E_γ: unweighted average of 2061.12 18 from 1990Is07 and 2061.84 12 from 1995Bo05. I_γ: weighted average of 2.7 7 from 1990Is07 and 3.3 4 from 1995Bo05.
2061.5jg 4	3.2j 4	4508.09	$(2^+,3)$	2445.55	3^+	E_γ: unweighted average of 2061.12 18 from 1990Is07 and 2061.84 12 from 1995Bo05. I_γ: weighted average of 2.7 7 from 1990Is07 and 3.3 4 from 1995Bo05.
2068.16j 15	2.0j 3	3504.01	2^-	1435.78	2^+	
2068.16j 15	2.0j 3	4707.41	1^-	2639.26	2^+	
x2073.5 3	0.7 2					
2082.95h 14	2.0 3	4665.69	$(1^-,2^+)$	2583.07	1^+	
2104.08 16	2.2 3	4743.28	$(2,3)^-$	2639.26	2^+	
x2112.3 2	1.2 2					
x2120.5 2	0.9 1					
x2142.5 4	1.6 4					
2164.99 12	1.1 2	3600.70	1	1435.78	2^+	
2189.2 4	0.4 1	2190.01	$(1,2^+)$	0.0	0^+	
2207#	5.2 7	3643.61	2^+	1435.78	2^+	I_γ: for 2207+2212 doublet, observed at Eγ=2209.6 4 (1995Bo05).
2212#	5.2 7	3646.55	$(3)^-$	1435.78	2^+	I_γ: for 2207+2212 doublet, observed at Eγ=2209.6 4 (1995Bo05).
2217.76g 7	70 10	2217.83	2^+	0.0	0^+	E_γ: weighted average of 2217.73 5 from 1990Is07 and 2217.92 11 from 1995Bo05. I_γ: unweighted average of 80 3 from 1990Is07 and 60 6 from 1995Bo05.
x2239.7 4	0.48 11					
2257.31 18	1.33 16	4564.74	$(2,3)^-$	2307.58	4^+	
2272.6 6	0.58 8	4855.25	$1^{(-)}$	2583.07	1^+	
x2280.43 17	1.7 3					
x2295.72 14	1.8 3					
x2309.6@ 20	5.5@					
x2327.1@ 20	6.2@					
2345.86j 18	1.6j 4	4536.01	1^-	2190.01	$(1,2^+)$	
2345.86jh 18	1.6j 4	4564.74	$(2,3)^-$	2217.83	2^+	
x2364.6 4	1.14 14					
x2377.36a 21	2.0a 3					
x2386.3 3	1.12 13					
x2390.9 3	1.22 14					
2401.8a 3	4.2ad 5	3837.87	(2^+)	1435.78	2^+	E_γ: unweighted average of 2402.10 8 from 1990Is07 and 2401.46 11 from 1995Bo05. I_γ: 9.1 11 from singles spectrum.
x2411.33 17	1.02 18					
x2419.83 18	0.59 12					
x2429.55 15	0.76 15					
x2436.97 22	1.10 13					E_γ: 2436.68 31 from 1990Is07 and 2437.12 22 from 1995Bo05.

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^{137}Ba(n,γ) E=thermal 1995Bo05,1990Is07 (continued)

γ(^{138}Ba) (continued)

E_γ †‡	I_γ †‡*i*	E_i(level)	J_i^π	E_f	J_f^π	Comments
						I_γ: 1.31 *42* from 1990Is07 (renormalized by 1995Bo05) and 1.08 *13* from 1995Bo05.
x2470.78 *13*	2.2 *8*					E_γ: 2470.84 *10* from 1990Is07 and 2470.51 *22* from 1995Bo05. I_γ: unweighted average of 2.95 *40* from 1990Is07 (renormalized by 1995Bo05) and 1.40 *17* from 1995Bo05.
x2477.7 *4*	1.44 *17*					
2486.48 *17*	2.6 *3*	3922.07	$(3)^-$	1435.78	2^+	
2499.8 *5*	1.65 *24*	3934.16	2^+	1435.78	2^+	E_γ: unweighted average of 2500.27 *32* from 1990Is07 and 2499.38 *25* from 1995Bo05. I_γ: 5.7 *32* from 1990Is07 (renormalized by 1995Bo05) and 1.64 *19* from 1995Bo05.
x2502.7 *6*	0.60 *7*					
x2512.16 *9*	3.8 *5*					E_γ: weighted average of 2512.02 *8* from 1990Is07 and 2512.16 *9* from 1995Bo05. I_γ: 4.6 *6* from 1990Is07 (renormalized by 1995Bo05) and 3.5 *4* from 1995Bo05.
x2523.9 *5*	0.40 *8*					
2525.9 *3*	1.05 *13*	4743.28	$(2,3)^-$	2217.83	2^+	
x2531.25 *12*	2.4 *3*					E_γ: weighted average of 2531.05 *28* from 1990Is07 and 2531.29 *12* from 1995Bo05. I_γ: 2.4 *6* from 1990Is07 (renormalized by 1995Bo05) and 2.4 *3* from 1995Bo05.
x2536.1 *4*	1.41 *17*					
x2539.41 *19*	1.2 *3*					
x2559.47 *24*	1.01 *12*					
x2562.7 *3*	0.74 *15*					
2566#	0.8 *6*	4002.15	$2^{(+)}$	1435.78	2^+	
x2569.57 *23*	0.21 *3*					E_γ: weighted average of 2569.55 *23* from 1990Is07 and 2570.2 *13* from 1995Bo05. I_γ: from 1995Bo05. Other: 2.6 *8* from 1990Is07 (renormalized by 1995Bo05).
2577.8j *3*	2.7j *3*	4012.93	$(1,2^+)$	1435.78	2^+	E_γ: unweighted average of 2577.45 *22* from 1990Is07 and 2578.12 *26* from 1995Bo05. I_γ: 2.89 from 1990Is07 (renormalized by 1995Bo05) and 2.7 *3* from 1995Bo05.
2578.1j *3*	2.7j *3*	4795.87	$(2,3)^-$	2217.83	2^+	
2583.02 *16*	5.3 *11*	2583.07	1^+	0.0	0^+	E_γ: unweighted average of 2582.86 *8* from 1990Is07 and 2583.18 *8* from 1995Bo05. I_γ: weighted average of 7.3 *13* from 1990Is07 and 4.7 *7* from 1995Bo05.
2590.71 *24*	1.34 *16*	4025.99	1^-	1435.78	2^+	
x2593.87 *16*	1.81 *22*					
2609.61 *16*	1.13 *14*	4508.09	$(2^+,3)$	1898.58	4^+	E_γ: weighted average of 2609.56 *16* from 1990Is07 and 2609.8 *3* from 1995Bo05. I_γ: weighted average of 1.1 *3* from 1990Is07 and 1.14 *14* from 1995Bo05.
x2618.4@ *20*	3.0@					
2639.26 *4*	31.6 *13*	2639.26	2^+	0.0	0^+	E_γ: weighted average of 2639.27 *4* from 1990Is07 and 2639.24 *8* from 1995Bo05. I_γ: weighted average of 32.2 *8* from 1990Is07 and 28.8 *18* from 1995Bo05.
x2668.6 *9*	0.72 *9*					
x2677.8 *5*	1.11 *13*					
2679.65 *8*	1.46 *17*	4115.32	$(1,2^+)$	1435.78	2^+	E_γ: weighted average of 2679.64 *8* from 1990Is07 and 2679.84 *31*

Continued on next page (footnotes at end of table)

^{137}Ba(n,γ) E=thermal 1995Bo05,1990Is07 (continued)

γ(^{138}Ba) (continued)

E_γ †‡	I_γ †‡i	E_i(level)	J_i^π	E_f	J_f^π	Comments
						from 1995Bo05.
						I_γ: from 1995Bo05. Other: 4.47 from 1990Is07 (renormalized by 1995Bo05).
x2748.11 *14*	0.76 *9*					E_γ: weighted average of 2748.10 *14* from 1990Is07 and 2748.2 *4* from 1995Bo05.
						I_γ: from 1995Bo05. Other: 1.7 *4* from 1990Is07 (renormalized by 1995Bo05).
x2752.54 *22*	1.46 *18*					
2762.32 *10*	0.70 *9*	4197.99	(1,2,3)	1435.78	2^+	E_γ: weighted average of 2762.34 *8* from 1990Is07 and 2761.8 *4* from 1995Bo05.
						I_γ: from 1995Bo05. Other: 3.8 *4* from 1990Is07 (renormalized by 1995Bo05).
x2771.6 *4*	0.58 *7*					
x2777.8 *4*	0.65 *8*					
2794.9 *8*	1.6 *4*	2794.84	$(1,2^+)$	0.0	0^+	E_γ: unweighted average of 2795.68 *14* from 1990Is07 and 2794.02 *14* from 1995Bo05.
						I_γ: weighted average of 2.1 *5* from 1990Is07 and 1.2 *4* from 1995Bo05.
2805.97 *10*	4.9 *5*	4242.09	$(1,2^+)$	1435.78	2^+	E_γ: weighted average of 2806.14 *22* from 1990Is07 and 2805.93 *10* from 1995Bo05.
						I_γ: 5.0 *5* from 1990Is07 (renormalized by 1995Bo05) and 4.8 *8* from 1995Bo05.
x2822.0 *4*	1.29 *16*					
x2832.10 *21*	1.69 *20*					
x2841.24 *22*	0.98 *15*					
2845& *3*	2&	4279.34	$(1,2)^-$	1435.78	2^+	E_γ,I_γ: from 1968Ma35. Iγ is renormalized to Iγ(1436γ)=399.
x2858.5[l] *4*	1.21 *15*					
x2885.45[a] *6*	1.52[a] *22*					E_γ: unweighted average of 2886.02 *20* from 1990Is07 and 2884.75 *24* from 1995Bo05.
						I_γ: 1.26 *24* from 1990Is07 (renormalized by 1995Bo05) and 1.71 *21* from 1995Bo05.
x2890.9[l] *8*	0.71 *9*					
2895.62 *9*	3.4 *3*	4331.52	$(1,2^+)$	1435.78	2^+	E_γ: weighted average of 2895.67 *9* from 1990Is07 and 2895.50 *14* from 1995Bo05.
						I_γ: 3.3 *3* from 1990Is07 (renormalized by 1995Bo05) and 3.8 *5* from 1995Bo05.
x2914.1 *4*	0.60 *17*					E_γ: weighted average of 2913.88 *30* from 1990Is07 and 2914.8 *6* from 1995Bo05.
						I_γ: from 1995Bo05. Other: 1.5 *4* from 1990Is07 (renormalized by 1995Bo05).
2916.98 *20*	1.6 *9*	2916.84	$(1,2^+)$	0.0	0^+	E_γ: weighted average of 2916.86 *18* from 1990Is07 and 2917.3 *3* from 1995Bo05.
						I_γ: unweighted average of 2.4 *4* from 1990Is07 and 0.71 *19* from 1995Bo05.
2923.7 *3*	2.6 *5*	4359.44	$(1^+,2,3)$	1435.78	2^+	E_γ: unweighted average of 2923.37 *14* from 1990Is07 and 2923.96 *11* from 1995Bo05.
						I_γ: weighted average of 2.5 *5* from 1990Is07 and 2.8 *7* from 1995Bo05.
2930.9 *8*	2.1 *3*	2931.30	2^+	0.0	0^+	E_γ: unweighted average of 2931.69 *21* from 1990Is07 and 2930.12 *16* from 1995Bo05.
						I_γ: weighted average of 1.9 *3* from 1990Is07 and 2.4 *4* from 1995Bo05.
x2954.50 *21*	0.76 *11*					
x2966.9 *4*	2.2 *4*					E_γ: unweighted average of 2966.48 *18* from 1990Is07 and 2967.32 *14* from 1995Bo05.

Continued on next page (footnotes at end of table)

^{137}Ba(n,γ) E=thermal 1995Bo05,1990Is07 (continued)

$\gamma(^{138}Ba)$ (continued)

E_γ †‡	I_γ †‡*i*	E_i(level)	J_i^π	E_f	J_f^π	Comments
						I_γ: 2.70 *34* from 1990Is07 (renormalized by 1995Bo05) and 1.92 *23* from 1995Bo05.
x2974.51 *18*	0.97 *19*					
x3035.1 *7*	1.42 *11*					
3049.27*h* *5*	5.3 *2*	3049.78	2^+	0.0	0^+	E_γ: weighted average of 3049.28 *5* from 1990Is07 and 3049.12 *17* from 1995Bo05. I_γ: weighted average of 5.28 *22* from 1990Is07 and 5.5 *7* from 1995Bo05.
3074.25*l* *11*	2.1 *2*	4508.09	$(2^+,3)$	1435.78	2^+	E_γ: weighted average of 3074.29 *11* from 1990Is07 and 3074.1 *2* from 1995Bo05. Placed by 1990Is07; not placed by 1995Bo05. I_γ: weighted average of 2.01 *21* from 1990Is07 and 2.6 *5* from 1995Bo05.
x3086.5 *3*	1.83 *22*					E_γ: 3085.43 *17* from 1990Is07 and 3086.6 *6* from 1995Bo05. I_γ: 1.8 *3* from 1990Is07 and 1.84 *22* from 1995Bo05.
3096.6*hl* *6*	4.3 *6*	4536.01	1^-	1435.78	2^+	E_γ: poor fit, inconsistent with level-energy difference=3100. The placement is considered questionable.
x3121.2@ *20*	3.3@					
3129.5 *5*	2.2 *3*	4564.74	$(2,3)^-$	1435.78	2^+	E_γ: weighted average of 3129.5 *7* from 1990Is07 and 3129.5 *5* from 1995Bo05. Unassigned by 1990Is07. I_γ: 1.5 *8* from 1990Is07 (renormalized by 1995Bo05) and 2.3 *3* from 1995Bo05.
x3140.4 *9*	2.2 *4*					E_γ: unweighted average of 3141.03 *18* from 1990Is07 and 3139.7 *3* from 1995Bo05. I_γ: 2.1 *4* from 1990Is07 (renormalized by 1995Bo05) and 2.2 *4* from 1995Bo05.
3143.98 *20*	2.4 *8*	4579.81	(1,2,3)	1435.78	2^+	E_γ: weighted average of 3144.28 *21* from 1990Is07 and 3143.84 *14* from 1995Bo05. Unassigned by 1990Is07. I_γ: 2.0 *5* from 1990Is07 (renormalized by 1995Bo05) and 4.0 *10* from 1995Bo05.
3150.6 *4*	1.40 *17*	4585.88	$(1)^-$	1435.78	2^+	E_γ: other: 3148.13 *22* unassigned in 1990Is07.
x3174.8*l* *4*	1.52 *23*					
x3179.02 *11*	2.4 *4*					
x3186.32 *24*	1.47 *18*					
x3197.10 *17*	0.87 *19*					E_γ: weighted average of 3197.11 *17* from 1990Is07 and 3197.0 *5* from 1995Bo05. I_γ: 1.3 *3* from 1990Is07 (renormalized by 1995Bo05) and 0.79 *13* from 1995Bo05.
3209.75& *10*	2.1& *4*	4645.67	$(1,2,3)^-$	1435.78	2^+	
x3224.79 *9*	1.6 *4*					E_γ: weighted average of 3224.79 *9* from 1990Is07 and 3225.0 *6* from 1995Bo05. I_γ: 2.7 *8* from 1990Is07 (renormalized by 1995Bo05) and 1.4 *3* from 1995Bo05.
3230.01*h* *9*	0.7 *4*	4665.69	$(1^-,2^+)$	1435.78	2^+	E_γ: weighted average of 3230.01 *9* from 1990Is07 and 3230.00 *14* from 1995Bo05. Unassigned by 1990Is07. I_γ: from 1995Bo05. Other: 2.8 *7* from 1990Is07 (renormalized by 1995Bo05).
x3279.07 *21*	0.60 *7*					
x3294.63 *17*	1.00 *12*					E_γ: weighted average of 3294.61 *17* from 1990Is07 and 3294.7 *3* from 1995Bo05. Unassigned by 1990Is07. I_γ: from 1995Bo05. Other: 2.0 *3* from 1990Is07 (renormalized by 1995Bo05).
3306.40*h* *25*	2.2 *3*	4743.28	$(2,3)^-$	1435.78	2^+	
x3335.0*l* *3*	1.8 *2*					
3338.62 *5*	14 *3*	3338.65	2^+	0.0	0^+	E_γ: weighted average of 3338.60 *5* from 1990Is07 and 3338.72 *10* from 1995Bo05.

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^{137}Ba(n,γ) E=thermal 1995Bo05,1990Is07 (continued)

γ(^{138}Ba) (continued)

E_γ †‡	I_γ †‡*i*	E_i(level)	J_i^π	E_f	J_f^π	Comments
						I_γ: unweighted average of 16.8 *8* from 1990Is07 and 11.6 *14* from 1995Bo05.
x3350.77 *20*	1.05 *14*					E_γ: weighted average of 3350.71 *20* from 1990Is07 and 3351.3 *6* from 1995Bo05. I_γ: from 1995Bo05. Other: 2.1 *3* from 1990Is07 (renormalized by 1995Bo05).
3360.1 *3*	1.12 *15*	4795.87	$(2,3)^-$	1435.78	2^+	E_γ: weighted average of 3359.9 *3* from 1990Is07 and 3360.5 *4* from 1995Bo05. Unassigned by 1990Is07. I_γ: 1.1 *3* from 1990Is07 (renormalized by 1995Bo05) and 1.12 *15* from 1995Bo05.
3366.67 *10*	4.9 *10*	3366.80	2^+	0.0	0^+	E_γ: weighted average of 3366.74 *9* from 1990Is07 and 3366.53 *13* from 1995Bo05. I_γ: unweighted average of 5.8 *5* from 1990Is07 and 3.9 *5* from 1995Bo05.
x3380.5 *2*	0.42 *6*					E_γ: weighted average of 3380.46 *14* from 1990Is07 and 3381.8 *12* from 1995Bo05. I_γ: from 1995Bo05. Other: 1.1 *4* from 1990Is07 (renormalized by 1995Bo05).
x3412.58 *19*	1.3 *3*					E_γ: weighted average of 3412.81 *9* from 1990Is07 and 3412.57 *19* from 1995Bo05. I_γ: 1.52 *21* from 1990Is07 (renormalized by 1995Bo05) and 0.9 *3* from 1995Bo05.
x3421.9@ *20*	3.5@					
3436.40j *22*	2.9j *5*	3436.45	$(1,2^+)$	0.0	0^+	E_γ: unweighted average of 3436.18 *9* from 1990Is07 and 3436.61 *19* from 1995Bo05. I_γ: from 1995Bo05. Other: 8.2 *13* from 1990Is07 but it may have interference with ^{136}Ba.
3436.40j *22*	2.9j *5*	4871.71	$(2,3)^-$	1435.78	2^+	E_γ: unweighted average of 3436.18 *9* from 1990Is07 and 3436.61 *19* from 1995Bo05. Placement is made by 1995Bo05 only. I_γ: from 1995Bo05. Other: 8.2 *13* from 1990Is07 but it may have interference with ^{136}Ba.
3442.30 *13*	2.7 *3*	3442.41	$2^{(+)}$	0.0	0^+	E_γ: weighted average of 3442.34 *13* from 1990Is07 and 3442.24 *16* from 1995Bo05. I_γ: weighted average of 3.7 *13* from 1990Is07 and 2.6 *3* from 1995Bo05.
x3453.9 *3*	1.5 *4*					
x3465.71 *23*	0.49 *6*					
3504.5 *5*	7.8 *8*	3504.01	2^-	0.0	0^+	E_γ: unweighted average of 3504.02 *6* from 1990Is07 and 3504.91 *18* from 1995Bo05. I_γ: weighted average of 8.3 *5* from 1990Is07 and 6.6 *8* from 1995Bo05.
x3530.1l *6*	1.0 *2*					
3583.4 *4*	3.4 *4*	8611.72	2^+	5027.74	$(2^-,3)$	
3591.81 *17*	1.6 *4*	5027.74	$(2^-,3)$	1435.78	2^+	
3600.52 *17*	1.97 *24*	3600.70	1	0.0	0^+	E_γ: weighted average of 3600.53 *17* from 1990Is07 and 3600.5 *3* from 1995Bo05. I_γ: weighted average of 1.9 *3* from 1990Is07 and 2.01 *24* from 1995Bo05.
3643.61& *3*	≤5.6&b	3643.61	2^+	0.0	0^+	I_γ: from 4.1 *15* in 1990Is07.
x3651.2@ *20*	3.2@					
x3676.12 *16*	2.7 *5*					
x3714.70 *9*	8.4 *4*					E_γ: 3714.65 *6* from 1990Is07 and 3714.87 *11* from 1995Bo05. I_γ: 8.3 *4* from 1990Is07 and 9.7 *12* from 1995Bo05.
x3734.0 *8*	2.6 *4*					E_γ: unweighted average of 3733.23 *14* from 1990Is07 and

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^{137}Ba(n,γ) E=thermal 1995Bo05,1990Is07 (continued)

γ(^{138}Ba) (continued)

E_γ[†‡]	I_γ[†‡i]	E_i(level)	J_i^π	E_f	J_f^π	Comments
						3734.73 *23* from 1995Bo05. I_γ: 2.36 *24* from 1990Is07 (renormalized by 1995Bo05) and 3.3 *4* from 1995Bo05.
3738.9[g] *7*	4.1 *14*	8611.72	2^+	4871.71	$(2,3)^-$	E_γ: unweighted average of 3738.22 *7* from 1990Is07 and 3739.53 *15* from 1995Bo05. I_γ: unweighted average of 5.5 *3* from 1990Is07 and 2.7 *8* from 1995Bo05.
3757.3 *4*	1.22 *15*	8611.72	2^+	4855.25	$1^{(-)}$	
[x]3763.11 *13*	5.6 *8*					
[x]3800.01 *13*	1.8 *4*					E_γ: weighted average of 3799.98 *9* from 1990Is07 and 3800.6 *4* from 1995Bo05. I_γ: 1.7 *4* from 1990Is07 (renormalized by 1995Bo05) and 2.1 *7* from 1995Bo05.
3814.4[g] *12*	3.6 *3*	8611.72	2^+	4795.87	$(2,3)^-$	E_γ: unweighted average of 3815.59 *8* from 1990Is07 and 3813.29 *17* from 1995Bo05. I_γ: weighted average of 3.5 *3* from 1990Is07 and 3.9 *6* from 1995Bo05.
[x]3823.0 *6*	2.6 *9*					E_γ: unweighted average of 3823.56 *18* from 1990Is07 and 3822.41 *16* from 1995Bo05. I_γ: weighted average of 1.67 *20* from 1990Is07 and 3.5 *5* from 1995Bo05.
[x]3826.54[&] *15*	1.93[&] *21*					
3837[#]	*d*	3837.87	(2^+)	0.0	0^+	
[x]3845.53 *22*	0.89 *20*					E_γ: weighted average of 3845.53 *22* from 1990Is07 and 3845.7 *15* from 1995Bo05. I_γ: 0.78 *20* from 1990Is07 (renormalized by 1995Bo05) and 1.0 *2* from 1995Bo05.
[x]3853.4[l] *22*	0.34 *12*					
3868.49[g] *17*	1.80 *23*	8611.72	2^+	4743.28	$(2,3)^-$	E_γ: weighted average of 3868.54 *17* from 1990Is07 and 3867.9 *6* from 1995Bo05. I_γ: weighted average of 1.8 *5* from 1990Is07 and 1.81 *23* from 1995Bo05.
[x]3891.33 *17*	2.5 *4*					
[x]3923.80 *9*	2.1 *7*					E_γ: weighted average of 3923.81 *9* from 1990Is07 and 3923.76 *18* from 1995Bo05. I_γ: unweighted average of 1.4 *3* from 1990Is07 and 2.8 *4* from 1995Bo05.
[x]3934.12 *21*	0.68 *21*					E_γ: weighted average of 3933.84 *22* from 1990Is07 and 3934.12 *21* from 1995Bo05. I_γ: from 1995Bo05. Other: 2.3 *9* from 1990Is07 (renormalized by 1995Bo05).
[x]3940.8 *8*	1.4 *4*					E_γ: unweighted average of 3940.0 *4* from 1990Is07 and 3941.6 *3* from 1995Bo05. I_γ: 1.5 *6* from 1990Is07 (renormalized by 1995Bo05) and 1.3 *4* from 1995Bo05.
3945.99[g] *18*	4.9 *12*	8611.72	2^+	4665.69	$(1^-,2^+)$	E_γ: unweighted average of 3945.81 *8* from 1990Is07 and 3946.17 *15* from 1995Bo05. I_γ: unweighted average of 6.0 *6* from 1990Is07 and 3.7 *7* from 1995Bo05.
3965.10[h] *18*	4.41 *18*	8611.72	2^+	4645.67	$(1,2,3)^-$	E_γ: unweighted average of 3965.28 *6* from 1990Is07 and 3964.92 *14* from 1995Bo05. I_γ: weighted average of 4.31 *18* from 1990Is07 and 4.7 *3* from 1995Bo05.
[x]3988.6 *3*	2.8 *4*					E_γ: weighted average of 3989.0 *4* from 1990Is07 and 3988.4 *3* from 1995Bo05.

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^{137}Ba(n,γ) E=thermal 1995Bo05,1990Is07 (continued)

γ(^{138}Ba) (continued)

E_γ †‡	I_γ †‡*i*	E_i(level)	J_i^π	E_f	J_f^π	Comments
						I_γ: from 1995Bo05. Other: 1.3 *4* from 1990Is07 (renormalized by 1995Bo05).
[x]3994.0 *4*	1.15 *14*					E_γ: weighted average of 3993.9 *4* from 1990Is07 and 3994.2 *6* from 1995Bo05. I_γ: 1.4 *5* from 1990Is07 (renormalized by 1995Bo05) and 1.13 *14* from 1995Bo05.
4001.41[h] *11*	3.5 *4*	4002.15	$2^{(+)}$	0.0	0^+	E_γ: weighted average of 4001.37 *8* from 1990Is07 and 4001.71 *21* from 1995Bo05. Unassigned by 1990Is07. I_γ: from 1995Bo05. Other: 6.0 *7* from 1990Is07 (renormalized by 1995Bo05).
4011.7 *4*	1.66 *22*	4012.93	$(1,2^+)$	0.0	0^+	E_γ: weighted average of 4011.54 *20* from 1990Is07 and 4012.7 *6* from 1995Bo05. Unassigned by 1990Is07. I_γ: 1.7 *3* from 1990Is07 (renormalized by 1995Bo05) and 1.64 *22* from 1995Bo05.
[x]4017.3[@] *20*	4.0[@]					
4025.80[j] *12*	5.8[j] *6*	4025.99	1^-	0.0	0^+	E_γ: weighted average of 4025.85 *7* from 1990Is07 and 4025.54 *15* from 1995Bo05. I_γ: weighted average of 6.4 *5* from 1990Is07 and 5.2 *5* from 1995Bo05.
4025.80[j] *12*	5.8[j] *6*	8611.72	2^+	4585.88	$(1)^-$	E_γ: weighted average of 4025.85 *7* from 1990Is07 and 4025.54 *15* from 1995Bo05. I_γ: weighted average of 6.4 *5* from 1990Is07 and 5.2 *5* from 1995Bo05.
4031.88[&] *13*	3.1[&e] *3*	8611.72	2^+	4579.81	(1,2,3)	E_γ: unassigned γ observed in neutron capture by natural barium 1990Is07; placed by 1995Bo05.
[x]4036.0 *8*	2.22 *24*					E_γ: unweighted average of 4036.82 *16* from 1990Is07 and 4035.2 *3* from 1995Bo05. I_γ: 2.24 *24* from 1990Is07 (renormalized by 1995Bo05) and 2.2 *3* from 1995Bo05.
4047.0 *4*	2.2 *3*	8611.72	2^+	4564.74	$(2,3)^-$	E_γ: unweighted average of 4046.62 *13* from 1990Is07 and 4047.3 *3* from 1995Bo05. Unassigned by 1990Is07. I_γ: 2.6 *5* from 1990Is07 (renormalized by 1995Bo05) and 2.1 *3* from 1995Bo05.
[x]4061.39 *9*	5.1 *4*					E_γ: weighted average of 4061.42 *9* from 1990Is07 and 4061.23 *20* from 1995Bo05. I_γ: weighted average of 4.7 *6* from 1990Is07 and 5.3 *4* from 1995Bo05.
4076.4 *3*	3.3 *4*	8611.72	2^+	4536.01	1^-	E_γ: unweighted average of 4076.10 *9* from 1990Is07 and 4076.64 *19* from 1995Bo05. I_γ: weighted average of 3.2 *4* from 1990Is07 and 3.4 *6* from 1995Bo05.
4080[l]		4079.93	$(1)^-$	0.0	0^+	
4083.3[g] *4*	7.9 *13*	4083.4	$(1,2^+)$	0.0	0^+	E_γ: unweighted average of 4082.95 *6* from 1990Is07 and 4083.66 *12* from 1995Bo05. I_γ: unweighted average of 6.6 *4* from 1990Is07 and 9.2 *6* from 1995Bo05.
[x]4095.9[@] *20*	6.3[@]					
4103.50 *17*	3.0 *15*	8611.72	2^+	4508.09	$(2^+,3)$	E_γ: weighted average of 4103.3 *5* from 1990Is07 and 4103.52 *17* from 1995Bo05. I_γ: unweighted average of 1.5 *7* from 1990Is07 and 4.4 *3* from 1995Bo05.
4114.5[g] *3*	4.8 *4*	4115.32	$(1,2^+)$	0.0	0^+	E_γ: unweighted average of 4114.76 *10* from 1990Is07 and 4114.17 *15* from 1995Bo05. I_γ: weighted average of 5.2 *4* from 1990Is07 and 4.5 *3* from 1995Bo05.

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^{137}Ba(n,γ) E=thermal 1995Bo05,1990Is07 (continued)

$\gamma(^{138}Ba)$ (continued)

E_γ †‡	I_γ †‡*i*	E_i(level)	J_i^π	E_f	J_f^π	Comments
						I_γ: weighted average of 5.2 *4* from 1990Is07 and 4.5 *3* from 1995Bo05.
4143.2 *3*	0.86 *16*	4142.85	$(1)^-$	0.0	0^+	E_γ: weighted average of 4142.15 *20* from 1990Is07 and 4143.0 *6* from 1995Bo05. I_γ: weighted average of 0.84 *16* from 1990Is07 and 0.88 *17* from 1995Bo05.
x4148.2 *7*	0.80 *15*					E_γ: unweighted average of 4148.89 *17* from 1990Is07 and 4147.51 *22* from 1995Bo05. I_γ: 0.86 *15* from 1990Is07 (renormalized by 1995Bo05) and 0.73 *15* from 1995Bo05.
4166.18 *5*	7.41 *23*	8611.72	2^+	4445.46	1^-	E_γ: weighted average of 4166.19 *5* from 1990Is07 and 4166.11 *12* from 1995Bo05. I_γ: weighted average of 7.43 *23* from 1990Is07 and 7.3 *5* from 1995Bo05.
x4190.2 *7*	0.58 *7*					E_γ: unweighted average of 4189.49 *19* from 1990Is07 and 4190.8 *6* from 1995Bo05. I_γ: from 1995Bo05. Other: 1.56 *18* from 1990Is07 (renormalized by 1995Bo05).
x4200.70 *5*	7.0 *3*					E_γ: weighted average of 4200.68 *5* from 1990Is07 and 4200.82 *13* from 1995Bo05. I_γ: 6.9 *3* from 1990Is07 (renormalized by 1995Bo05) and 7.1 *4* from 1995Bo05.
x4207.72 *9*	2.8 *4*					E_γ: weighted average of 4207.69 *7* from 1990Is07 and 4207.94 *18* from 1995Bo05. I_γ: unweighted average of 3.09 *18* from 1990Is07 (renormalized by 1995Bo05) and 2.4 *3* from 1995Bo05.
x4216.9@ *20*	3.2@					
4242#	1.0	4242.09	$(1,2^+)$	0.0	0^+	
4251.8 *3*	9.0 *4*	8611.72	2^+	4359.44	$(1^+,2,3)$	E_γ: unweighted average of 4252.10 *6* from 1990Is07 and 4251.49 *12* from 1995Bo05. I_γ: weighted average of 9.1 *4* from 1990Is07 and 8.4 *10* from 1995Bo05.
x4274.2 *5*	0.8 *3*					E_γ: unweighted average of 4273.7 *4* from 1990Is07 and 4274.7 *3* from 1995Bo05. I_γ: 0.63 *20* from 1990Is07 (renormalized by 1995Bo05) and 1.4 *4* from 1995Bo05.
4280.31kh *8*	<1.0k	4279.34	$(1,2)^-$	0.0	0^+	E_γ: weighted average of 4280.28 *8* from 1990Is07 and 4280.42 *15* from 1995Bo05. E_γ,I_γ: This γ is also placed as a primary transition in (n,γ) E=thermal. 1995Bo05 in (n,γ) E=thermal state that Iγ(4280.31) in 4232-4280 cascade is less than 1 per 1000 neutron captures.
4280.31kh *8*	5.0k *3*	8611.72	2^+	4331.52	$(1,2^+)$	E_γ: weighted average of 4280.28 *8* from 1990Is07 and 4280.42 *15* from 1995Bo05. I_γ: weighted average of 4.8 *4* from 1990Is07 and 5.3 *5* from 1995Bo05.
4287.88 *15*	8.5 *4*	8611.72	2^+	4323.51	1^-	E_γ: unweighted average of 4288.03 *6* from 1990Is07 and 4287.73 *12* from 1995Bo05. I_γ: weighted average of 8.6 *4* from 1990Is07 and 8.3 *6* from 1995Bo05.
x4318.8 *3*	1.90 *22*					E_γ: weighted average of 4318.8 *3* from 1990Is07 and 4318.7 *4* from 1995Bo05. I_γ: 2.0 *4* from 1990Is07 (renormalized by 1995Bo05) and 1.87 *22* from 1995Bo05.
4323.37 *7*	10.7 *6*	4323.51	1^-	0.0	0^+	E_γ: weighted average of 4323.39 *7* from 1990Is07 and

Continued on next page (footnotes at end of table)

^{137}Ba(n,γ) E=thermal 1995Bo05,1990Is07 (continued)

γ(^{138}Ba) (continued)

E_γ [†‡]	I_γ [†‡i]	E_i(level)	J_i^π	E_f	J_f^π	Comments
						4323.31 *13* from 1995Bo05. E_γ: weighted average of 2923.37 *14* from 1990Is07 and 2923.96 *11* from 1995Bo05.
4332.23[jh] *6*	13.0[j] *6*	4331.52	(1,2$^+$)	0.0	0$^+$	E_γ: weighted average of 4332.21 *6* from 1990Is07 and 4332.30 *11* from 1995Bo05. I_γ: weighted average of 13.5 *6* from 1990Is07 and 12.4 *6* from 1995Bo05.
4332.23[jh] *6*	13.0[j] *6*	8611.72	2$^+$	4279.34	(1,2)$^-$	E_γ: weighted average of 4332.21 *6* from 1990Is07 and 4332.30 *11* from 1995Bo05. I_γ: weighted average of 13.5 *6* from 1990Is07 and 12.4 *6* from 1995Bo05.
[x]4349.15 *8*	2.4 *3*					E_γ: weighted average of 4349.16 *8* from 1990Is07 and 4348.8 *4* from 1995Bo05. I_γ: 2.7 *4* from 1990Is07 (renormalized by 1995Bo05) and 2.2 *3* from 1995Bo05.
4369.46 *5*	8.7 *5*	8611.72	2$^+$	4242.09	(1,2$^+$)	E_γ: weighted average of 4369.47 *5* from 1990Is07 and 4369.44 *9* from 1995Bo05. I_γ: weighted average of 8.4 *3* from 1990Is07 and 9.5 *5* from 1995Bo05.
4414.24 *21*	2.1 *4*	8611.72	2$^+$	4197.99	(1,2,3)	E_γ: weighted average of 4414.42 *25* from 1990Is07 and 4414.12 *21* from 1995Bo05. Unassigned by 1990Is07. I_γ: 2.3 *4* from 1990Is07 (renormalized by 1995Bo05) and 1.8 *5* from 1995Bo05.
[x]4432.2[@] *20*	4.0[@]					
4445.40 *7*	5.8 *3*	4445.46	1$^-$	0.0	0$^+$	E_γ: weighted average of 4445.38 *5* from 1990Is07 and 4445.61 *16* from 1995Bo05. I_γ: weighted average of 5.9 *3* from 1990Is07 and 5.2 *6* from 1995Bo05.
[x]4454.65[l] *21*	2.9 *4*					
4469.07 *25*	1.6 *9*	8611.72	2$^+$	4142.85	(1)$^-$	E_γ: weighted average of 4469.25 *25* from 1990Is07 and 4468.8 *3* from 1995Bo05. I_γ: unweighted average of 2.4 *5* from 1990Is07 and 0.70 *9* from 1995Bo05.
4481.7 *6*	0.54 *7*	8611.72	2$^+$	4130.63		E_γ: weighted average of 4482.8 *5* from 1990Is07 and 4481.7 *6* from 1995Bo05. Unassigned by 1990Is07. I_γ: from 1995Bo05. Other: 1.2 *4* from 1990Is07 (renormalized by 1995Bo05).
4496.95 *21*	3.6 *4*	8611.72	2$^+$	4115.32	(1,2$^+$)	E_γ: other: 4495.50 *17*, unassigned in 1990Is07.
[x]4501.8 *6*	1.1[ce] *3*					
4531.69 *7*	3.6 *12*	8611.72	2$^+$	4079.93	(1)$^-$	E_γ: weighted average of 4531.67 *5* from 1990Is07 and 4531.96 *21* from 1995Bo05. I_γ: unweighted average of 4.79 *18* from 1990Is07 and 2.4 *6* from 1995Bo05.
4535.94 *6*	3.92 *15*	4536.01	1$^-$	0.0	0$^+$	E_γ: weighted average of 4535.93 *6* from 1990Is07 and 4536.02 *24* from 1995Bo05. I_γ: weighted average of 3.85 *15* from 1990Is07 and 4.10 *25* from 1995Bo05.
[x]4551.05 *11*	1.6 *7*					E_γ: weighted average of 4551.04 *11* from 1990Is07 and 4551.1 *3* from 1995Bo05. I_γ: unweighted average of 2.3 *3* from 1990Is07 and 0.92 *11* from 1995Bo05.
4585.6[j] *7*	1.1[j] *1*	4585.88	(1)$^-$	0.0	0$^+$	
4585.6[j] *7*	1.1[j] *1*	8611.72	2$^+$	4025.99	1$^-$	
[x]4593.6[l] *11*	2.9 *4*					
4598.8 *7*	6.0[cf] *5*	8611.72	2$^+$	4012.93	(1,2$^+$)	E_γ: unweighted average of 4599.42 *6* from 1990Is07 and 4598.1 *4* from 1995Bo05.

Continued on next page (footnotes at end of table)

^{137}Ba(n,γ) E=thermal 1995Bo05,1990Is07 (continued)

$\gamma(^{138}Ba)$ (continued)

E_γ †‡	I_γ †‡i	E_i(level)	J_i^π	E_f	J_f^π	Comments
4609.35 *9*	3.3 *4*	8611.72	2^+	4002.15	$2^{(+)}$	E_γ: weighted average of 4609.36 *9* from 1990Is07 and 4609.2 *3* from 1995Bo05. Unassigned by 1990Is07. I_γ: 3.4 *4* from 1990Is07 (renormalized by 1995Bo05) and 3.2 *4* from 1995Bo05.
4664.12[h] *11*	0.62 *7*	4665.69	$(1^-,2^+)$	0.0	0^+	E_γ: weighted average of 4664.12 *11* from 1990Is07 and 4664.3 *15* from 1995Bo05. Unassigned by 1990Is07. I_γ: from 1995Bo05. Other: 0.99 *11* from 1990Is07 (renormalized by 1995Bo05).
4677.7 *3*	2.5 *3*	8611.72	2^+	3934.16	2^+	E_γ: weighted average of 4676.65 *20* from 1990Is07 and 4677.8 *8* from 1995Bo05. I_γ: weighted average of 2.6 *3* from 1990Is07 and 2.3 *4* from 1995Bo05.
4689.62 *5*	19 *3*	8611.72	2^+	3922.07	$(3)^-$	E_γ: weighted average of 4689.61 *5* from 1990Is07 and 4689.73 *19* from 1995Bo05. I_γ: unweighted average of 21.9 *7* from 1990Is07 and 16.8 *11* from 1995Bo05.
4707.21[&] *11*	1.71[&e] *11*	4707.41	1^-	0.0	0^+	E_γ: unassigned γ from 1990Is07, placed by 1995Bo05.
[x]4739.76 *8*	1.9 *5*					E_γ: weighted average of 4739.76 *8* from 1990Is07 and 4739.8 *3* from 1995Bo05. I_γ: unweighted average of 2.40 *13* from 1990Is07 and 1.41 *13* from 1995Bo05.
4773.89 *22*	9.0 *7*	8611.72	2^+	3837.87	(2^+)	
4855.11 *14*	1.6 *3*	4855.25	$1^{(-)}$	0.0	0^+	E_γ: weighted average of 4855.11 *14* from 1990Is07 and 4855.1 *5* from 1995Bo05. Unassigned by 1990Is07. I_γ: weighted average of 1.55 *29* from 1990Is07 (renormalized by 1995Bo05) and 1.7 *13* from 1995Bo05.
[x]4876.68 *11*	1.58 *19*					E_γ: weighted average of 4876.69 *8* from 1990Is07 and 4875.7 *7* from 1995Bo05. I_γ: from 1995Bo05. Other: 2.67 *21* from 1990Is07 (renormalized by 1995Bo05).
[x]4881.25 *9*	2.44[cf] *23*					E_γ: weighted average of 4881.25 *9* from 1990Is07 and 4881.3 *4* from 1995Bo05.
4918.13[&g] *13*	1.05[&] *14*	8611.72	2^+	3693.62		
[x]4925.12 *9*	1.28 *8*					E_γ: weighted average of 4925.13 *6* from 1990Is07 and 4924.1 *7* from 1995Bo05. I_γ: from 1995Bo05. Other: 3.06 *21* from 1990Is07 (renormalized by 1995Bo05).
4968.38[h] *6*	15 *4*	8611.72	2^+	3643.61	2^+	E_γ: weighted average of 4968.39 *6* from 1990Is07 and 4968.18 *22* from 1995Bo05. I_γ: unweighted average of 19.1 *7* from 1990Is07 and 10.3 *6* from 1995Bo05.
5010.92 *7*	2.97[cf] *17*	8611.72	2^+	3600.70	1	
5107.6 *3*	8.72 *25*	8611.72	2^+	3504.01	2^-	E_γ: unweighted average of 5107.35 *5* from 1990Is07 and 5107.84 *21* from 1995Bo05. I_γ: weighted average of 8.83 *25* from 1990Is07 and 8.3 *5* from 1995Bo05.
5169.10 *15*	1.9 *3*	8611.72	2^+	3442.41	$2^{(+)}$	E_γ: weighted average of 5169.05 *9* from 1990Is07 and 5169.6 *3* from 1995Bo05. I_γ: unweighted average of 2.14 *14* from 1990Is07 and 1.55 *14* from 1995Bo05.
5235.70 *8*	1.25 *7*	8611.72	2^+	3376.02	3	E_γ: weighted average of 5235.71 *8* from 1990Is07 and 5235.4 *4* from 1995Bo05. Unassigned by 1990Is07. I_γ: from 1995Bo05. Other: 1.55 *9* from 1990Is07 (renormalized by 1995Bo05).
5244.71[&] *8*	1.62[&] *9*	8611.72	2^+	3366.80	2^+	

Continued on next page (footnotes at end of table)

^{137}Ba(n,γ) E=thermal 1995Bo05,1990Is07 (continued)

γ(^{138}Ba) (continued)

E_γ †‡	I_γ †‡*i*	E_i(level)	J_i^π	E_f	J_f^π	Comments
5272.94 *5*	10.8 *9*	8611.72	2^+	3338.65	2^+	E_γ: weighted average of 5272.93 *5* from 1990Is07 and 5273.08 *22* from 1995Bo05. I_γ: unweighted average of 11.6 *3* from 1990Is07 and 9.9 *5* from 1995Bo05.
x5308.0 *3*	2.59 *21*					E_γ: weighted average of 5308.1 *3* from 1990Is07 and 5307.6 *5* from 1995Bo05. I_γ: from 1995Bo05. Other: 1.16 *15* from 1990Is07 (renormalized by 1995Bo05).
5354.19 *15*	0.8 *3*	8611.72	2^+	3257.42	3	E_γ: weighted average of 5354.20 *15* from 1990Is07 and 5353.1 *15* from 1995Bo05. I_γ: unweighted average of 1.10 *11* from 1990Is07 and 0.57 *7* from 1995Bo05.
5369.11 *20*	0.76 *19*	8611.72	2^+	3242.31	3	E_γ: weighted average of 5369.15 *20* from 1990Is07 and 5368.3 *9* from 1995Bo05. I_γ: unweighted average of 0.95 *10* from 1990Is07 and 0.57 *9* from 1995Bo05.
x5418.2@ *20*	3.7@					
5448.8 *4*	8.5 *23*	8611.72	2^+	3163.06	$(2)^+$	E_γ: unweighted average of 5449.19 *5* from 1990Is07 and 5448.36 *22* from 1995Bo05. I_γ: unweighted average of 10.7 *3* from 1990Is07 and 6.2 *3* from 1995Bo05.
5526.63&l *9*	2.9& *3*	8611.72	2^+	3085?		
5561.80a *6*	3.85a *19*	8611.72	2^+	3049.78	2^+	E_γ: weighted average of 5561.80 *6* from 1990Is07 and 5561.8 *3* from 1995Bo05. I_γ: weighted average of 3.74 *19* from 1990Is07 and 3.97 *20* from 1995Bo05.
5620.0 *5*	1.7 *5*	8611.72	2^+	2991.29	3^+	E_γ: unweighted average of 5620.53 *11* from 1990Is07 and 5619.5 *3* from 1995Bo05. I_γ: unweighted average of 1.23 *7* from 1990Is07 and 2.23 *11* from 1995Bo05.
5680.39 *9*	1.3 *5*	8611.72	2^+	2931.30	2^+	E_γ: weighted average of 5680.38 *9* from 1990Is07 and 5680.6 *5* from 1995Bo05. I_γ: unweighted average of 1.71 *8* from 1990Is07 and 0.81 *4* from 1995Bo05.
5695.1 *5*	1.4 *4*	8611.72	2^+	2916.84	$(1,2^+)$	E_γ: unweighted average of 5694.56 *9* from 1990Is07 and 5695.6 *4* from 1995Bo05. I_γ: unweighted average of 1.81 *8* from 1990Is07 and 0.95 *5* from 1995Bo05.
x5716@ *2*	4.0@					
5730.84 *4*	99 *2*	8611.72	2^+	2880.72	3^-	E_γ: weighted average of 5730.83 *4* from 1990Is07 and 5730.93 *15* from 1995Bo05. I_γ: from 1990Is07. 1995Bo05 normalize their Iγ with respect to 1436γ, 5730γ of 1990Is07 and get Iγ(5730γ)=95 *5*.
x5752.9@ *20*	3.5@					
5816.82 *15*	0.7 *3*	8611.72	2^+	2794.84	$(1,2^+)$	E_γ: weighted average of 5815.77 *15* from 1990Is07 and 5816.0 *3* from 1995Bo05. I_γ: weighted average of 1.01 *8* from 1990Is07 and 0.33 *9* from 1995Bo05. I_γ: has interference with background line (1995Bo05).
5831.06h *11*	0.9 *4*	8611.72	2^+	2779.59	4^+	E_γ: weighted average of 5831.06 *11* from 1990Is07 and 5831.5 *11* from 1995Bo05. I_γ: unweighted average of 1.33 *10* from 1990Is07 and 0.5 *2* from 1995Bo05.
5972.36 *5*	6.56 *20*	8611.72	2^+	2639.26	2^+	E_γ: weighted average of 5972.35 *5* from 1990Is07 and 5972.52 *19* from 1995Bo05.

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^{137}Ba(n,γ) E=thermal 1995Bo05,1990Is07 (continued)

γ(^{138}Ba) (continued)

E_γ †‡	I_γ †‡*i*	E_i(level)	J_i^π	E_f	J_f^π	Comments
						I_γ: weighted average of 6.64 *13* from 1990Is07 and 6.1 *3* from 1995Bo05.
6028.47 *5*	13.7 *9*	8611.72	2^+	2583.07	1^+	E_γ: weighted average of 6028.48 *4* from 1990Is07 and 6028.30 *15* from 1995Bo05. I_γ: unweighted average of 14.6 *3* from 1990Is07 and 12.8 *7* from 1995Bo05.
[x]6129.42 *6*	0.70 *4*					E_γ: weighted average of 6129.41 *6* from 1990Is07 and 6130.1 *7* from 1995Bo05. I_γ: from 1995Bo05. Other: 3.86 *21* from 1990Is07 (renormalized by 1995Bo05).
6165.8 *4*	0.97 *10*	8611.72	2^+	2445.55	3^+	E_γ: unweighted average of 6166.23 *13* from 1990Is07 and 6165.4 *4* from 1995Bo05. I_γ: unweighted average of 0.87 *7* from 1990Is07 and 1.06 *6* from 1995Bo05.
[x]6210.7 *3*	0.81 *10*					E_γ: weighted average of 6210.58 *22* from 1990Is07 and 6211.8 *8* from 1995Bo05. I_γ: from 1995Bo05. Other: 0.29 *4* from 1990Is07 (renormalized by 1995Bo05).
6304.3 *11*	0.38 *5*	8611.72	2^+	2307.58	4^+	E_γ: weighted average of 6303.70 *11* from 1990Is07 and 6304.3 *11* from 1995Bo05. I_γ: weighted average of 0.40 *5* from 1990Is07 and 0.3 *1* from 1995Bo05.
6394.3 *5*	0.64 *4*	8611.72	2^+	2217.83	2^+	E_γ: unweighted average of 6393.81 *13* from 1990Is07 and 6394.8 *3* from 1995Bo05. I_γ: weighted average of 0.64 *4* from 1990Is07 and 0.71 *25* from 1995Bo05.
6421.48 *5*	4.59 *12*	8611.72	2^+	2190.01	$(1,2^+)$	E_γ: weighted average of 6421.49 *5* from 1990Is07 and 6421.31 *17* from 1995Bo05. I_γ: weighted average of 4.57 *12* from 1990Is07 and 4.66 *24* from 1995Bo05.
[x]6487.5 *3*	0.50 *10*					E_γ: weighted average of 6487.56 *22* from 1990Is07 and 6485.9 *11* from 1995Bo05. I_γ: 0.51 *10* from 1990Is07 (renormalized by 1995Bo05) and 0.39 *3* from 1995Bo05.
7175.59 *6*	1.37 *4*	8611.72	2^+	1435.78	2^+	E_γ: weighted average of 7175.57 *6* from 1990Is07 and 7175.64 *10* from 1995Bo05. I_γ: weighted average of 1.36 *4* from 1990Is07 and 1.39 *8* from 1995Bo05.
8611.27 *10*	0.66 *22*	8611.72	2^+	0.0	0^+	E_γ: weighted average of 8611.28 *10* from 1990Is07 and 8611.2 *3* from 1995Bo05. I_γ: unweighted average of 0.87 *4* from 1990Is07 and 0.44 *4* from 1995Bo05.

† From 1995Bo05, unless values are also available in 1990Is07 in which case weighted average is taken, unless otherwise noted. Values of Iγ are for per 1000 neutron captures. 1995Bo05 normalized their Iγ with respect to 1436γ, 5730γ of 1990Is07. As stated in 1990Is07, a 8% uncertainty due to the uncertainty in σ_γ of ^{137}Ba has to be added to the quoted uncertainty in absolute Iγ. The evaluator has assumed the same for absolute Iγ in 1995Bo05. Data are also available in 1968Ma35 and 1968Bu20 but less complete.

‡ Additional information 1.

[#] Observed in coincidence in 1995Bo05.

[@] From 1968Bu20. Values of Iγ are renormalized to Iγ(1435.8γ)=399 by evaluator. Those unplaced ones were not seen by 1990Is07 and 1995Bo05.

[&] Not seen by 1995Bo05, from 1990Is07 if Eγ>1435, otherwise 1968Ma35. Values of Iγ from 1968Ma35 are renormalized to

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^{137}Ba(n,γ) E=thermal 1995Bo05,1990Is07 (continued)

$\gamma(^{138}Ba)$ (continued)

Iγ(1435.8γ)=399 by evaluator.

[a] Complex peak (1995Bo05).

[b] Possible contribution due to strong 3641γ in ^{139}Ba.

[c] Interference from escape peak in 1995Bo05.

[d] Renormalized from authors' (1995Bo05) level branching table, with respect to the strongest branch of each level.

[e] Quoted values are deduced by 1995Bo05 from relative Iγ of unassigned transitions listed in Table 7 of 1990Is07 by multiplying a factor of 1/2.313.

[f] From 1990Is07.

[g] Placements are made by 1995Bo05; unplaced in 1990Is07.

[h] Poor fit, differ by more than 3 sigma from calculated. For fitting purpose only, uncertainties are increased by a factor of 2 except for the following γ rays by a factor 3: 364.65, 3049.27, 4280.31, 4332.23, 4664.12, 5831.06.

[i] For intensity per 100 neutron captures, multiply by 0.1.

[j] Multiply placed with undivided intensity.

[k] Multiply placed with intensity suitably divided.

[l] Placement of transition in the level scheme is uncertain.

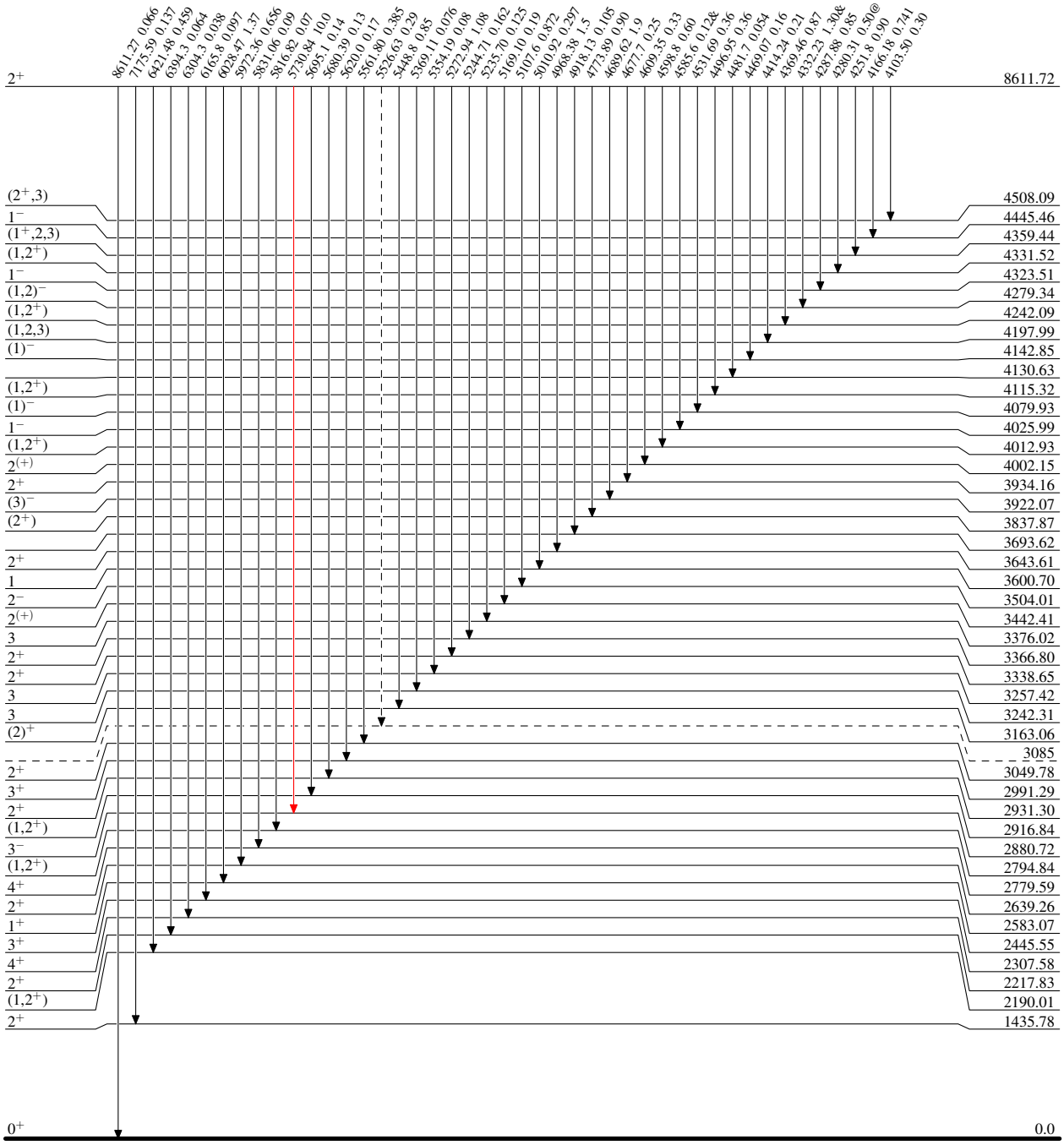
[x] γ ray not placed in level scheme.

^{137}Ba(n,γ) E=thermal 1995Bo05,1990Is07

Level Scheme

Intensities: I_γ per 100 neutron captures
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided

Legend
$I_\gamma < 2\% \times I_\gamma^{max}$
$I_\gamma < 10\% \times I_\gamma^{max}$
$I_\gamma > 10\% \times I_\gamma^{max}$
γ Decay (Uncertain)



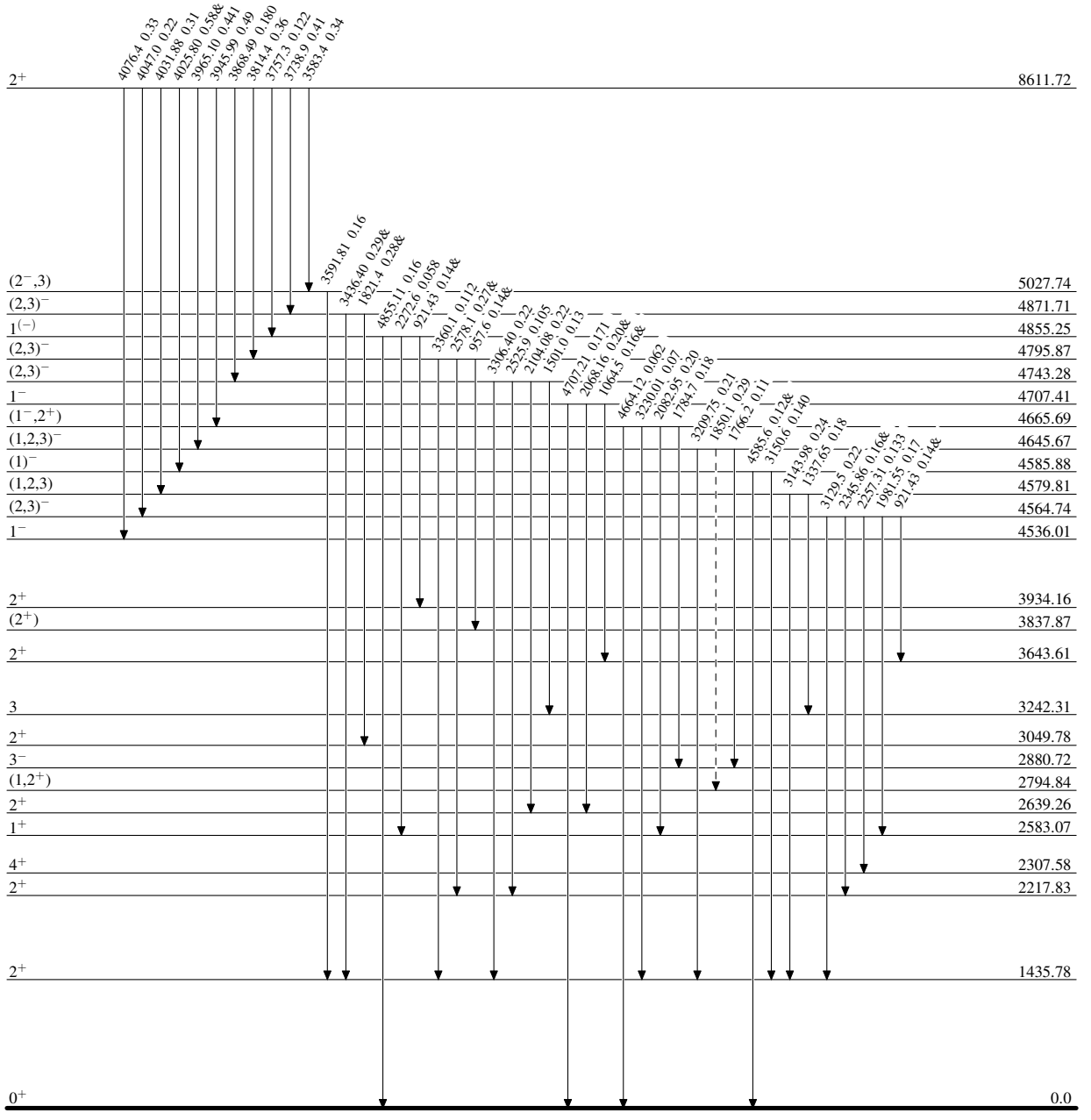
$^{138}_{56}Ba_{82}$

^{137}Ba(n,γ) E=thermal 1995Bo05,1990Is07

Level Scheme (continued)

Intensities: I_γ per 100 neutron captures
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided

Legend
$I_\gamma < 2\% \times I_\gamma^{max}$
$I_\gamma < 10\% \times I_\gamma^{max}$
$I_\gamma > 10\% \times I_\gamma^{max}$
γ Decay (Uncertain)



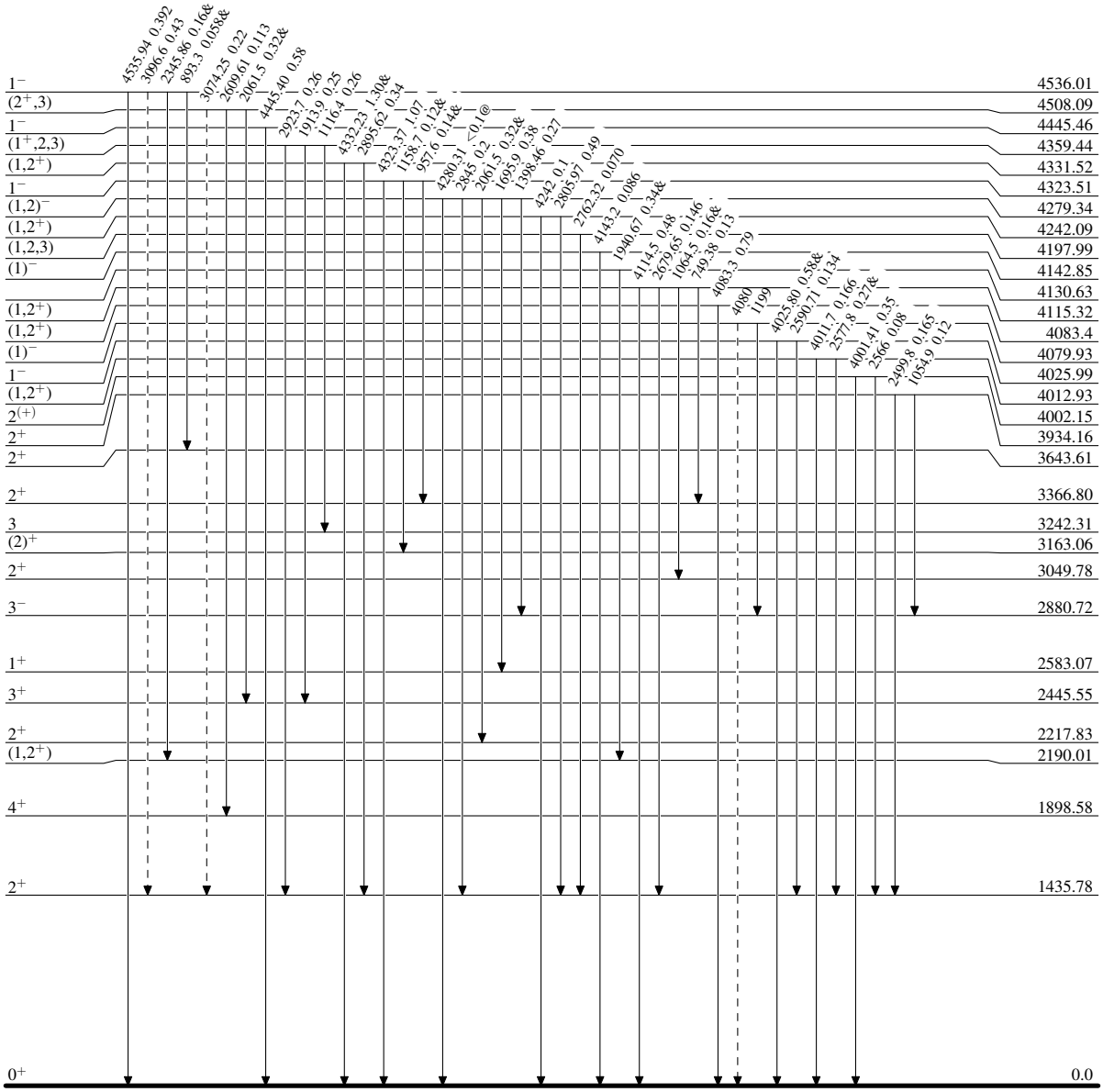
$^{138}_{56}Ba_{82}$

^{137}Ba(n,γ) E=thermal 1995Bo05,1990Is07

Level Scheme (continued)

Intensities: I_γ per 100 neutron captures
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided

Legend
$I_\gamma < 2\% \times I_\gamma^{max}$
$I_\gamma < 10\% \times I_\gamma^{max}$
$I_\gamma > 10\% \times I_\gamma^{max}$
γ Decay (Uncertain)



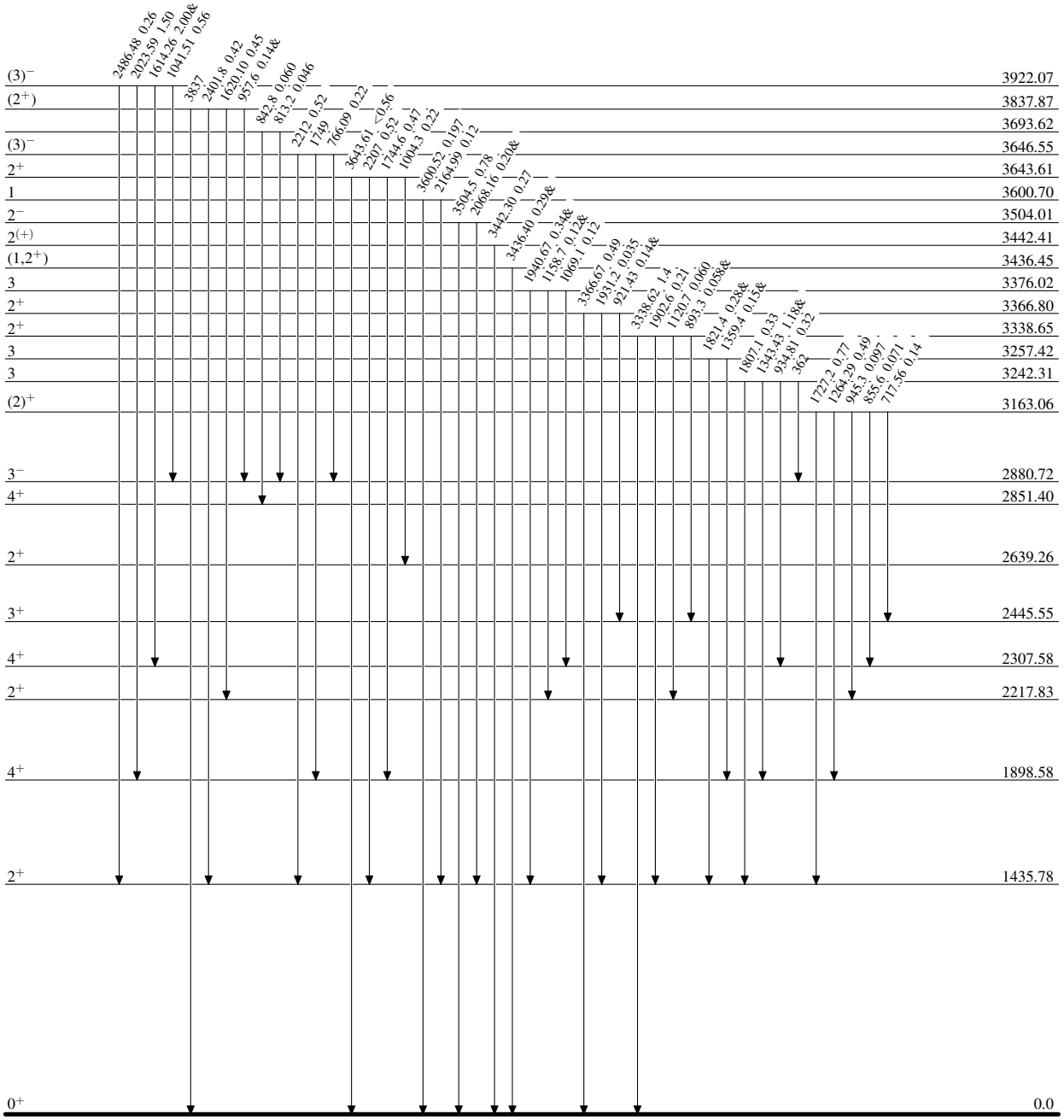
$^{138}_{56}Ba_{82}$

^{137}Ba(n,γ) E=thermal 1995Bo05,1990Is07

Level Scheme (continued)

Intensities: I_γ per 100 neutron captures
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided

Legend
$I_\gamma < 2\% \times I_\gamma^{max}$
$I_\gamma < 10\% \times I_\gamma^{max}$
$I_\gamma > 10\% \times I_\gamma^{max}$



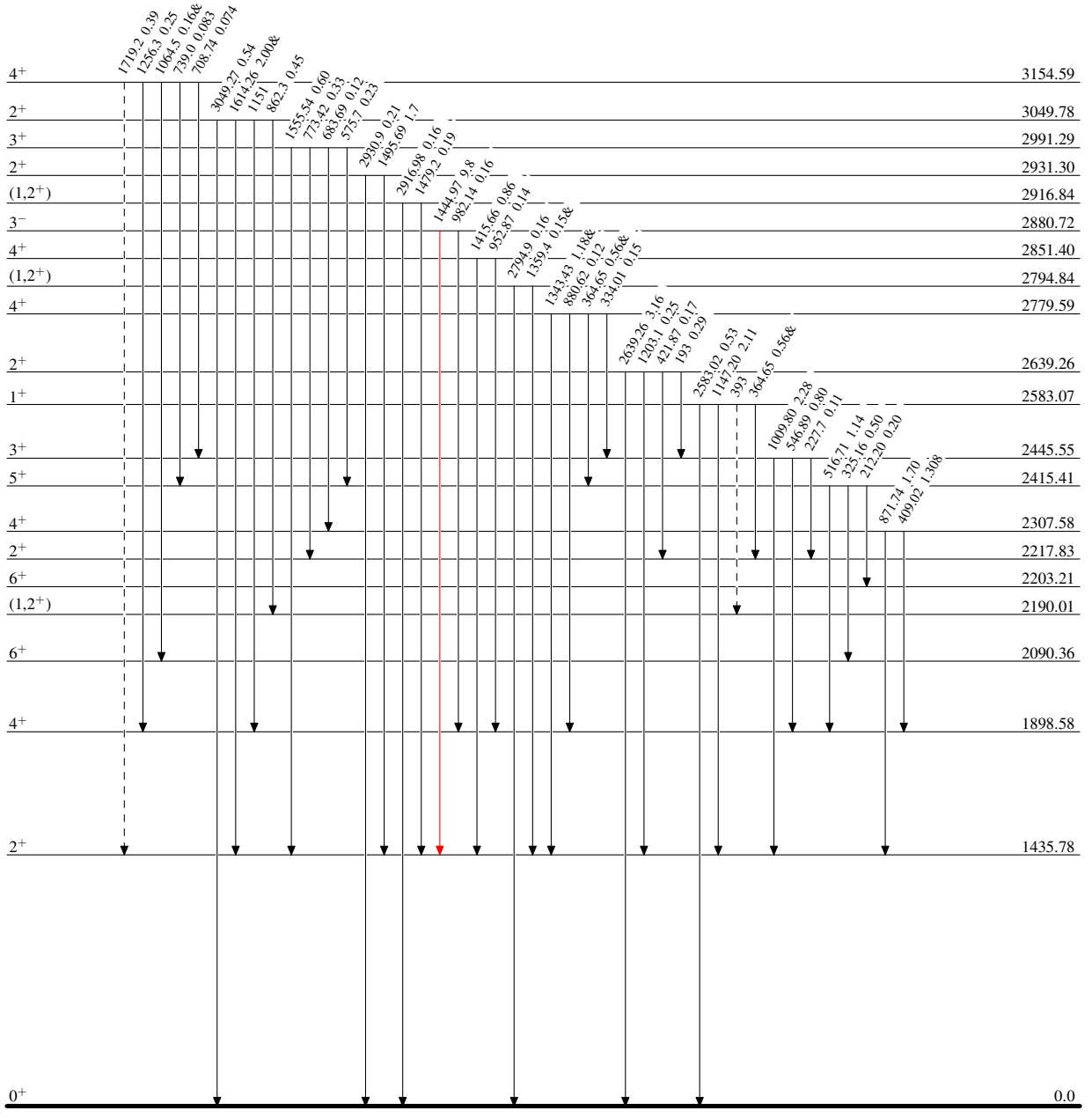
$^{138}_{56}Ba_{82}$

^{137}Ba(n,γ) E=thermal 1995Bo05,1990Is07

Level Scheme (continued)

Intensities: I_γ per 100 neutron captures
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided

Legend
- $I_\gamma < 2\% \times I_\gamma^{max}$
- $I_\gamma < 10\% \times I_\gamma^{max}$
- $I_\gamma > 10\% \times I_\gamma^{max}$
- γ Decay (Uncertain)



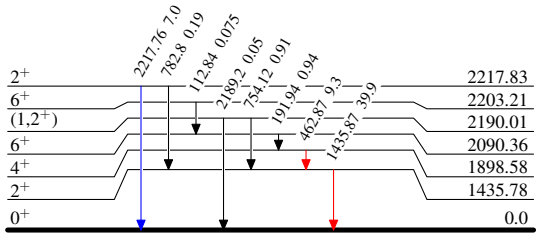
$^{138}_{56}Ba_{82}$

^{137}Ba(n,γ) E=thermal 1995Bo05,1990Is07

Level Scheme (continued)

Intensities: I_γ per 100 neutron captures
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided

Legend
$I_\gamma < 2\% \times I_\gamma^{max}$
$I_\gamma < 10\% \times I_\gamma^{max}$
$I_\gamma > 10\% \times I_\gamma^{max}$



$^{138}_{56}Ba_{82}$