Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	J. Katakura, Z. D. Wu	NDS 109, 1655 (2008)	1-Apr-2008

Q(β^-)=−8.83×10^3 *6*; S(n)=11506 *18*; S(p)=5335 *18*; Q(α)=658 *18* 2012Wa38
Note: Current evaluation has used the following Q record.
Q-$_{exp}$=8930 *110* (1998Ko66).
Q(β^-)=−8.83×10^3 *6*; S(n)=11506 *17*; S(p)=5335 *17*; Q(α)=658 *17* 2003Au03

^{124}Ba Levels

Nomenclature for quasiparticle orbitals:
Neutrons: 1/2[411] from $s_{1/2}$, $d_{3/2}$ orbitals; 5/2[402] and 5/2[413] from $d_{5/2}$, $g_{7/2}$ orbitals; 7/2[523] and 5/2[532] from $h_{11/2}$ orbital.
Protons: 3/2[422] and 1/2[420] from $d_{5/2}$, $g_{7/2}$ orbitals; 9/2[404] from $g_{9/2}$ orbital; 1/2[550] and 3/2[541] from $h_{11/2}$ orbital.
A: ν1/2[411], α=+1/2.
B: ν1/2[411], α=−1/2.
C: ν5/2[402], α=+1/2.
D: ν5/2[402], α=−1/2.
α': ν5/2[413], α=+1/2.
B′: ν5/2[413], α=−1/2.
E: ν7/2[523], α=−1/2.
F: ν7/2[523], α=+1/2.
G: ν5/2[532], α=−1/2.
H: ν5/2[532], α=+1/2.
a: π3/2[422], α=+1/2.
b: π3/2[422], α=−1/2.
c: π1/2[420], α=+1/2.
d: π1/2[422], α=−1/2.
a′: π9/2[404], α=+1/2.
b′: π9/2[404], α=−1/2.
e: π1/2[550], α=−1/2.
f: π1/2[550], α=+1/2.
g: π3/2[541], α=−1/2.
h: π3/2[541], α=+1/2.

Cross Reference (XREF) Flags

A	^{124}La ε decay
B	(HI,xnγ)
C	^{125}Ce εp decay
D	^{64}Ni(^{64}Ni,4nγ)

E(level)[†]	J$^\pi$[l]	T$_{1/2}$	XREF	Comments
0.0[#]	0$^+$	11.0 min *5*	ABCD	%ε+%β^+=100 T$_{1/2}$: weighted average of 11.9 min *10* (γ(t)) (1972Dr06), 10.5 min *5* (β(t)) (1975Ra03), 12.0 min *15* (γ(t)) (1967DaZY). <r^2>$^{1/2}$=4.819 fm *5* (2004An14, evaluation).
229.91[#] *10*	2$^+$	191 ps *8*	ABCD	J$^\pi$: E2 γ to 0$^+$. T$_{1/2}$: From recoil-distance Doppler shift (RDDS) method (1998Uc01). Other: 0.297 ns *26* from $\beta\gamma$(t) (1992Mo13). 2001Ra27 evaluation gives 191 ps *8*.

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Adopted Levels, Gammas (continued)

^{124}Ba Levels (continued)

E(level)[†]	J^{π}[l]	XREF	Comments
651.66[#] *13*	4^+	ABCD	J^{π}: stretched E2 γ to 2^+.
873.20[@] *12*	2^+	AB D	J^{π}: M1 γ to 2^+. E2 γ to 0^+.
898.0? *10*	0^+		
1071.3 *10*	0^+	A	J^{π}: from $\gamma\gamma(\theta)$ in ^{124}La ε decay.
1162.04[@] *14*	(3^+)	AB D	J^{π}: (3^+) member of γ band.
1228.39[#] *14*	6^+	ABCD	J^{π}: E2 γ to 4^+.
1324.78[@] *13*	4^+	AB D	J^{π}: M1(+E2) γ to 4^+. E2 γ to 2^+.
1353.3 *10*	(2^+)	A	J^{π}: γ to 0^+.
1356.9 *10*	0^+	A	J^{π}: from $\gamma\gamma(\theta)$ in ^{124}La ε decay.
1672.25[@] *16*	$(5)^+$	AB D	J^{π}: M1,E2 γ to 4^+. γ's to (3^+) and 6^+.
1722.1 *8*	(3^-)	B D	
1858.14[@] *15*	$(6)^+$	AB D	J^{π}: E2 γ to 4^+.
1912.92[b] *20*	5^-	AB D	J^{π}: E1 γ's to 4^+ and 6^+.
1923.25[#] *16*	8^+	AB D	J^{π}: stretched E2 γ to 6^+.
2034.2[c] *3*	(4^-)	AB D	
2261.79[b] *16*	$(7)^-$	AB D	J^{π}: E1 γ to 6^+. M1,E2 γ to 5^-.
2267.08 *19*	5^-	AB D	J^{π}: E1 γ to 6^+. E1 γ to 4^+.
2285.31[@] *19*	(7^+)	B D	J^{π}: Q γ to (5^+). D γ to 6^+.
2359.46[c] *18*	$(6)^-$	AB D	J^{π}: E1 γ to 6^+. M1(+E2) γ to 5^-.
2479.03[@] *18*	(8^+)	AB D	J^{π}: Q γ to $(6)^+$; $(8)^+$ member of γ band.
2497.6[e] *3*	(6^-)	B D	
2647.47 *24*	(7^-)	AB D	
2687.50[#] *20*	(10^+)	B D	
2690.8[d] *3*	(7^-)	B D	
2704.91[c] *18*	$(8)^-$	AB D	
2721.65[b] *18*	$(9)^-$	AB D	J^{π}: E1 γ to 8^+. Q γ to $(7)^-$.
2906.5[e] *3*	(8^-)	B D	
2975.18[@] *21*	(9^+)	B D	J^{π}: (9^+) member of γ band.
3095.8 *4*	(7^-)	A	J^{π}: (E1) γ to 8^+. γ to 6^+.
3109.8[d] *3*	(9^-)	B D	
3156.76[c] *24*	(10^-)	B D	
3177.1[@] *5*	(10^+)	B D	J^{π}: Q γ to (8^+) member of γ band.
3286.91[b] *19*	$(11)^-$	B D	
3335.5[e] *4*	(10^-)	B D	
3436.2[&] *3*	(12^+)	B D	
3591.6[d] *4*	(11^-)	B D	
3691.8[a] *4*	(12^+)	B D	
3694.0[@] *3*	(11^+)	B D	J^{π}: (11^+) member of γ band.
3772.6[c] *4*	(12^-)	B D	
3829.5 *11*	(11)	D	
3891.5[e] *5*	(12^-)	B D	
3968.21[b] *22*	$(13)^-$	B D	
4125.9[&] *4*	(14^+)	B D	
4228.0[d] *5*	(13^-)	B D	
4381.8[h] *8*	(11^+)	D	
4407.3[a] *4*	(14^+)	B D	
4534.3[c] *6*	(14^-)	B D	
4551.5[i] *10*	(12^+)	D	

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Adopted Levels, Gammas (continued)

^{124}Ba Levels (continued)

E(level)[†]	Jπ[l]	XREF
4603.8[e] 5	(14−)	B D
4761.8[b] 3	(15−)	B D
4766.3[h] 10	(13+)	D
4892.5[&] 6	(16+)	B D
5009.7[d] 5	(15−)	B D
5027.3[i] 10	(14+)	D
5215.8[a] 6	(16+)	B D
5329.1[h] 10	(15+)	D
5392.4[c] 7	(16−)	B D
5446.0[e] 6	(16−)	B D
5638.9[b] 5	(17−)	B D
5668.0[i] 11	(16+)	D
5725.0[f] 7	(17+)	B D
5763.2[&] 7	(18+)	B D
5905.8[d] 7	(17−)	B D
6044.8[h] 11	(17+)	D
6080.4[a] 7	(18+)	B D
6189.6[g] 6	(18+)	D
6290.4[c] 8	(18−)	B D
6383.0[e] 7	(18−)	B D
6452.9[i] 11	(18+)	D
6556.0[b] 7	(19−)	B D
6581.3[f] 4	(19+)	D
6704.0 7	(18)	D
6711.1[&] 8	(20+)	B D
6870.8[d] 8	(19−)	B D
6896.9[h] 12	(19+)	D
6999.4[a] 8	(20+)	B D
7081.5[g] 6	(20+)	D
7229.9[c] 9	(20−)	B D
7362.9[i] 13	(20+)	D
7366.0[e] 8	(20−)	B D
7499.9[f] 5	(21+)	D
7502.6[b] 8	(21−)	B D
7716.4[&] 9	(22+)	B D
7863.8[h] 13	(21+)	D
7876.4[d] 10	(21−)	D
7983.4[a] 9	(22+)	B D
8098.3[g] 6	(22+)	D
8262.5[c] 7	(22−)	D
8369.2[i] 14	(22+)	D
8408.2[e] 10	(22−)	D
8483.5[f] 5	(23+)	D
8512.4[b] 9	(23−)	B D
8794.4[&] 10	(24+)	B D
8904.4[h] 15	(23+)	D
8910.4[d] 12	(23−)	D
9053.4[a] 10	(24+)	B D
9176.9[g] 7	(24+)	D
9380.1[c] 9	(24−)	D
9427.7[i] 16	(24+)	D
9525.3[e] 12	(24−)	D
9561.8[f] 8	(25+)	D
9613.1[b] 10	(25−)	B D
9916.4[j] 8	(25)	D
9950.7[&] 10	(26+)	B D
9975.0[h] 16	(25+)	D
9981.2[d] 13	(25−)	D
10220.0[a] 7	(26+)	D
10308.3[g] 9	(26+)	D
10519.6[i] 17	(26+)	D
10561.3[c] 11	(26−)	D
10703.7[e] 13	(26−)	D
10746.6[f] 10	(27+)	D
10811.9[b] 11	(27−)	D
11067.7[j] 10	(27)	D
11077.4[h] 17	(27+)	D
11115.4 11	(26)	D
11182.5[&] 11	(28+)	B D
11471.8[a] 9	(28+)	D
11522.5[g] 11	(28+)	D
11648.9[i] 18	(28+)	D
11753.3[c] 13	(28−)	D
12029.5[f] 12	(29+)	D
12116.4[b] 12	(29−)	D
12242.3[h] 18	(29+)	D
12288.9[j] 12	(29)	D
12491.3[&] 12	(30+)	B D
12733.0[a] 11	(30+)	D
12820.4[g] 13	(30+)	D
12859.8[i] 19	(30+)	D
12959.8[c] 14	(30−)	D
13348.3[k] 13	(30)	D
13406.5[f] 13	31+	D
13491.8[h] 19	(31+)	D
13517.2[b] 13	(31−)	D
13590.3[j] 13	(31)	D
13880.4[&] 13	(32+)	B D
14057.6[a] 12	(32+)	D
14184.1[c] 15	(32−)	D
14190.5[g] 14	(32+)	D
14755.2[k] 14	(32)	D
14832.4[h] 20	(33+)	D
14881.2[f] 15	(33+)	D
14979.4[j] 15	(33)	D
15003.7[b] 15	(33−)	D
15335.4[&] 13	(34+)	B D
15459.2[a] 14	(34+)	D
15475.0[c] 17	(34−)	D
15618.0[g] 15	(34+)	D
16029.2[k] 15	(34)	D
16280.4[h] 21	(35+)	D
16425.4[f] 16	(35+)	D
16461.2[j] 16	(35)	D
16775.3[&] 13	(36+)	D
16914.4[‡] 13	(36+)	D
16943.5[a] 15	(36+)	D
17111.3[g] 17	(36+)	D
17435.2[k] 16	(36)	D
18040.9[j] 17	(37)	D
18045.0[f] 17	(37+)	D
18069.7[‡] 14	(38+)	D
18143.7[‡] 14	(38+)	D
18525.3[‡] 14	(38+)	D
18649.1[g] 18	(38+)	D
18909.2[k] 17	(38)	D
19720.6[j] 18	(39)	D
20483.3[k] 18	(40)	D
21501.5[j] 19	(41)	D
22150.1[k] 19	(42)	D
23384.7[j] 20	(43)	D
25371.1[j] 21	(45)	D

[†] From a least-squares fit to adopted gammas.
[‡] Level related to band #1 in figure 1 of 2006Al15 or to band with configuration=efEF.
[#] Band(A): g.s. Band.
[@] Band(B): γ Band.

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Adopted Levels, Gammas (continued)

^{124}Ba Levels (continued)

[&] Band(C): 0-qp to ef to efEF, α=0 Configuration=ef after first crossing at $\hbar\omega$=0.37 MeV, and efEF above second crossing at $\hbar\omega$=0.49 MeV.
[a] Band(D): 0-qp to EF to EFef, α=0 Configuration=EF after first crossing at $\hbar\omega$=0.41 MeV, and EFef above second crossing at $\hbar\omega$=0.44 MeV.
[b] Band(e): eb to ebEF, α=1 Configuration=ebEF after crossing at $\hbar\omega$=0.46 MeV.
[c] Band(E): ea to eaGH to eaGHEF, α=0 Configuration=eaGH after first crossing at $\hbar\omega$=0.44 MeV, and eaGHEF above second crossing at $\hbar\omega$=0.59 MeV.
[d] Band(f): eb′ to eb′EF, α=1 Configuration=eb′EF after crossing at $\hbar\omega$=0.44 MeV.
[e] Band(F): ea′ to ea′EF, α=0 Configuration=ea′EF after crossing at $\hbar\omega$=0.44 MeV.
[f] Band(G): efGH, α=1.
[g] Band(H): efFH, α=0.
[h] Band(I): eb′EA′ to eb′EA′GH, α=1 Configuration=eb′Eα′GH after crossing at $\hbar\omega$=0.52 MeV.
[i] Band(i): eb′FA′ to eb′FA′GH, α=0 Configuration=eb′FA′GH after crossing at $\hbar\omega$=0.52 MeV.
[j] Band(J): Band based on (25), α=1. Possible configuration=$\pi h^2_{11/2}\otimes\nu(h^5_{11/2}i_{13/2})$; Decay to ef band suggests $\pi h^2_{11/2}\otimes\nu h^6_{11/2}$.
[k] Band(K): Band based on (30), α=0. Possibly a six-quasiparticle configuration.
[l] From DCO and angular correlation ratios in ^{64}Ni(^{64}Ni,4nγ), unless otherwise noted.

Adopted Levels, Gammas (continued)

$\gamma(^{124}Ba)$

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[@]	δ[a]	α[b]	Comments
229.91	2^+	229.7 *1*	100[‡]	0.0	0^+	E2		0.1080	B(E2)(W.u.)=113 *5* α(K)=0.0854 *12*; α(L)=0.0179 *3*; α(M)=0.00380 *6*; α(N+..)=0.000919 *13* α(N)=0.000801 *12*; α(O)=0.0001129 *16*; α(P)=4.64×10^{-6} *7*
651.66	4^+	421.1 *1*	100[‡]	229.91	2^+	E2		0.01604	α(K)=0.01336 *19*; α(L)=0.00212 *3*; α(M)=0.000444 *7*; α(N+..)=0.0001092 *16* α(N)=9.45×10^{-5} *14*; α(O)=1.388×10^{-5} *20*; α(P)=7.91×10^{-7} *11*
873.20	2^+	643.4 *6*	100[‡] *8*	229.91	2^+	M1		0.00709	α(K)=0.00611 *9*; α(L)=0.000779 *11*; α(M)=0.0001600 *23*; α(N+..)=4.02×10^{-5} *6* α(N)=3.45×10^{-5} *5*; α(O)=5.31×10^{-6} *8*; α(P)=3.94×10^{-7} *6*
		873.3 *6*	79[‡] *16*	0.0	0^+	E2		0.00244	α(K)=0.00209 *3*; α(L)=0.000280 *4*; α(M)=5.76×10^{-5} *9*; α(N+..)=1.439×10^{-5} *21* α(N)=1.238×10^{-5} *18*; α(O)=1.88×10^{-6} *3*; α(P)=1.293×10^{-7} *19*
898.0?	0^+	668[c] *5*	≈100	229.91	2^+				See ^{124}La ε decay.
		898[c]		0.0	0^+	E0			q_K^2(E0/E2)=1.4 *7*, X(E0/E2)=0.09 *5*, (2005Ki02, evaluation).
1071.3	0^+	841.4[‡]	[‡]	229.91	2^+				
1162.04	(3^+)	510.0 *6*	25	651.66	4^+	D			I_γ: composite line (1990Pi11).
		932.8 *6*	100[‡] *9*	229.91	2^+	D			
1228.39	6^+	576.5 *1*	100	651.66	4^+	E2		0.00672	α(K)=0.00568 *8*; α(L)=0.000824 *12*; α(M)=0.0001711 *24*; α(N+..)=4.24×10^{-5} *6* α(N)=3.66×10^{-5} *6*; α(O)=5.46×10^{-6} *8*; α(P)=3.45×10^{-7} *5* Mult.: from $\gamma(\theta)$ and linear polarization in (HI,xnγ).
1324.78	4^+	451.7 *6*	47[‡] *5*	873.20	2^+	M1,E2		0.0150 *20*	α(K)=0.0128 *19*; α(L)=0.00179 *10*; α(M)=0.000371 *17*; α(N+..)=9.2×10^{-5} *6* α(N)=8.0×10^{-5} *5*; α(O)=1.20×10^{-5} *9*; α(P)=8.0×10^{-7} *15*
		673.1 *6*	100[‡] *11*	651.66	4^+	M1(+E2)	−0.15 *+25−20*	0.00631 *19*	α(K)=0.00544 *17*; α(L)=0.000694 *17*; α(M)=0.000143 *4*; α(N+..)=3.59×10^{-5} *9* α(N)=3.08×10^{-5} *8*; α(O)=4.73×10^{-6} *13*; α(P)=3.51×10^{-7} *12*
		1094.5 *6*	20[‡] *7*	229.91	2^+	E2		1.49×10^{-3}	α(K)=0.001284 *18*; α(L)=0.0001664 *24*; α(M)=3.42×10^{-5} *5*; α(N+..)=8.56×10^{-6} *12* α(N)=7.36×10^{-6} *11*; α(O)=1.122×10^{-6} *16*; α(P)=7.97×10^{-8} *12*
1353.3	(2^+)	1353.3[‡]	[‡]	0.0	0^+				
1356.9	0^+	1127[‡]	[‡]	229.91	2^+				

$^{124}_{56}Ba_{68}$-5

Adopted Levels, Gammas (continued)

$\gamma(^{124}Ba)$ (continued)

E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f	Mult.@	α[b]	Comments
1672.25	$(5)^+$	444.4 *6*	30	1228.39	6^+	D		
		510.0 *6*	37	1162.04	(3^+)	Q		
		1020.8 *6*	100 *12*	651.66	4^+	M1,E2	0.0021 *4*	α(K)=0.0018 *3*; α(L)=0.00023 *4*; α(M)=4.6×10^{-5} *7*; α(N+..)=1.17×10^{-5} *17* α(N)=1.00×10^{-5} *15*; α(O)=1.53×10^{-6} *23*; α(P)=1.12×10^{-7} *20*
1722.1	(3^-)	1492.6 *6*		229.91	2^+	D		
1858.14	$(6)^+$	533.4 *6*	100‡ *11*	1324.78	4^+	E2	0.00826	α(K)=0.00696 *10*; α(L)=0.001031 *15*; α(M)=0.000214 *3*; α(N+..)=5.30×10^{-5} *8* α(N)=4.58×10^{-5} *7*; α(O)=6.81×10^{-6} *10*; α(P)=4.21×10^{-7} *6*
		629.7 *6*	69‡ *11*	1228.39	6^+	M1+E2	0.0064 *11*	α(K)=0.0055 *10*; α(L)=0.00073 *9*; α(M)=0.000151 *18*; α(N+..)=3.8×10^{-5} *5* α(N)=3.3×10^{-5} *4*; α(O)=4.9×10^{-6} *7*; α(P)=3.5×10^{-7} *7*
1912.92	5^-	684.9 *6*	18‡ *4*	1228.39	6^+	E1	1.62×10^{-3}	α(K)=0.001404 *20*; α(L)=0.0001745 *25*; α(M)=3.57×10^{-5} *5*; α(N+..)=8.94×10^{-6} *13* α(N)=7.68×10^{-6} *11*; α(O)=1.173×10^{-6} *17*; α(P)=8.49×10^{-8} *12*
		1260.8 *3*	100‡ *5*	651.66	4^+	E1	5.59×10^{-4}	α(K)=0.000432 *6*; α(L)=5.27×10^{-5} *8*; α(M)=1.075×10^{-5} *15*; α(N+..)=6.29×10^{-5} *9* α(N)=2.32×10^{-6} *4*; α(O)=3.56×10^{-7} *5*; α(P)=2.64×10^{-8} *4*; α(IPF)=6.02×10^{-5} *9*
1923.25	8^+	694.7 *1*	100	1228.39	6^+	E2	0.00419	α(K)=0.00356 *5*; α(L)=0.000496 *7*; α(M)=0.0001026 *15*; α(N+..)=2.55×10^{-5} *4* α(N)=2.20×10^{-5} *3*; α(O)=3.31×10^{-6} *5*; α(P)=2.19×10^{-7} *3*
2034.2	(4^-)	312.0 *6*		1722.1	(3^-)	D		
		1381.9 *6*	100‡ *20*	651.66	4^+	D		
2261.79	$(7)^-$	338.4 *6*	3.0 *15*	1923.25	8^+			
		348.4 *6*	9.0‡ *15*	1912.92	5^-	M1,E2	0.0306 *24*	α(K)=0.026 *3*; α(L)=0.00382 *16*; α(M)=0.00079 *4*; α(N+..)=0.000197 *8* α(N)=0.000170 *8*; α(O)=2.54×10^{-5} *5*; α(P)=1.59×10^{-6} *25*
		1033.7 *1*	100‡ *23*	1228.39	6^+	E1	7.16×10^{-4}	α(K)=0.000620 *9*; α(L)=7.60×10^{-5} *11*; α(M)=1.552×10^{-5} *22*; α(N+..)=3.90×10^{-6} *6* α(N)=3.35×10^{-6} *5*; α(O)=5.13×10^{-7} *8*; α(P)=3.78×10^{-8} *6*
2267.08	5^-	354.0 *6*		1912.92	5^-	D		
		942.4 *6*	51‡ *11*	1324.78	4^+	E1	8.53×10^{-4}	α(K)=0.000739 *11*; α(L)=9.08×10^{-5} *13*; α(M)=1.85×10^{-5} *3*; α(N+..)=4.65×10^{-6} *7* α(N)=4.00×10^{-6} *6*; α(O)=6.12×10^{-7} *9*; α(P)=4.50×10^{-8} *7*
		1038.6 *6*	1.0×10^2‡ *3*	1228.39	6^+	E1	7.09×10^{-4}	α(K)=0.000615 *9*; α(L)=7.53×10^{-5} *11*; α(M)=1.538×10^{-5} *22*; α(N+..)=3.86×10^{-6} *6* α(N)=3.32×10^{-6} *5*; α(O)=5.08×10^{-7} *8*; α(P)=3.75×10^{-8} *6*
		1615.3 *6*	83‡ *17*	651.66	4^+	D		

$^{124}_{56}Ba_{68}$-6

Adopted Levels, Gammas (continued)

$\gamma(^{124}Ba)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[@]	δ[a]	α[b]	Comments
2285.31	(7^+)	612.7 *6*	100	1672.25	$(5)^+$	Q			
		1057.0 *6*	40	1228.39	6^+	D			
2359.46	$(6)^-$	325.5 *3*	42 *6*	2034.2	(4^-)	Q			
		446.3 *3*	71 *13*	1912.92	5^-	M1		0.01749	α(K)=0.01505 *22*; α(L)=0.00194 *3*; α(M)=0.000399 *6*; α(N+..)=0.0001004 *15* α(N)=8.62×10^{-5} *13*; α(O)=1.324×10^{-5} *19*; α(P)=9.76×10^{-7} *14*
		1130.0 *2*	100 *22*	1228.39	6^+	E1		6.14×10^{-4}	α(K)=0.000526 *8*; α(L)=6.43×10^{-5} *9*; α(M)=1.313×10^{-5} *19*; α(N+..)=1.013×10^{-5} *15* α(N)=2.83×10^{-6} *4*; α(O)=4.34×10^{-7} *6*; α(P)=3.21×10^{-8} *5*; α(IPF)=6.84×10^{-6} *11*
2479.03	(8^+)	555.7 *6*	2.4×10^2[#]	1923.25	8^+	D			I_γ: intensity undivided (1990Pi11).
		620.9 *6*	100[#]	1858.14	$(6)^+$	Q			
2497.6	(6^-)	230.5 *1*	100 *19*	2267.08	5^-				I_γ: composite line (1990Pi11).
		824.9 *6*	6[#]	1672.25	$(5)^+$				
2647.47	(7^-)	288.0 *6*	25 *13*	2359.46	$(6)^-$	D			
		380.4 *6*	63 *25*	2267.08	5^-	Q			
		385.7 *6*	88 *25*	2261.79	$(7)^-$	D+Q			
		789.3 *6*	100 *40*	1858.14	$(6)^+$	D			
2687.50	(10^+)	764.4 *1*	100	1923.25	8^+	Q			
2690.8	(7^-)	193.0 *3*	100	2497.6	(6^-)	D			
2704.91	$(8)^-$	345.2 *3*	100 *17*	2359.46	$(6)^-$	E2		0.0291	α(K)=0.0240 *4*; α(L)=0.00409 *6*; α(M)=0.000860 *13*; α(N+..)=0.000210 *3* α(N)=0.000183 *3*; α(O)=2.65×10^{-5} *4*; α(P)=1.385×10^{-6} *20*
		443.0 *4*	13 *7*	2261.79	$(7)^-$	M1		0.0178	α(K)=0.01533 *22*; α(L)=0.00198 *3*; α(M)=0.000407 *6*; α(N+..)=0.0001024 *15* α(N)=8.79×10^{-5} *13*; α(O)=1.349×10^{-5} *20*; α(P)=9.95×10^{-7} *15*
		781.8 *2*	63 *13*	1923.25	8^+				
2721.65	$(9)^-$	459.8 *3*	57 *12*	2261.79	$(7)^-$	Q			
		798.0 *1*	100 *11*	1923.25	8^+	E1		1.18×10^{-3}	α(K)=0.001024 *15*; α(L)=0.0001266 *18*; α(M)=2.59×10^{-5} *4*; α(N+..)=6.49×10^{-6} *9* α(N)=5.58×10^{-6} *8*; α(O)=8.53×10^{-7} *12*; α(P)=6.22×10^{-8} *9*
2906.5	(8^-)	215.9 *3*	100 *50*	2690.8	(7^-)	D(+Q)	−0.21 *+25−15*		
		408.7 *6*	26 *17*	2497.6	(6^-)	Q			
2975.18	(9^+)	689.8 *6*		2285.31	(7^+)				
		1053.0 *6*		1923.25	8^+				
3095.8	(7^-)	834.0[‡] *4*	100[‡] *10*	2261.79	$(7)^-$	M1		0.00381	α(K)=0.00329 *5*; α(L)=0.000416 *6*; α(M)=8.54×10^{-5} *12*; α(N+..)=2.15×10^{-5} *3*

$^{124}_{56}Ba_{68}$-7

$\gamma(^{124}$Ba) (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[@]	α[b]	Comments
								α(N)=1.84×10^{-5} *3*; α(O)=2.83×10^{-6} *4*; α(P)=2.11×10^{-7} *3*
3095.8	(7$^-$)	1173[‡] *1*	>69[‡]	1923.25	8$^+$	(E1)	5.86×10^{-4}	α(K)=0.000492 *7*; α(L)=6.00×10^{-5} *9*; α(M)=1.226×10^{-5} *18*; α(N+..)=2.18×10^{-5} *5* α(N)=2.64×10^{-6} *4*; α(O)=4.05×10^{-7} *6*; α(P)=3.00×10^{-8} *5*; α(IPF)=1.87×10^{-5} *5*
		1867[‡] *1*	98[‡] *20*	1228.39	6$^+$			
3109.8	(9$^-$)	203.2 *6*		2906.5	(8$^-$)	D		
		404.9 *6*	40 *13*	2704.91	(8)$^-$	D		
		419.2 *3*	100 *20*	2690.8	(7$^-$)	Q		
		462.0 *6*		2647.47	(7$^-$)	Q		
3156.76	(10$^-$)	434.7 *6*	4.9 *16*	2721.65	(9)$^-$	D		
		452.0 *1*	100 *30*	2704.91	(8)$^-$	Q		I_γ: composite line (1990Pi11).
3177.1	(10$^+$)	698.7 *6*	100	2479.03	(8$^+$)	Q		
3286.91	(11)$^-$	564.9 *1*	100 *22*	2721.65	(9)$^-$	E2	0.00709	α(K)=0.00599 *9*; α(L)=0.000873 *13*; α(M)=0.000181 *3*; α(N+..)=4.50×10^{-5} *7* α(N)=3.88×10^{-5} *6*; α(O)=5.79×10^{-6} *9*; α(P)=3.63×10^{-7} *5*
		599.8 *6*	19[#]	2687.50	(10$^+$)	D		
3335.5	(10$^-$)	225.8 *3*	46 *11*	3109.8	(9$^-$)	D		
		429.4 *3*	100 *21*	2906.5	(8$^-$)	Q		
3436.2	(12$^+$)	748.3 *1*	100	2687.50	(10$^+$)	Q		
3591.6	(11$^-$)	256.0 *3*	33 *13*	3335.5	(10$^-$)	D		I_γ: composite line (1990Pi11).
		482.2 *3*	100 *21*	3109.8	(9$^-$)	Q		
3691.8	(12$^+$)	255.6 *6*	38 *19*	3436.2	(12$^+$)	D		
		1004.0 *3*	100 *30*	2687.50	(10$^+$)	Q		
3694.0	(11$^+$)	718.8 *6*	100	2975.18	(9$^+$)	Q		
3772.6	(12$^-$)	486.1 *6*	15[#]	3286.91	(11)$^-$	D		
		615.5 *1*	100 *30*	3156.76	(10$^-$)	Q		
3891.5	(12$^-$)	299.9 *3*	100 *25*	3591.6	(11$^-$)	D		
		556.4 *3*	81[#] *30*	3335.5	(10$^-$)			
3968.21	(13)$^-$	681.0 *1*	100	3286.91	(11)$^-$	E2	0.00440	α(K)=0.00374 *6*; α(L)=0.000523 *8*; α(M)=0.0001081 *16*; α(N+..)=2.69×10^{-5} *4* α(N)=2.32×10^{-5} *4*; α(O)=3.48×10^{-6} *5*; α(P)=2.29×10^{-7} *4*
4125.9	(14$^+$)	434.2 *6*		3691.8	(12$^+$)	Q		
		689.4 *1*	100 *8*	3436.2	(12$^+$)	E2	0.00427	α(K)=0.00363 *5*; α(L)=0.000506 *7*; α(M)=0.0001047 *15*; α(N+..)=2.60×10^{-5} *4* α(N)=2.24×10^{-5} *4*; α(O)=3.37×10^{-6} *5*; α(P)=2.23×10^{-7} *4*
4228.0	(13$^-$)	336.6 *6*	35 *10*	3891.5	(12$^-$)	D		
		636.3 *4*	100 *20*	3591.6	(11$^-$)	Q		
4381.8	(11$^+$)	689.9[c] *6*		3691.8	(12$^+$)	D		
		945.4[c] *6*		3436.2	(12$^+$)	D		
		1407.0 *6*		2975.18	(9$^+$)	Q		

γ(^{124}Ba) (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[@]	α[b]	Comments
4407.3	(14+)	281.3 *6*	13 *4*	4125.9	(14+)	D		
		715.5 *3*	58 *17*	3691.8	(12+)	Q		
		971.1 *3*	100 *25*	3436.2	(12+)	Q		
4534.3	(14−)	566.2 *6*		3968.21	(13)−	D		
		762.1 *3*	100 *33*	3772.6	(12−)	Q		
4551.5	(12+)	170.0 *6*		4381.8	(11+)	D		
		722.0 *6*		3829.5	(11)			
		858.2[c] *6*		3694.0	(11+)	D		
4603.8	(14−)	375.6 *6*	38 *15*	4228.0	(13−)	D		
		711.3 *4*	100 *50*	3891.5	(12−)	Q		
4761.8	(15−)	793.8 *1*	100	3968.21	(13)−	Q		
4766.3	(13+)	215.0 *6*		4551.5	(12+)	D		
		384.2 *6*		4381.8	(11+)	Q		
		1073.2[c] *6*		3694.0	(11+)	Q		
4892.5	(16+)	766.1 *1*	100	4125.9	(14+)	Q		
5009.7	(15−)	405.6 *6*	15 *5*	4603.8	(14−)			
		780.9 *3*	100 *15*	4228.0	(13−)	Q		I_γ: see comment for 781.3γ.
5027.3	(14+)	261.0 *6*		4766.3	(13+)	D		
		476.0 *6*		4551.5	(12+)	Q		
5215.8	(16+)	323.2 *6*	7 *5*	4892.5	(16+)	D[&]		
		808.5 *3*	100 *19*	4407.3	(14+)	Q		
		1090.0 *3*	26 *12*	4125.9	(14+)	Q		
5329.1	(15+)	302.0 *6*		5027.3	(14+)	D		
		562.5 *6*		4766.3	(13+)	Q		
		1203.7[c] *6*		4125.9	(14+)	D		
5392.4	(16−)	630.7 *6*		4761.8	(15−)	D		
		858.3 *3*	100 *40*	4534.3	(14−)	Q		
5446.0	(16−)	436.3 *4*	22 *11*	5009.7	(15−)	D		
		842.6 *6*	100 *22*	4603.8	(14−)	Q		
5638.9	(17−)	878.0 *4*	100	4761.8	(15−)	Q		
5668.0	(16+)	339.0 *6*		5329.1	(15+)	D		
		640.9 *6*		5027.3	(14+)	Q		
5725.0	(17+)	832.0 *3*	100	4892.5	(16+)	(M1)	0.00383	α(K)=0.00331 *5*; α(L)=0.000418 *6*; α(M)=8.58×10^{-5} *12*; α(N+..)=2.16×10^{-5} *3* α(N)=1.85×10^{-5} *3*; α(O)=2.85×10^{-6} *4*; α(P)=2.13×10^{-7} *3*
5763.2	(18+)	871.6 *1*	100	4892.5	(16+)	Q		
5905.8	(17−)	459.8 *6*		5446.0	(16−)	D		
		895.7 *3*	100 *17*	5009.7	(15−)	Q		
6044.8	(17+)	377.0 *6*		5668.0	(16+)	D		
		715.5 *6*		5329.1	(15+)	Q		
6080.4	(18+)	317.2 *6*		5763.2	(18+)	D		
		864.7 *3*	100 *24*	5215.8	(16+)	Q		
6189.6	(18+)	1299.0 *6*		4892.5	(16+)	Q		
6290.4	(18−)	896.6 *3*	100	5392.4	(16−)	Q		

$^{124}_{56}$Ba$_{68}$-9

$\gamma(^{124}$Ba) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[@]	Comments
6383.0	(18⁻)	477.2 *6*		5905.8	(17⁻)	D	
		938.1 *6*	100 *22*	5446.0	(16⁻)	Q	
6452.9	(18⁺)	408.0 *6*		6044.8	(17⁺)	D	
		784.9 *6*		5668.0	(16⁺)	Q	
6556.0	(19⁻)	917.3 *3*	100	5638.9	(17⁻)	Q	
6581.3	(19⁺)	819.1 *6*	32 *9*	5763.2	(18⁺)	D	
		857.7 *3*	100 *40*	5725.0	(17⁺)	Q	
6704.0	(18)	1066.0 *6*		5638.9	(17⁻)		
6711.1	(20⁺)	948.6 *1*	100	5763.2	(18⁺)	Q	
6870.8	(19⁻)	487.8 *6*		6383.0	(18⁻)	D	
		965.0 *6*	100 *30*	5905.8	(17⁻)	Q	
6896.9	(19⁺)	444.0 *6*		6452.9	(18⁺)	D	
		852.0 *6*		6044.8	(17⁺)	Q	
6999.4	(20⁺)	919.4 *3*	100 *24*	6080.4	(18⁺)	Q	
		1236.2 *6*		5763.2	(18⁺)	Q	
7081.5	(20⁺)	891.9 *3*	100 *50*	6189.6	(18⁺)	Q	
		1319.7 *6*		5763.2	(18⁺)	Q	
7229.9	(20⁻)	940.5 *3*	100	6290.4	(18⁻)	Q	
7362.9	(20⁺)	910.0 *6*		6452.9	(18⁺)	Q	
7366.0	(20⁻)	495.2 *6*		6870.8	(19⁻)	D	
		982.6 *4*	100 *50*	6383.0	(18⁻)	Q	
7499.9	(21⁺)	791.3 *6*		6711.1	(20⁺)	D	
		918.0 *3*	100 *33*	6581.3	(19⁺)	Q	
7502.6	(21⁻)	945.3 *3*	100	6556.0	(19⁻)	Q	
7716.4	(22⁺)	1004.9 *3*	100	6711.1	(20⁺)	Q	
7863.8	(21⁺)	966.9 *6*		6896.9	(19⁺)	Q	
7876.4	(21⁻)	1007.4 *6*		6870.8	(19⁻)	Q	
7983.4	(22⁺)	983.7 *3*	100 *22*	6999.4	(20⁺)	Q	
		1272.3 *6*		6711.1	(20⁺)	Q	
8098.3	(22⁺)	1016.8 *3*	100 *50*	7081.5	(20⁺)	Q	
		1389.0[c] *6*		6711.1	(20⁺)	Q	
8262.5	(22⁻)	1034.4 *3*	100 *50*	7229.9	(20⁻)	Q	DCO=0.91
8369.2	(22⁺)	1006.3 *6*		7362.9	(20⁺)	Q	
8408.2	(22⁻)	1044.0 *6*		7366.0	(20⁻)	Q	
8483.5	(23⁺)	769.2 *6*		7716.4	(22⁺)	D	
		983.4 *3*	100 *40*	7499.9	(21⁺)	Q	
8512.4	(23⁻)	1009.7 *3*	100	7502.6	(21⁻)	Q	
8794.4	(24⁺)	1077.1 *3*	100	7716.4	(22⁺)	Q	
8904.4	(23⁺)	1040.6 *6*		7863.8	(21⁺)	Q	
8910.4	(23⁻)	1034.0 *6*		7876.4	(21⁻)	Q	
9053.4	(24⁺)	1069.2 *3*	100	7983.4	(22⁺)	Q	
9176.9	(24⁺)	1078.6 *3*	100 *50*	8098.3	(22⁺)	Q	
		1462.3[c] *6*		7716.4	(22⁺)	Q	

$^{124}_{56}Ba_{68}$-10

Adopted Levels, Gammas (continued)

$\gamma(^{124}Ba)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[@]
9380.1	(24⁻)	1117.6 *6*	100	8262.5	(22⁻)	Q
9427.7	(24⁺)	1058.5 *6*		8369.2	(22⁺)	Q
9525.3	(24⁻)	1117.1 *6*		8408.2	(22⁻)	Q
9561.8	(25⁺)	1078.2 *6*	100	8483.5	(23⁺)	Q
9613.1	(25⁻)	1100.1 *6*	100	8512.4	(23⁻)	Q
9916.4	(25)	1124.1[c] *6*		8794.4	(24⁺)	
9950.7	(26⁺)	1154.5 *3*	100	8794.4	(24⁺)	Q
9975.0	(25⁺)	1070.6 *6*		8904.4	(23⁺)	Q
9981.2	(25⁻)	1070.7[c] *6*		8910.4	(23⁻)	Q
10220.0	(26⁺)	1168.6 *3*	100	9053.4	(24⁺)	Q
10308.3	(26⁺)	1131.4 *6*	100	9176.9	(24⁺)	Q
		1516.9[c] *6*		8794.4	(24⁺)	Q
10519.6	(26⁺)	1091.9 *6*		9427.7	(24⁺)	Q
10561.3	(26⁻)	1181.2 *6*	100	9380.1	(24⁻)	Q
10703.7	(26⁻)	1178.4[c] *6*		9525.3	(24⁻)	Q
10746.6	(27⁺)	1184.8 *6*	100	9561.8	(25⁺)	Q
10811.9	(27⁻)	1201.5 *6*	100	9613.1	(25⁻)	Q
11067.7	(27)	1151.3 *6*		9916.4	(25)	Q
11077.4	(27⁺)	1102.4 *6*		9975.0	(25⁺)	Q
11115.4	(26)	1505.0 *6*		9613.1	(25⁻)	
11182.5	(28⁺)	1231.2 *3*	100	9950.7	(26⁺)	Q
11471.8	(28⁺)	1251.8 *6*	100	10220.0	(26⁺)	Q
11522.5	(28⁺)	1214.2 *6*	100	10308.3	(26⁺)	Q
11648.9	(28⁺)	1129.3 *6*		10519.6	(26⁺)	Q
11753.3	(28⁻)	1192.0 *6*	100	10561.3	(26⁻)	Q
12029.5	(29⁺)	1282.9 *6*		10746.6	(27⁺)	Q
12116.4	(29⁻)	1304.4 *6*	100	10811.9	(27⁻)	Q
12242.3	(29⁺)	1164.9 *6*		11077.4	(27⁺)	Q
12288.9	(29)	1221.2 *6*		11067.7	(27)	Q
12491.3	(30⁺)	1309.6 *3*	100	11182.5	(28⁺)	Q
12733.0	(30⁺)	1261.2 *6*	100	11471.8	(28⁺)	Q
12820.4	(30⁺)	1297.9 *6*		11522.5	(28⁺)	Q
12859.8	(30⁺)	1210.9 *6*		11648.9	(28⁺)	Q
12959.8	(30⁻)	1206.5 *6*		11753.3	(28⁻)	Q
13348.3	(30)	1232.0 *6*		12116.4	(29⁻)	
13406.5	31⁺	1377.0 *6*		12029.5	(29⁺)	Q
13491.8	(31⁺)	1249.5 *6*		12242.3	(29⁺)	Q
13517.2	(31⁻)	1400.8 *6*	100	12116.4	(29⁻)	Q
13590.3	(31)	1301.4 *6*		12288.9	(29)	Q
13880.4	(32⁺)	1388.6 *6*	100	12491.3	(30⁺)	Q
14057.6	(32⁺)	1324.5 *6*	100	12733.0	(30⁺)	Q
14184.1	(32⁻)	1224.3 *6*		12959.8	(30⁻)	Q
14190.5	(32⁺)	1370.1 *6*		12820.4	(30⁺)	Q
14755.2	(32)	1238.0 *6*		13517.2	(31⁻)	
		1406.9 *6*		13348.3	(30)	Q
14832.4	(33⁺)	1340.6 *6*		13491.8	(31⁺)	Q
14881.2	(33⁺)	1474.7 *6*		13406.5	31⁺	Q
14979.4	(33)	1389.1 *6*		13590.3	(31)	Q
15003.7	(33⁻)	1486.5 *6*		13517.2	(31⁻)	Q
15335.4	(34⁺)	1454.8 *6*	100	13880.4	(32⁺)	Q
15459.2	(34⁺)	1401.6 *6*		14057.6	(32⁺)	Q
15475.0	(34⁻)	1290.9[c] *6*		14184.1	(32⁻)	Q
15618.0	(34⁺)	1427.5 *6*		14190.5	(32⁺)	Q
16029.2	(34)	1274.0 *6*		14755.2	(32)	Q
16280.4	(35⁺)	1448.0 *6*		14832.4	(33⁺)	Q
16425.4	(35⁺)	1544.2 *6*		14881.2	(33⁺)	Q
16461.2	(35)	1481.8 *6*		14979.4	(33)	Q
16775.3	(36⁺)	1444.3 *6*	100	15335.4	(34⁺)	Q
16914.4	(36⁺)	1583.4 *6*		15335.4	(34⁺)	Q
16943.5	(36⁺)	1484.3 *6*		15459.2	(34⁺)	Q
17111.3	(36⁺)	1493.3[c] *6*		15618.0	(34⁺)	Q
17435.2	(36)	1406.0 *6*		16029.2	(34)	Q
18040.9	(37)	1579.7 *6*		16461.2	(35)	Q
18045.0	(37⁺)	1619.6 *6*		16425.4	(35⁺)	Q
18069.7	(38⁺)	1294.4 *6*		16775.3	(36⁺)	Q
18143.7	(38⁺)	1368.4 *6*		16775.3	(36⁺)	Q
18525.3	(38⁺)	1610.9 *6*		16914.4	(36⁺)	Q
18649.1	(38⁺)	1537.7[c] *6*		17111.3	(36⁺)	Q
18909.2	(38)	1474.0 *6*		17435.2	(36)	Q
19720.6	(39)	1679.7 *6*		18040.9	(37)	Q
20483.3	(40)	1574.0 *6*		18909.2	(38)	Q
21501.5	(41)	1780.9 *6*		19720.6	(39)	Q
22150.1	(42)	1666.8 *6*		20483.3	(40)	Q
23384.7	(43)	1883.2 *6*		21501.5	(41)	Q
25371.1	(45)	1986.3 *6*		23384.7	(43)	Q

† From $^{64}Ni(^{64}Ni,4n\gamma)$, unless otherwise noted.
‡ From ^{124}La ε decay.

From ENSDF

$^{124}_{56}Ba_{68}$-11

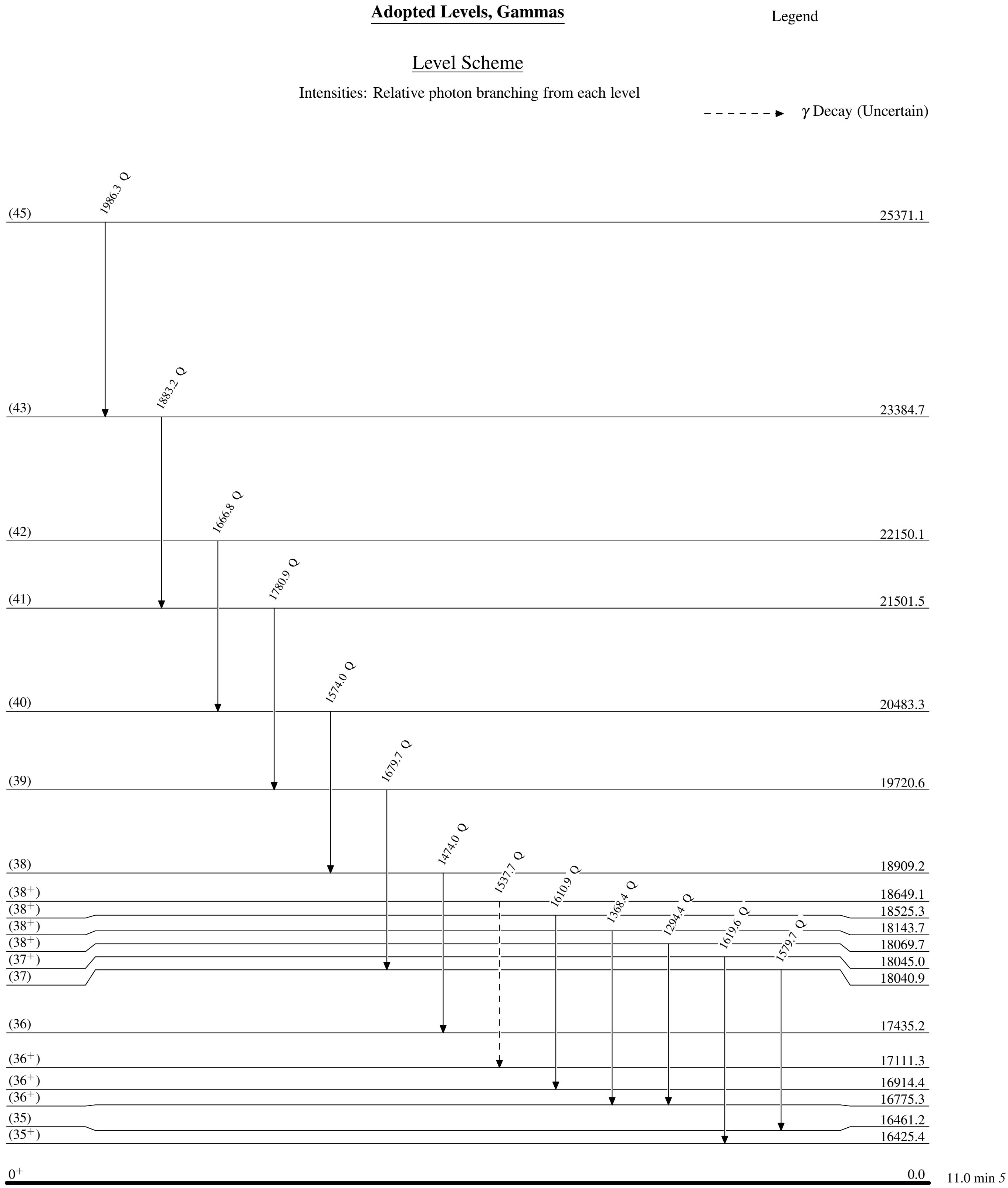
$\gamma(^{124}$Ba) (continued)

[#] From (HI,xnγ).
[@] From α(K)exp in ^{124}La ε decay, and $\gamma(\theta)$, DCO and linear polarization in (HI,xnγ) and ^{64}Ni(^{64}Ni,4nγ).
[&] ΔJ=0 transition.
[a] From $\gamma(\theta)$, DCO and linear polarization in (HI,xnγ).
[b] Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.
[c] Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas

Level Scheme

Intensities: Relative photon branching from each level

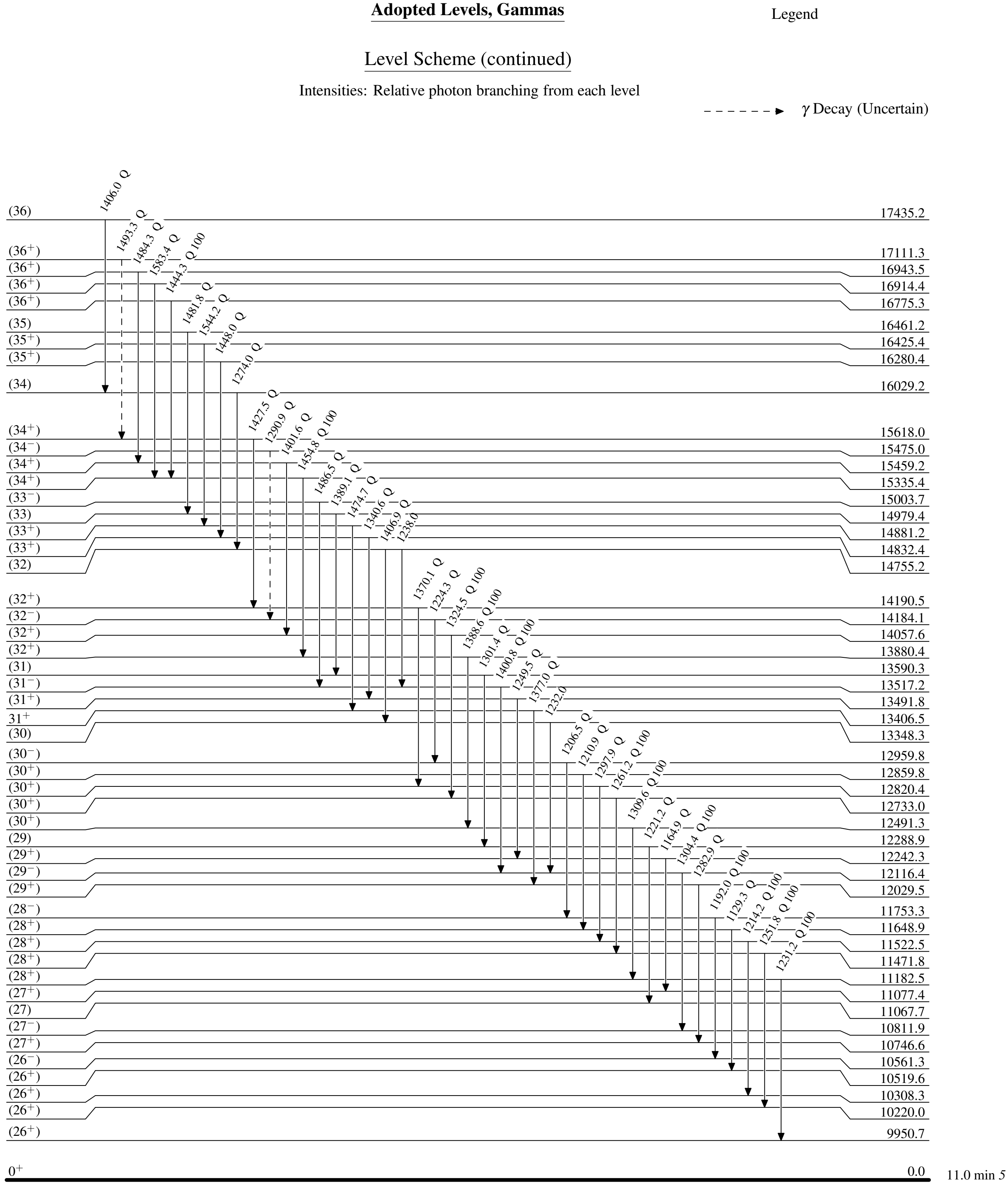


$^{124}_{56}Ba_{68}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

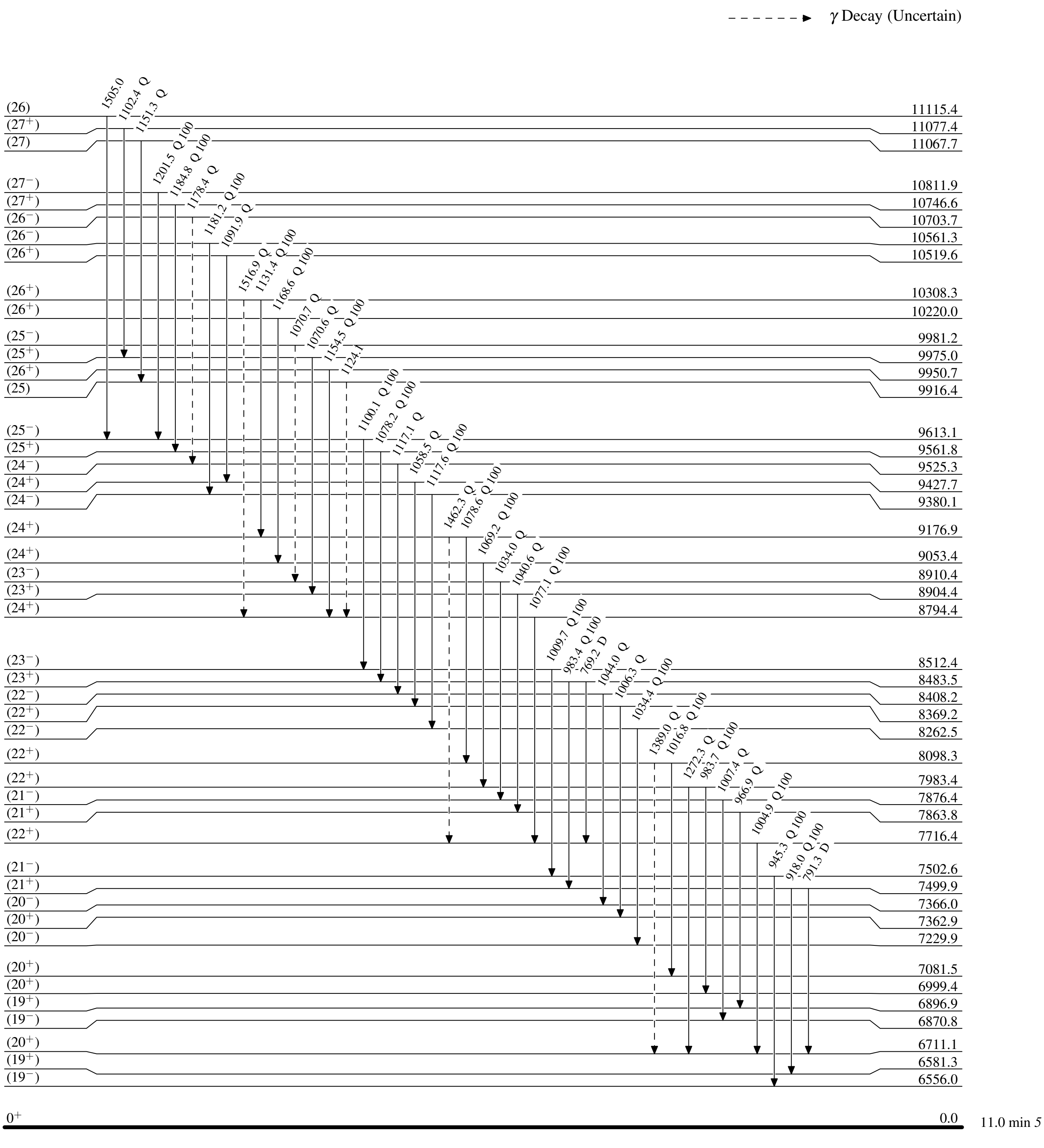


$^{124}_{56}Ba_{68}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

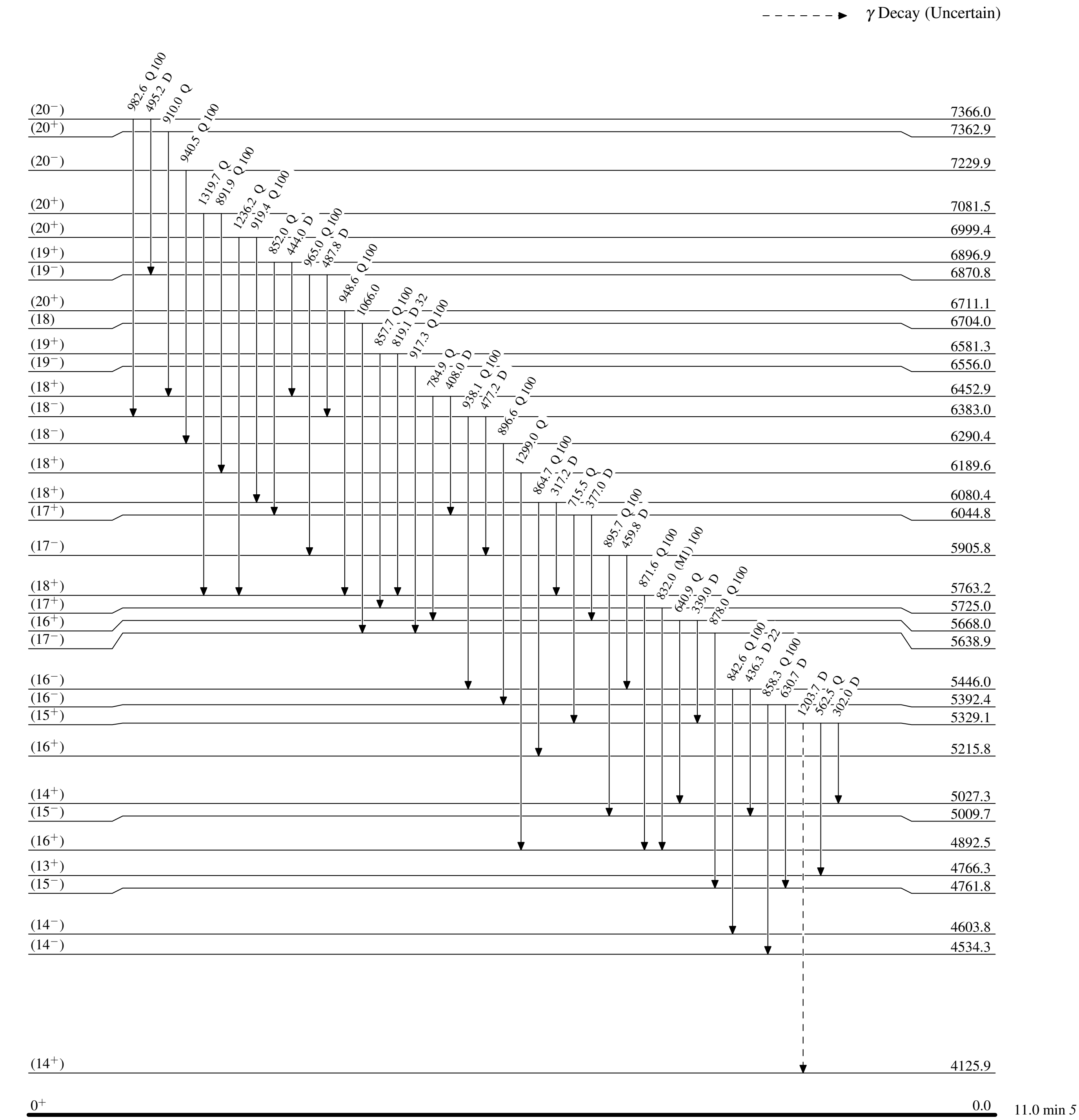


$^{124}_{56}Ba_{68}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



$^{124}_{56}Ba_{68}$

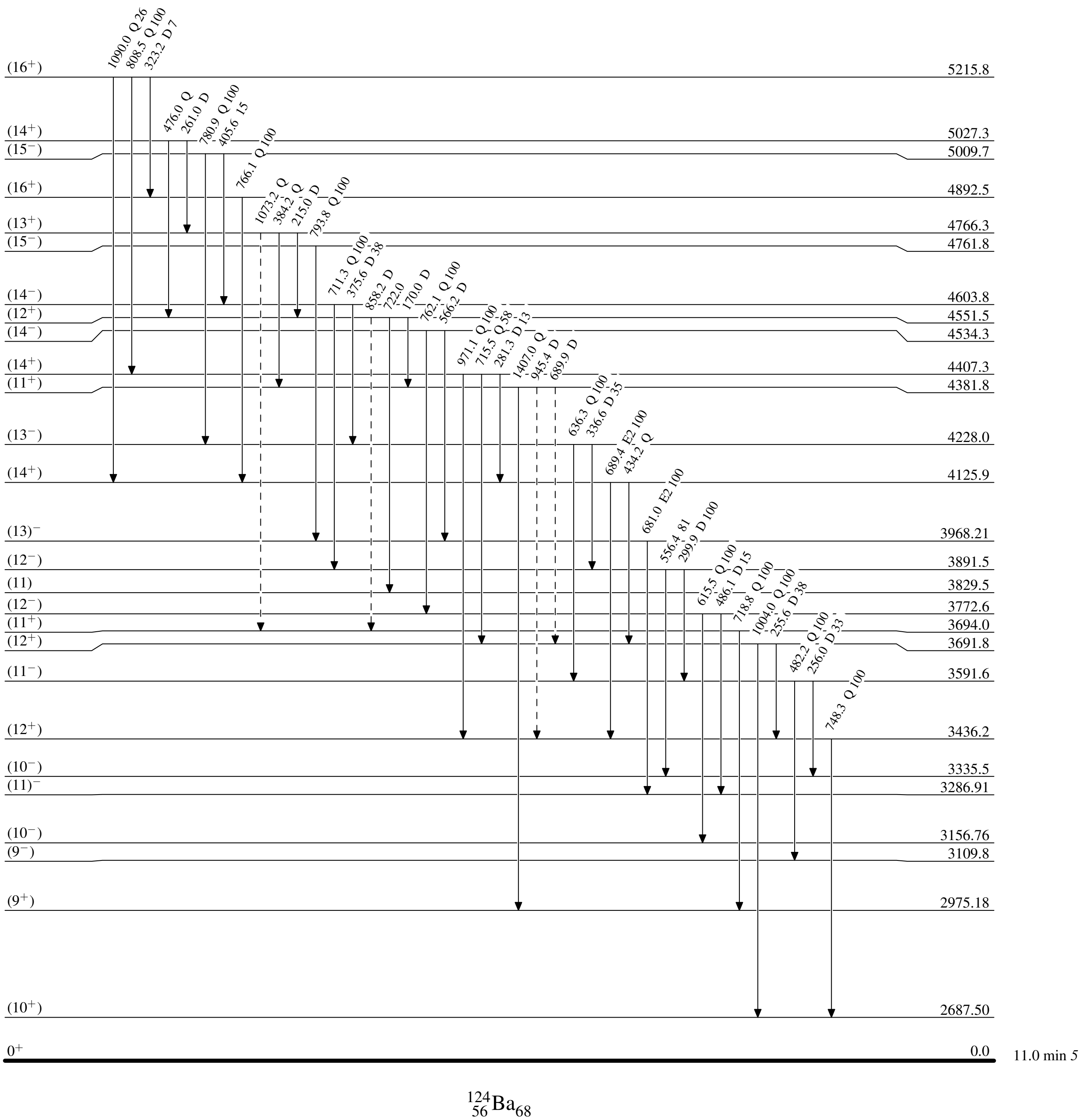
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

Legend

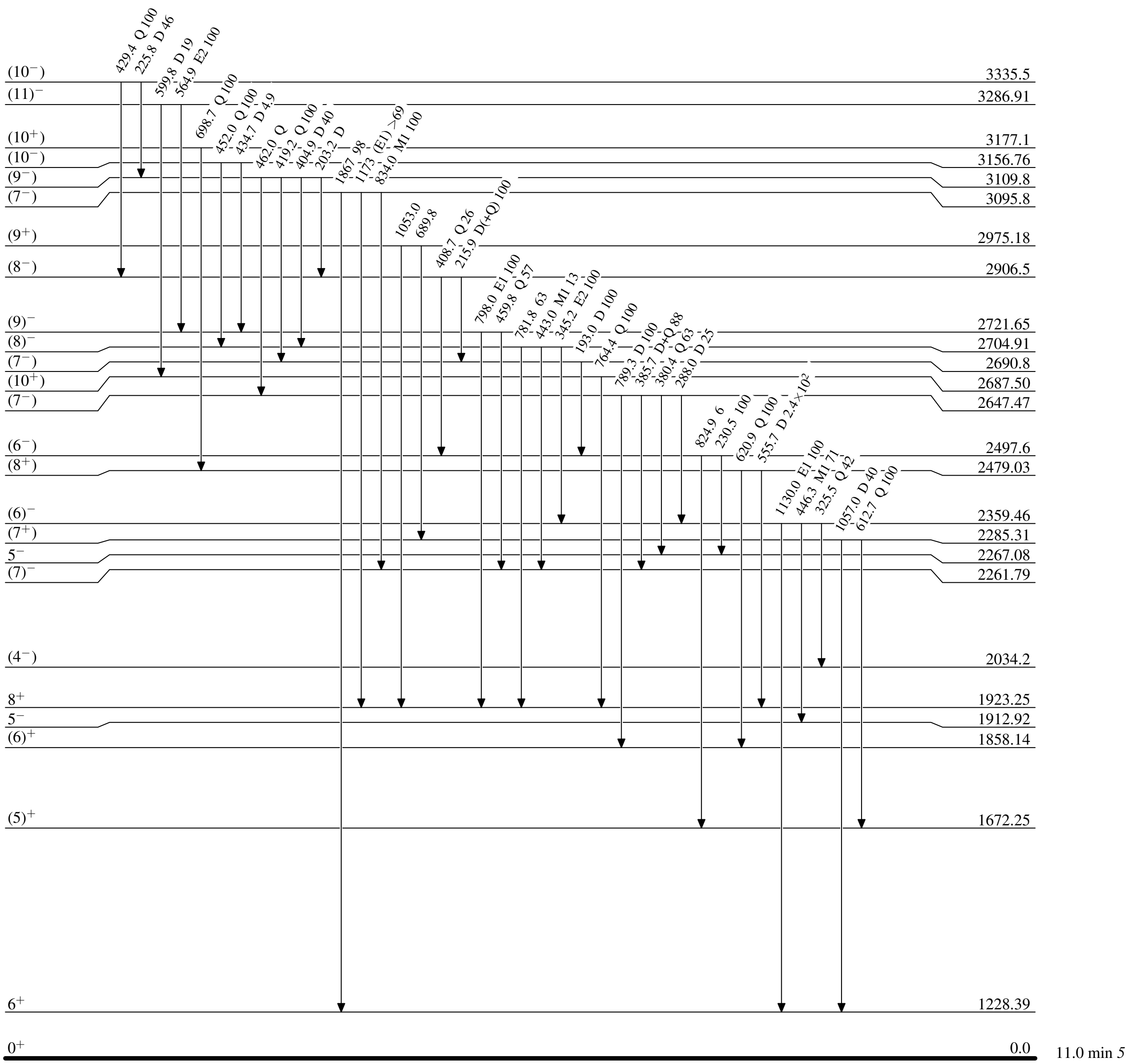
- - - - - -► γ Decay (Uncertain)



Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

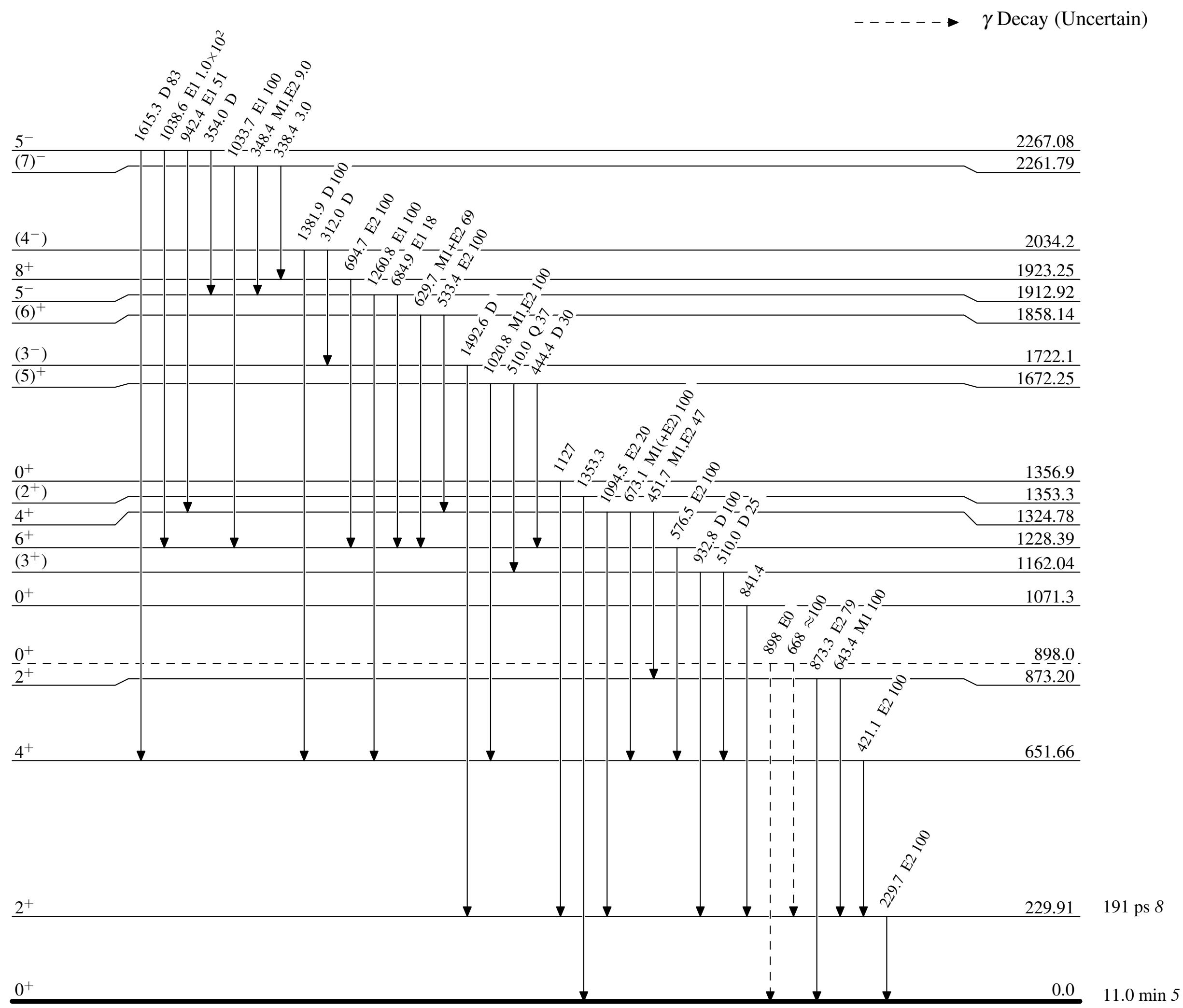


$^{124}_{56}Ba_{68}$

Adopted Levels, Gammas

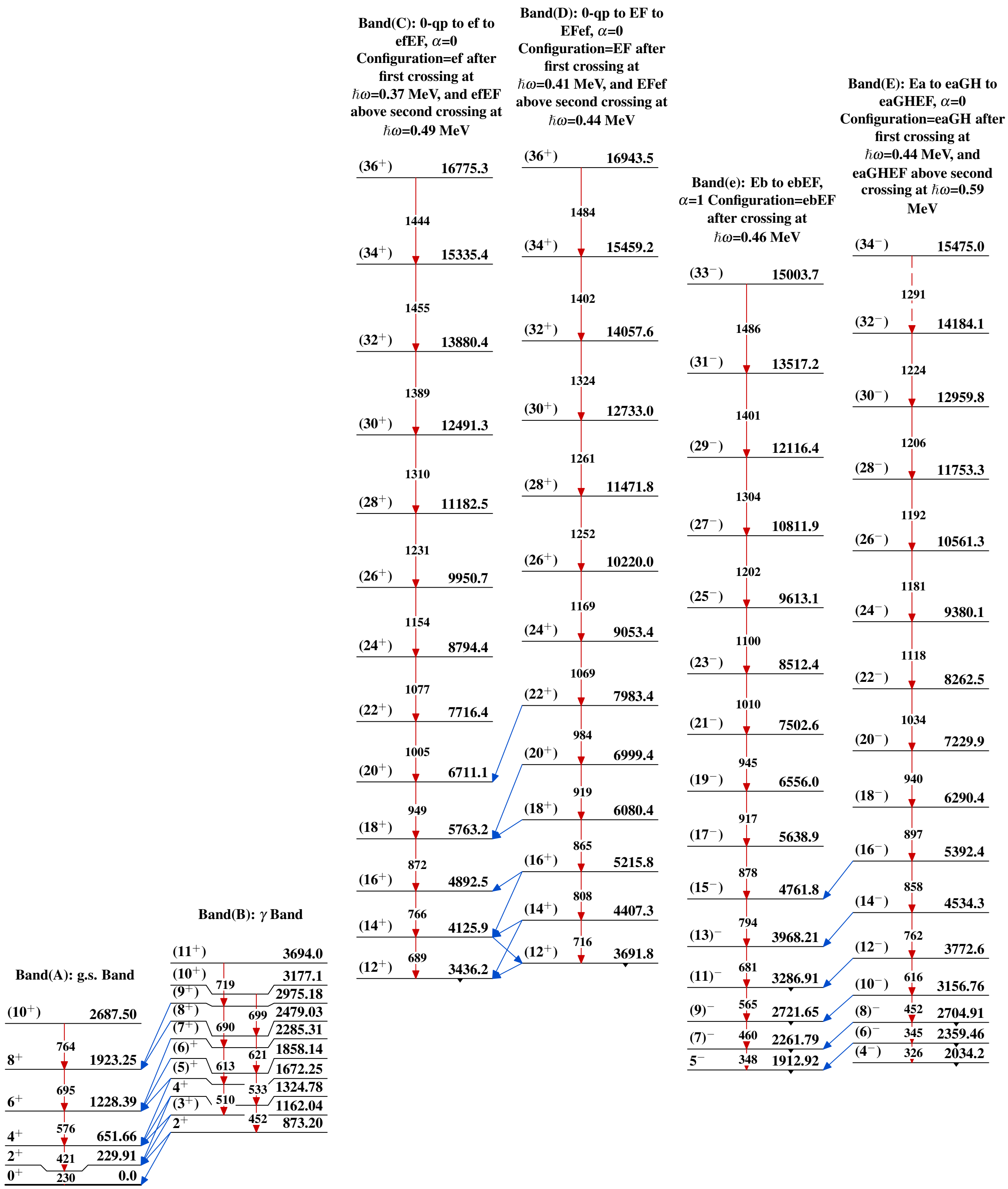
Level Scheme (continued)

Intensities: Relative photon branching from each level



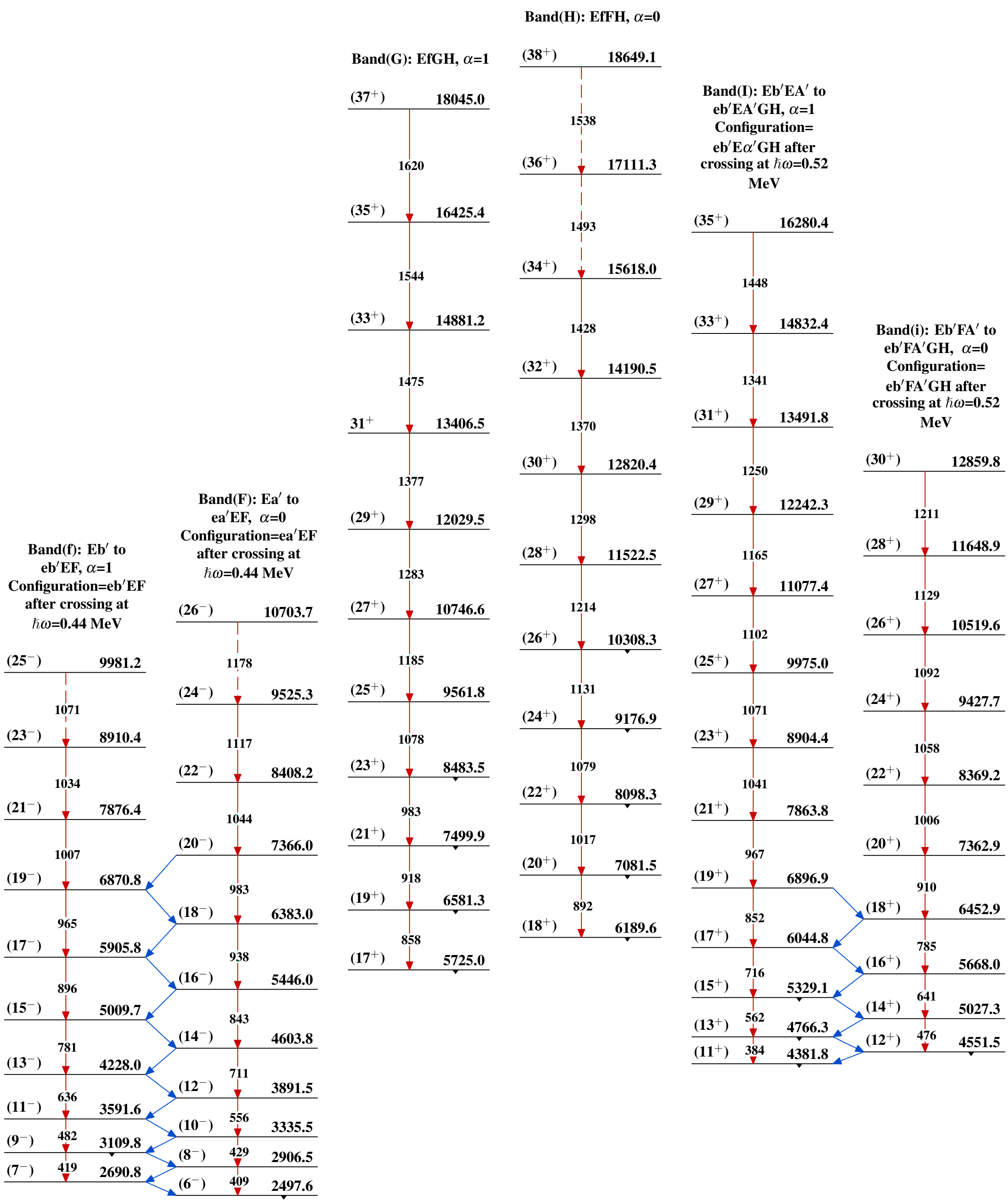
$^{124}_{56}Ba_{68}$

Adopted Levels, Gammas



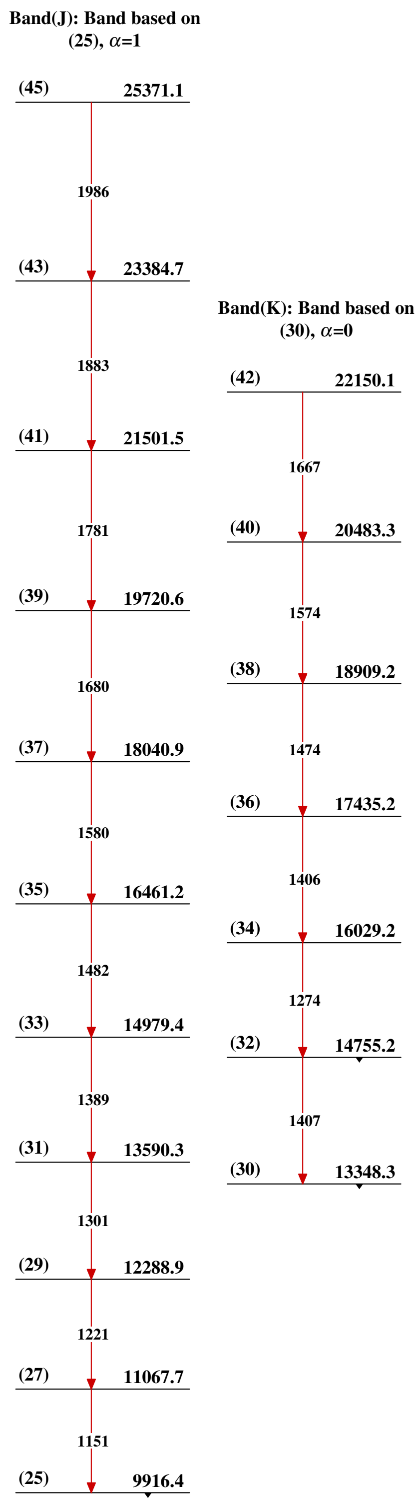
$^{124}_{56}Ba_{68}$

Adopted Levels, Gammas (continued)



$^{124}_{56}Ba_{68}$

Adopted Levels, Gammas (continued)



$^{124}_{56}Ba_{68}$

Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	H. Iimura, J. Katakura, S. Ohya	NDS 180, 1 (2022)	1-Oct-2021

Q(β^-)=−7700 *90*; S(n)=11072 *17*; S(p)=5869 *15*; Q(α)=260 *17*   2021Wa16
Mass measurement: 1999Am05: Mass excess =−82675 *14* keV.

^{126}Ba Levels

Cross Reference (XREF) Flags

A ^{126}La ε decay (54 s+50 s)
B   (HI,xnγ)

E(level)[#]	J$^\pi$[†]	T$_{1/2}$[‡]	XREF	Comments
0.0[@]	0$^+$	100 min *2*	AB	%ε+%β^+=100 T$_{1/2}$: from 1976Pa11. Others: 96.5 min *20* (1954Ka33), 103 min *5* (1962Pr09).
256.02[@] *6*	2$^+$	136 ps *5*	AB	J$^\pi$: E2 γ to 0$^+$. T$_{1/2}$: weighted average of 120 ps *20* (1972Ku14), 130 ps *+7−21* (1979Se03), 118 ps *9* (1989Sc06), 141 ps *14* (1992Mo13), and 141 ps *4* (1996De50); Others: 187 ps *35* (1967Cl02), 137 ps *7* (2001Ra27), 137.4 ps *+67−61* (2016Pr01).
711.10[@] *6*	4$^+$	5.99 ps *12*	AB	J$^\pi$: from $\gamma\gamma(\theta)$ in in ε decay (54 s+50 s); E2 γ to 2$^+$.
873.57[&] *6*	2$^+$		AB	J$^\pi$: from E2 γ to 0$^+$.
983.45 *9*	0$^+$		A	J$^\pi$: from $\gamma\gamma(\theta)$ in ε decay (54 s+50 s); E2 γ to 2$^+$.
1236.24[a] *7*	3$^+$		AB	J$^\pi$: from $\gamma\gamma(\theta)$ in ^{126}La ε decay (54 s +50 s) and M1+E2 to 2$^+$ state.
1295.99 *7*	2$^{(+)}$		A	J$^\pi$: $\gamma\gamma(\theta)$ in ^{126}La ε decay (54 s +50 s) and (E2) to 4$^+$ state.
1332.47[@] *8*	6$^+$	0.94 ps *4*	AB	J$^\pi$: from $\gamma\gamma(\theta)$ in ^{126}La ε decay and E2 γ to 4$^+$.
1345.45[&] *7*	4$^+$		AB	J$^\pi$: from $\gamma\gamma(\theta)$ in ^{126}La ε decay and M1+E2 γ to 4$^+$.
1717.61 *9*	2$^+$		A	J$^\pi$: γ's to 0$^+$ and 4$^+$.
1742.57[f] *7*	3$^-$		AB	J$^\pi$: from $\gamma\gamma(\theta)$ in ^{126}La ε decay and E1 γ to 4$^+$.
1753.84 *14*	2$^+$,3,4$^+$		A	J$^\pi$: γ's to 2$^+$ and 4$^+$.
1808.01[a] *10*	5$^+$		AB	J$^\pi$: $\gamma(\theta)$ in (HI,xnγ) and Q γ to 3$^+$.
1810.16 *19*	2$^+$,3,4$^+$		A	J$^\pi$: γ's to 2$^+$ and 4$^+$.
1876.71 *9*			A	
1890.20[&] *9*	6$^{(+)}$		AB	
1936.29 *9*	1,3		A	J$^\pi$: from $\gamma\gamma(\theta)$ in ^{126}La ε decay.
1938.85[e] *7*	5$^-$		AB	J$^\pi$: E1 γ to 4$^+$, γ to 6$^+$.
2018.30 *11*	2$^+$,3,4$^+$		A	J$^\pi$: γ's to 2$^+$ and 4$^+$.
2029.83 *12*	0$^{(+)}$		A	J$^\pi$: from $\gamma\gamma(\theta)$ in ^{126}La ε decay (54 s+50 s), Q γ to 2$^+$.
2056.13[f] *8*	4$^-$		AB	J$^\pi$: $\gamma(\theta)$ and M1+E2 γ to 3$^-$.
2089.67[@] *11*	8$^+$	0.284 ps *21*	B	
2100.34 *20*			A	
2103.48 *12*			A	
2117.25 *19*			A	
2179.18 *9*	2$^+$,3,4$^+$		A	J$^\pi$: γ's to 2$^+$ and 4$^+$.
2247.61 *10*	3$^-$,5$^-$		A	J$^\pi$: from $\gamma\gamma(\theta)$ in ^{126}La ε decay and E2(+M1) γ to 3$^-$.
2255.26[h] *8*	5		AB	
2303.43[e] *8*	7$^-$	3.3 ps *11*	AB	J$^\pi$: E1 γ to 6$^+$, γ's to 5$^-$ and 8$^+$.
2378.91 *12*			A	
2386.02 *12*			A	
2399.1 *4*	2$^+$,3,4$^+$		A	J$^\pi$: γ's to 2$^+$ and 4$^+$.

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{126}Ba Levels (continued)

E(level)[#]	J$^{\pi}$[†]	T$_{1/2}$[‡]	XREF	Comments
2408.21[f] *11*	6$^{(-)}$		AB	
2429.61[g] *9*	6$^{(-)}$		B	
2459.17 *10*			A	
2484.7[a] *3*	7$^+$		B	
2499.19 *8*	3$^-$,4$^+$		A	J$^{\pi}$: γ's to 2$^+$ and 5$^-$.
2512.32 *11*	4$^+$,5,6$^+$		A	J$^{\pi}$: γ's to 4$^+$ and 6$^+$.
2530.19[&] *13*	8$^{(+)}$		B	
2566.36 *12*	4$^{(+)}$,5,6$^+$		A	J$^{\pi}$: γ's to 4$^+$ and 6$^{(+)}$.
2567.0 *8*			B	
2576.81 *9*	3,4		A	J$^{\pi}$: γ's to 3$^-$, 3$^+$, 4$^-$ and 4$^+$.
2605.57 *9*			A	
2609.37[h] *13*	7$^{(-)}$		B	
2657.44 *11*	2$^+$,3,4$^+$		A	J$^{\pi}$: γ's to 2$^+$ and 4$^+$.
2684.37 *8*	(4)		A	J$^{\pi}$: γ's to 3$^-$, 3$^+$, 5$^-$ and 5$^{(+)}$.
2716.27 *10*	4$^+$,5,6$^+$		A	J$^{\pi}$: γ's to 4$^+$ and 6$^+$.
2732.60 *9*	3$^-$,4,5$^+$		A	J$^{\pi}$: γ's to 3$^+$ and 5$^-$.
2748.60 *10*	4$^{(+)}$,5,6$^+$		A	J$^{\pi}$: γ's to 4$^+$ and 6$^{(+)}$.
2772.94[f] *15*	8$^{(-)}$		B	
2786.61[e] *11*	9$^-$	2.8 ps *4*	B	J$^{\pi}$: E2 γ to 7$^-$ and E1 to 8$^+$.
2813.30[g] *14*	8$^{(-)}$		B	
2872.09 *11*	2,3,4		A	J$^{\pi}$: γ's to 3$^-$ and 3$^+$.
2886.5[i] *8*			B	
2942.07[@] *13*	10$^+$	0.173 ps *21*	B	
2953.70 *8*	2$^+$,3,4$^+$		A	J$^{\pi}$: γ's to 2$^+$ and 4$^+$.
3096.48[h] *16*	9$^{(-)}$		B	
3108.0 *4*	2$^+$,3,4$^+$		A	J$^{\pi}$: γ's to 2$^+$ and 4$^+$.
3185.6 *3*	2$^+$,3,4$^+$		A	J$^{\pi}$: γ's to 2$^+$ and 4$^+$.
3236.62[f] *13*	10$^{(-)}$		B	
3243.8[a] *15*	(9$^+$)		B	
3261.48[&] *16*	10$^{(+)}$		B	
3375.37[e] *13*	11$^-$	1.39 ps *21*	B	
3389.7 *4*			B	
3403.0 *5*	2$^+$,3,4$^+$		A	J$^{\pi}$: γ's to 2$^+$ and 4$^+$.
3419.91[g] *19*	10$^{(-)}$		B	
3450.5[i] *5*	(8)		B	
3484.8 *7*	2$^+$,3,4$^+$		A	J$^{\pi}$: γ's to 2$^+$ and 4$^+$.
3588.8 *8*			B	
3703.76 *18*	2$^+$,3,4$^+$		A	J$^{\pi}$: γ's to 2$^+$ and 4$^+$.
3746.84[h] *23*	11$^{(-)}$		B	
3747.40[c] *16*	12$^+$	0.38 ps *+6−4*	B	
3758.9 *3*			A	
3886.78[f] *24*	(12$^-$)		B	
3887.86[b] *16*	12$^+$		B	
4074.09[&] *19*	12$^{(+)}$		B	
4078.89[e] *16*	13$^-$	0.35 ps *14*	B	
4093.3[a] *17*	(11$^+$)		B	
4110.2[g] *3*	12$^{(-)}$		B	
4121.4[i] *4*	(10)		B	
4419.63[c] *19*	14$^+$	0.69 ps *5*	B	
4456.9[h] *6*	13$^{(-)}$		B	
4670.6[b] *4*	14$^{(+)}$		B	

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{126}Ba Levels (continued)

E(level)[#]	Jπ[†]	T1/2[‡]	XREF
4713.9[f] *3*	(14⁻)		B
4764.3[j] *8*	(12)		B
4845.7[g] *5*	14$^{(-)}$		B
4851.6[&] *7*	14$^{(+)}$		B
4856.3[a] *20*	(13⁺)		B
4896.4[i] *11*	(12)		B
4900.27[e] *19*	15⁻	0.35 ps *14*	B
4905.2[k] *7*	(13)		B
5086.7 *11*			B
5122.2[j] *12*	(14)		B
5199.8[d] *4*	15		B
5244.72[c] *21*	16⁺	0.32 ps *6*	B
5255.8[h] *8*	(15⁻)		B
5398.2[k] *15*	(15)		B
5509.6[b] *5*	16$^{(+)}$		B
5650.6[&] *13*	(16⁺)		B
5662.5[f] *6*	(16⁻)		B
5707.7[g] *9*	16$^{(-)}$		B
5725.2[j] *15*	(16)		B
5806.39[e] *22*	17⁻	0.28 ps *14*	B
6042.5[d] *4*	17		B
6098.2[k] *16*	(17)		B
6182.8[h] *11*	(17⁻)		B
6195.2[c] *6*	18⁺	<0.5 ps	B
6415.6[b] *11*	(18⁺)		B
6513.2[j] *16*	(18)		B
6530.6[&] *16*	(18⁺)		B
6585.5[f] *12*	(18⁻)		B
6700.7[g] *14*	(18⁻)		B
6721.6[e] *3*	19$^{(-)}$		B
6968.2[k] *17*	(19)		B
6995.9[d] *8*	(19)		B
7183.2[c] *12*	20$^{(+)}$		B
7387.6[b] *15*	(20⁺)		B
7461.2[j] *19*	(20)		B
7636.8[e] *4*	21$^{(-)}$		B
8145.2[c] *15*	22$^{(+)}$		B
8388.6[b] *18*	(22⁺)		B
8621.8[e] *11*	23$^{(-)}$		B
9202.2[c] *18*	(24⁺)		B
9700.8[e] *15*	(25⁻)		B
10308.2[c] *21*	(26⁺)		B
10872.8[e] *18*	(27⁻)		B
11475.2[c] *23*	(28⁺)		B
12132.8[e] *21*	(29⁻)		B
12718[c] *3*	(30⁺)		B
13469.8[e] *23*	(31⁻)		B
14041[c] *3*	(32⁺)		B

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{126}Ba Levels (continued)

E(level)[#]	J^{π}[†]	XREF	Comments
14878.8[e] 25	(33⁻)	B	
15434[c] 3	(34⁺)	B	
16895[c] 3	(36⁺)	B	
x+0.0[m]	(13)	B	Additional information 1. E(level): this level possibly decays to 4074, 3888 and 3748 levels (1991Wa20).
180.0+x[l] 10	(14)	B	E(level): this level possibly decays to 4074, 3888 and 3748 levels (1991Wa20).
425.0+x[m] 13	(15)	B	
693.0+x[l] 13	(16)	B	
1012.0+x[m] 14	(17)	B	
1377.0+x[l] 15	(18)	B	
1773.0+x[m] 16	(19)	B	
2206.0+x[l] 16	(20)	B	

† From $\gamma(\theta)$ and linear pol. and/or RUL in (HI,xnγ), unless otherwise noted. Band structures in (HI,xnγ) are also considered.
‡ From (HI,xnγ), unless otherwise noted.
# From a least-squares fit to E(γ's). Uncertainty of 1 keV is given for each Eγ without uncertainty.
@ Band(A): ground state band.
& Band(B): Band 1, γ-vibrational band below crossing, γ-vibrational band coupled with $\pi(h_{11/2})^2$ above crossing.
a Band(C): Band 2, γ-vibrational band below crossing, γ-vibrational band coupled with $\pi(h_{11/2})^2$ above crossing.
b Band(D): Band 3, ground state band below crossing, $\nu(h_{11/2})^2$ above crossing.
c Band(E): Band 5, ground state band below 1st crossing, $\pi(h_{11/2})^2$ below 2nd crossing, $\pi(h_{11/2})^2$ $\nu(h_{11/2})^2$ below 3rd crossing, $\pi(h_{11/2})^2$ $\nu(h_{11/2})^2$ $\pi(g_{7/2})^2$ above 3rd crossing.
d Band(F): band 6, could Be a continuation of band 1.
e Band(G): Band 7, $\pi(h_{11/2},g_{7/2})$ below crossing, $\pi(h_{11/2},g_{7/2})\nu(h_{11/2})^2$ above crossing.
f Band(H): Band 8, $\pi(h_{11/2},g_{7/2})$ below crossing, $\pi(h_{11/2},g_{7/2})\nu(h_{11/2})^2$ above crossing.
g Band(I): Band 9, $\nu(h_{11/2},g_{7/2})$ below crossing, $\pi(h_{11/2},g_{9/2})$ above crossing.
h Band(J): Band 10, $\nu(h_{11/2},g_{7/2})$ below crossing, $\pi(h_{11/2},g_{9/2})$ above crossing.
i Band(K): band 11, based on the 2887-keV level.
j Band(L): Band 12, $\nu(h_{11/2})^2$ $\pi(h_{11/2},g_{7/2})$ below crossing.
k Band(M): Band 13, $\nu(h_{11/2})^2$ $\pi(h_{11/2},g_{7/2})$ below crossing.
l Band(N): Band 14, $\nu(h_{11/2})^2$ $\pi(h_{11/2},d_{5/2})$ below crossing.
m Band(O): Band 15, $\nu(h_{11/2})^2$ $\pi(h_{11/2},d_{5/2})$ below crossing.

Adopted Levels, Gammas (continued)

γ(^{126}Ba)

E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f	Mult.‡	δ‡	α&	Comments
256.02	2^+	256.04 8	100	0.0	0^+	E2		0.0758	B(E2)(W.u.)=94 4
711.10	4^+	455.05 6	100	256.02	2^+	E2		0.0128	B(E2)(W.u.)=127 3
873.57	2^+	617.45 7	100.0 14	256.02	2^+	M1+E2	+5 +2−1		δ: from $\gamma(\theta)$ in (HI,xnγ), other: 18 +10−5 (2002Ko02).
		873.50 7	63.3 13	0.0	0^+	E2			
983.45	0^+	727.4 1	100	256.02	2^+	E2			
1236.24	3^+	362.71 9	15.2 5	873.57	2^+	E2(+M1)		0.028 3	
		525.2 1	12.0 3	711.10	4^+	M1+E2	−1.7 2		
		980.2 9	100.0 14	256.02	2^+	M1+E2	+5.5 +11−9		δ: from 2002Ko02.
1295.99	$2^{(+)}$	312.5 1	38 6	983.45	0^+				
		422.4 5	20 5	873.57	2^+				
		584.9 2	24 6	711.10	4^+	(E2)			
		1040.0 1	100 4	256.02	2^+	(M1+E2)	+1.9 +11−9		δ: from 2002Ko02.
		1296.0 1	57.4 11	0.0	0^+				
1332.47	6^+	621.35 6	100	711.10	4^+	E2			B(E2)(W.u.)=173 8
1345.45	4^+	471.85 7	81.2 21	873.57	2^+	E2		0.0116	
		634.30 7	100.0 15	711.10	4^+	M1+E2	+1.4 +80−3		δ: from 2002Ko02.
		1089.52 9	41.8 16	256.02	2^+	Q			
1717.61	2^+	1006.6 1	34.4 14	711.10	4^+				
		1461.5 1	100.0 24	256.02	2^+				
		1717.4 5	55 3	0.0	0^+				
1742.57	3^-	397.0 5	<0.24	1345.45	4^+				E_γ: not observed in (HI,xnγ).
		1031.40 9	60.3 10	711.10	4^+	E1			
		1486.60 9	100.0 17	256.02	2^+	D			
1753.84	2^+,3,4^+	408.4 5	15 7	1345.45	4^+				
		457.8 3	41 9	1295.99	$2^{(+)}$				
		517.6 2	21 6	1236.24	3^+				
		880.3 5	100 12	873.57	2^+				
		1042.8 3	25.5 9	711.10	4^+				
1808.01	5^+	462.5 3	8.4 14	1345.45	4^+				
		475.4 4	8.3 10	1332.47	6^+				
		571.78 9	100 8	1236.24	3^+	Q			
		1096.6 3	61 16	711.10	4^+	D			
1810.16	2^+,3,4^+	573.7 5	100 14	1236.24	3^+				
		936.6 5	15 3	873.57	2^+				
		1099.1 2	73 49	711.10	4^+				
1876.71		640.5 1	40.2 15	1236.24	3^+				
		1003.1 1	63.2 17	873.57	2^+				
		1620.8 2	100 5	256.02	2^+				
1890.20	$6^{(+)}$	544.75 7	100.0 11	1345.45	4^+	Q			
		557.89 19	21 3	1332.47	6^+	(M1+E2)	+2.8 +24−9		
		1178.0 5	12.0 22	711.10	4^+				E_γ: not observed in ^{126}La ε decay.
1936.29	1,3	700.0 3	60 18	1236.24	3^+				

$^{126}_{56}$Ba$_{70}$-5

Adopted Levels, Gammas (continued)

$\gamma(^{126}Ba)$ (continued)

E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f	Mult.‡	δ‡	α&	Comments
1936.29	1,3	1062.6 *1*	45 *13*	873.57	2^+				
		1680.4 *1*	100 *6*	256.02	2^+				
1938.85	5^-	606.40 *10*	20.5 *4*	1332.47	6^+	E1			
		1227.78 *9*	100 *8*	711.10	4^+	E1			
2018.30	2^+,3,4^+	672.8 *3*	7.6 *12*	1345.45	4^+				
		1144.6 *3*	4.8 *18*	873.57	2^+				
		1307.1 *5*	26 *5*	711.10	4^+				
		1762.3 *1*	100 *4*	256.02	2^+				
2029.83	$0^{(+)}$	1773.8 *1*	100	256.02	2^+	Q			Mult.: from $\gamma\gamma(\theta)$ in ^{126}La ε decay (54 s+50 s).
2056.13	4^-	117.0 *5*	4.1 *8*	1938.85	5^-				E_γ: not observed in (HI,xnγ).
		313.45 *15*	76 *6*	1742.57	3^-	M1+E2	−2.0 *+9−13*	0.0403 *11*	
		820.0 *2*	6.3 *3*	1236.24	3^+				E_γ: not observed in (HI,xnγ).
		1345.00 *9*	100.0 *17*	711.10	4^+	D			
2089.67	8^+	757.2 *1*	100	1332.47	6^+	E2			B(E2)(W.u.)=213 *16*
2100.34		346.5 *5*	<22	1753.84	2^+,3,4^+				
		1844.3 *2*	100 *4*	256.02	2^+				
2103.48		757.9 *5*	66 *15*	1345.45	4^+				
		1392.4 *1*	100 *3*	711.10	4^+				
2117.25		771.8 *2*	66.7 *21*	1345.45	4^+				
		880.8 *5*	100 *14*	1236.24	3^+				
		1406.3 *5*	45.1 *18*	711.10	4^+				
2179.18	2^+,3,4^+	1305.5 *5*	31 *5*	873.57	2^+				
		1468.1 *1*	33.2 *25*	711.10	4^+				
		1923.1 *1*	100 *4*	256.02	2^+				
2247.61	3^-,5^-	505.1 *2*	62 *10*	1742.57	3^-	E2(+M1)		0.0114 *17*	
		902.1 *2*	8.6 *7*	1345.45	4^+				
		1536.5 *1*	100 *3*	711.10	4^+				
2255.26	5	316.49 *9*	13.0 *11*	1938.85	5^-				
		909.75 *7*	100 *6*	1345.45	4^+	D			
		922.8 *5*	6.1 *17*	1332.47	6^+				E_γ: not observed in (HI,xnγ).
		1545 *1*	5.1 *11*	711.10	4^+				E_γ: not observed in ^{126}La ε decay.
2303.43	7^-	213.6 *5*	2.4 *6*	2089.67	8^+				E_γ: not observed in ^{126}La ε decay.
		364.4 *3*	5.9 *18*	1938.85	5^-				E_γ: not observed in ^{126}La ε decay.
		970.97 *1*	100 *11*	1332.47	6^+	E1			B(E1)(W.u.)=8.E−5 *3*
2378.91		1667.8 *1*	100	711.10	4^+				
2386.02		1674.9 *1*	100	711.10	4^+				
2399.1	2^+,3,4^+	1687.9 *5*	60 *11*	711.10	4^+				
		2143.1 *5*	100 *56*	256.02	2^+				
2408.21	$6^{(-)}$	352.06 *9*	93 *4*	2056.13	4^-	Q			
		469.2 *4*	100@ *30*	1938.85	5^-				
		1076.1 *3*	54 *13*	1332.47	6^+	D			E_γ: not observed in ^{126}La ε decay.
2429.61	$6^{(-)}$	174.4 *1*	81 *8*	2255.26	5	D(+Q)	+0.03 *5*		
		373.4 *1*	100 *11*	2056.13	4^-	Q			

$^{126}_{56}Ba_{70}$-6

$\gamma(^{126}Ba)$ (continued)

E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f	Mult.‡	δ‡	α&
2429.61	$6^{(-)}$	490.8 *1*	78 *14*	1938.85	5^-	(M1+E2)	−1.2 *4*	0.0118 *7*
		1097.1 *2*	94 *11*	1332.47	6^+			
2459.17		520.3 *2*	100 *19*	1938.85	5^-			
		1126.5 *2*	9.8 *5*	1332.47	6^+			
		1748.1 *1*	81 *3*	711.10	4^+			
2484.7	7^+	676.7 *3*	100 *9*	1808.01	5^+	Q		
		1153	30 *9*	1332.47	6^+			
2499.19	$3^-,4^+$	560.2 *3*	10 *5*	1938.85	5^-			
		756.6 *3*	99 *20*	1742.57	3^-			
		1203.2 *1*	72 *5*	1295.99	$2^{(+)}$			
		1262.9 *1*	100 *15*	1236.24	3^+			
		1625.6 *3*	19.8 *13*	873.57	2^+			
		1788.1 *1*	37.2 *20*	711.10	4^+			
2512.32	$4^+,5,6^+$	573.5 *5*	26 *4*	1938.85	5^-			
		1166.9 *2*	12.7 *5*	1345.45	4^+			
		1179.8 *3*	5.6 *19*	1332.47	6^+			
		1801.2 *1*	100 *3*	711.10	4^+			
2530.19	$8^{(+)}$	440	6.3 *21*	2089.67	8^+			
		640.0 *1*	100 *16*	1890.20	$6^{(+)}$	Q		
2566.36	$4^{(+)},5,6^+$	627.7 *5*	60 *13*	1938.85	5^-			
		676.3 *5*	43 *10*	1890.20	$6^{(+)}$			
		1220.9 *1*	100.0 *21*	1345.45	4^+			
2567.0		137	100	2429.61	$6^{(-)}$			
2576.81	3,4	520.7 *3*	16 *3*	2056.13	4^-			
		834.2 *1*	30.2 *13*	1742.57	3^-			
		1231.3 *5*	15.1 *25*	1345.45	4^+			
		1340.6 *1*	100 *13*	1236.24	3^+			
		1865.9 *3*	20.4 *13*	711.10	4^+			
2605.57		1894.4 *1*	78 *3*	711.10	4^+			
		2349.6 *1*	100 *3*	256.02	2^+			
2609.37	$7^{(-)}$	179.8 *1*	100	2429.61	$6^{(-)}$	D+Q	−0.13 *5*	
2657.44	$2^+,3,4^+$	1946.3 *3*	16.7 *9*	711.10	4^+			
		2401.4 *1*	100 *5*	256.02	2^+			
2684.37	(4)	628.2 *1*	100 *17*	2056.13	4^-			
		745.5 *1*	14 *3*	1938.85	5^-			
		876.3 *5*	11.7 *22*	1808.01	5^+			
		941.8 *2*	12.4 *5*	1742.57	3^-			
		1448.1 *1*	52.4 *9*	1236.24	3^+			
		1973.3 *1*	48.9 *17*	711.10	4^+			
2716.27	$4^+,5,6^+$	1383.7 *1*	23.1 *6*	1332.47	6^+			
		2005.2 *1*	100 *3*	711.10	4^+			
2732.60	$3^-,4,5^+$	676.4 *5*	86 *16*	2056.13	4^-			

$^{126}_{56}Ba_{70}$-7

Adopted Levels, Gammas (continued)

γ(^{126}Ba) (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[‡]	δ[‡]	α[&]	Comments
2732.60	3^-,4,5^+	793.7 *1*	54 *3*	1938.85	5^-				
		1387.2 *5*	57 *3*	1345.45	4^+				
		1496.4 *2*	100 *5*	1236.24	3^+				
		2021.5 *1*	65 *3*	711.10	4^+				
2748.60	$4^{(+)}$,5,6^+	809.7 *1*	86.9 *20*	1938.85	5^-				
		858.3 *3*	64 *3*	1890.20	$6^{(+)}$				
		1403.2 *1*	100 *3*	1345.45	4^+				
		2037.6 *5*	35.4 *20*	711.10	4^+				
2772.94	$8^{(-)}$	364.8 *2*	100 *2*	2408.21	$6^{(-)}$	Q			
		469.4 *5*	@	2303.43	7^-				
2786.61	9^-	483.2 *1*	96 *7*	2303.43	7^-	E2		0.0108	B(E2)(W.u.)=100 *16*
		696.8 *1*	100 *11*	2089.67	8^+	E1			B(E1)(W.u.)=0.000145 *25*
2813.30	$8^{(-)}$	204.0 *1*	100 *17*	2609.37	$7^{(-)}$	D+Q	−0.34 *5*		
		246	33 *8*	2567.0		D			
		383.5 *2*	15 *3*	2429.61	$6^{(-)}$	Q			
2872.09	2,3,4	1129.5 *1*	100 *3*	1742.57	3^-				
		1635.9 *2*	28.8 *16*	1236.24	3^+				
2886.5		1554	100	1332.47	6^+				
2942.07	10^+	852.4 *1*	100	2089.67	8^+	E2			B(E2)(W.u.)=194 *24*
2953.70	2^+,3,4^+	774.6 *5*	18.6 *7*	2179.18	2^+,3,4^+				
		1211.2 *1*	100 *4*	1742.57	3^-				
		1657.6 *3*	18.2 *15*	1295.99	$2^{(+)}$				
		2242.6 *1*	65 *3*	711.10	4^+				
		2697.6 *1*	91 *3*	256.02	2^+				
3096.48	$9^{(-)}$	283.2 *1*	100 *10*	2813.30	$8^{(-)}$	D+Q	−0.37 *5*		
		487.0 *2*	53 *10*	2609.37	$7^{(-)}$	Q			
3108.0	2^+,3,4^+	2396.8 *5*	100 *50*	711.10	4^+				
		2852.0 *5*	93 *7*	256.02	2^+				
3185.6	2^+,3,4^+	2474.5 *3*	90 *7*	711.10	4^+				
		2929.6 *5*	100 *7*	256.02	2^+				
3236.62	$10^{(-)}$	450.0 *1*	41 *6*	2786.61	9^-				
		463.7 *1*	100 *2*	2772.94	$8^{(-)}$	Q			
3243.8	(9^+)	759.1 *14*	100	2484.7	7^+				
3261.48	$10^{(+)}$	731.3 *1*	100 *13*	2530.19	$8^{(+)}$	Q			
		1172	15 *4*	2089.67	8^+				
3375.37	11^-	433.3 *1*	6.5 *16*	2942.07	10^+	D+Q	−0.05 *5*		
		588.7 *1*	100 *5*	2786.61	9^-	E2			B(E2)(W.u.)=144 *22*
3389.7		447.6 *3*	100	2942.07	10^+				
3403.0	2^+,3,4^+	2691.9 *5*	100 *8*	711.10	4^+				
		3146.8 *8*	89 *11*	256.02	2^+				
3419.91	$10^{(-)}$	323.4 *1*	57 *7*	3096.48	$9^{(-)}$	D+Q	−0.5 *1*		
		606.5 *5*	100 *12*	2813.30	$8^{(-)}$	Q			

$^{126}_{56}$Ba$_{70}$-8

$\gamma(^{126}Ba)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[‡]	δ[‡]	Comments
3450.5	(8)	564	23 *15*	2886.5		Q		
		1360.8 *6*	100 *15*	2089.67	8^+			
3484.8	2^+,3,4^+	2773.5 *10*	100 *7*	711.10	4^+			
		3228.9 *10*	23 *4*	256.02	2^+			
3588.8		327	100	3261.48	$10^{(+)}$			
		1059	[@]	2530.19	$8^{(+)}$			
3703.76	2^+,3,4^+	2992.6 *3*	44 *13*	711.10	4^+			
		3447.7 *2*	100 *3*	256.02	2^+			
3746.84	$11^{(-)}$	326.7 *3*	28 *8*	3419.91	$10^{(-)}$	D+Q	−0.5 *1*	
		650.5 *2*	100 *14*	3096.48	$9^{(-)}$	Q		
3747.40	12^+	486	1.6 *6*	3261.48	$10^{(+)}$			
		805.3 *1*	100 *3*	2942.07	10^+	E2		B(E2)(W.u.)=116 *15*
3758.9		1702.7 *3*	100	2056.13	4^-			
3886.78	(12^-)	511	15 *4*	3375.37	11^-			
		650.2 *2*	100 *15*	3236.62	$10^{(-)}$			
3887.86	12^+	945.8 *1*	100	2942.07	10^+	E2		
4074.09	$12^{(+)}$	812.6 *1*	100 *14*	3261.48	$10^{(+)}$	Q		
		1132	21 *3*	2942.07	10^+			
4078.89	13^-	703.5 *1*	100	3375.37	11^-	E2		B(E2)(W.u.)=2.5×10^2 *+16−8*
4093.3	(11^+)	849.5 *8*	100[@]	3243.8	(9^+)			
4110.2	$12^{(-)}$	363.6 *5*	16 *8*	3746.84	$11^{(-)}$			
		690.3 *2*	100 *12*	3419.91	$10^{(-)}$	Q		
4121.4	(10)	671	19 *10*	3450.5	(8)			
		860	26 *10*	3261.48	$10^{(+)}$	Q		
		1179.4 *4*	100 *14*	2942.07	10^+			
4419.63	14^+	532	4.2 *9*	3887.86	12^+	E2		B(E2)(W.u.)=21 *5*
		672.2 *1*	100 *8*	3747.40	12^+	E2		B(E2)(W.u.)=153 *12*
4456.9	$13^{(-)}$	347	24 *8*	4110.2	$12^{(-)}$			
		710	100 *12*	3746.84	$11^{(-)}$	Q		
4670.6	$14^{(+)}$	783.0 *4*	100 *15*	3887.86	12^+	Q		
		922.9 *4*	42 *6*	3747.40	12^+			
4713.9	(14^-)	827.1 *2*	100	3886.78	(12^-)	Q		
4764.3	(12)	1017[b]	100[b#]	3747.40	12^+			
4845.7	$14^{(-)}$	389	45 *18*	4456.9	$13^{(-)}$			
		735.4 *4*	100 *18*	4110.2	$12^{(-)}$	Q		
4851.6	$14^{(+)}$	777.7 *9*	100 *20*	4074.09	$12^{(+)}$	Q		
		1104	70 *7*	3747.40	12^+			
4856.3	(13^+)	763	100	4093.3	(11^+)	Q		
4896.4	(12)	775	100	4121.4	(10)			
4900.27	15^-	821.4 *1*	100	4078.89	13^-	E2		B(E2)(W.u.)=1.2×10^2 *+8−4*
4905.2	(13)	141	100 *29*	4764.3	(12)	D		

$^{126}_{56}Ba_{70}$-9

γ(^{126}Ba) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[‡]	Comments
4905.2	(13)	784	36 *14*	4121.4	(10)		
		1017[b]	43[b#]	3887.86	12^+		
5086.7		241	100	4845.7	$14^{(-)}$		
5122.2	(14)	217	100	4905.2	(13)	D	
5199.8	15	780.2 *3*	100	4419.63	14^+	D	
5244.72	16^+	825.1 *1*	100	4419.63	14^+	E2	B(E2)(W.u.)=123 *+29−20*
5255.8	(15^-)	410	35 *12*	4845.7	$14^{(-)}$		
		799	100 *24*	4456.9	$13^{(-)}$		
5398.2	(15)	276	100	5122.2	(14)	D	
5509.6	$16^{(+)}$	839.0 *3*	100	4670.6	$14^{(+)}$	Q	
5650.6	(16^+)	799	100	4851.6	$14^{(+)}$		
5662.5	(16^-)	948.6 *5*	100	4713.9	(14^-)		
5707.7	$16^{(-)}$	452	38 *15*	5255.8	(15^-)		
		862	100 *15*	4845.7	$14^{(-)}$	Q	
5725.2	(16)	327	100 *29*	5398.2	(15)	D	
		603	57 *29*	5122.2	(14)		
5806.39	17^-	906.1 *1*	100	4900.27	15^-	E2	B(E2)(W.u.)=9.E+1 *+9−3*
6042.5	17	797.5 *4*	50 *20*	5244.72	16^+		
		842.9 *4*	100 *20*	5199.8	15	Q	
6098.2	(17)	373	100 *50*	5725.2	(16)		
		700	75 *25*	5398.2	(15)		
6182.8	(17^-)	475	62 *18*	5707.7	$16^{(-)}$		
		927	100 *50*	5255.8	(15^-)		
6195.2	18^+	950.8 *5*	100	5244.72	16^+	E2	B(E2)(W.u.)>39
6415.6	(18^+)	906	100	5509.6	$16^{(+)}$		
6513.2	(18)	415	83 *17*	6098.2	(17)		
		788	100 *33*	5725.2	(16)		
6530.6	(18^+)	880	100	5650.6	(16^+)		
6585.5	(18^-)	923	100	5662.5	(16^-)	Q	
6700.7	(18^-)	993	100	5707.7	$16^{(-)}$		
6721.6	$19^{(-)}$	915.2[a] *2*	100[a]	5806.39	17^-	Q	
6968.2	(19)	455	[@]	6513.2	(18)		
		870	100 *50*	6098.2	(17)		
6995.9	(19)	802	100 *40*	6195.2	18^+		
		952	1.2×10^2 *20*	6042.5	17		I_γ: $\Delta I\gamma$=200.
7183.2	$20^{(+)}$	988	100	6195.2	18^+	Q	
7387.6	(20^+)	972	100	6415.6	(18^+)		
7461.2	(20)	948	100	6513.2	(18)		
7636.8	$21^{(-)}$	915.2[a] *2*	100[a]	6721.6	$19^{(-)}$	Q	
8145.2	$22^{(+)}$	962	100	7183.2	$20^{(+)}$	Q	
8388.6	(22^+)	1001	100	7387.6	(20^+)		
8621.8	$23^{(-)}$	985	100	7636.8	$21^{(-)}$	Q	

$^{126}_{56}$Ba$_{70}$-10

γ(^{126}Ba) (continued)

E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f
9202.2	(24$^+$)	1057	100	8145.2	22$^{(+)}$
9700.8	(25$^-$)	1079	100	8621.8	23$^{(-)}$
10308.2	(26$^+$)	1106	100	9202.2	(24$^+$)
10872.8	(27$^-$)	1172	100	9700.8	(25$^-$)
11475.2	(28$^+$)	1167	100	10308.2	(26$^+$)
12132.8	(29$^-$)	1260	100	10872.8	(27$^-$)
12718	(30$^+$)	1243	100	11475.2	(28$^+$)
13469.8	(31$^-$)	1337	100	12132.8	(29$^-$)
14041	(32$^+$)	1323	100	12718	(30$^+$)
14878.8	(33$^-$)	1409	100	13469.8	(31$^-$)
15434	(34$^+$)	1393	100	14041	(32$^+$)
16895	(36$^+$)	1461	100	15434	(34$^+$)

E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f	Mult.‡
180.0+x	(14)	180	100	x+0.0	(13)	
425.0+x	(15)	245	100	180.0+x	(14)	
693.0+x	(16)	268	100 *33*	425.0+x	(15)	D
		513	50 *17*	180.0+x	(14)	
1012.0+x	(17)	319	100 *23*	693.0+x	(16)	D
		587	38 *23*	425.0+x	(15)	
1377.0+x	(18)	365	100 *50*	1012.0+x	(17)	
		684	50 *13*	693.0+x	(16)	
1773.0+x	(19)	396	100 *40*	1377.0+x	(18)	
		761	80 *40*	1012.0+x	(17)	
2206.0+x	(20)	433	100 *50*	1773.0+x	(19)	
		829	50 *25*	1377.0+x	(18)	

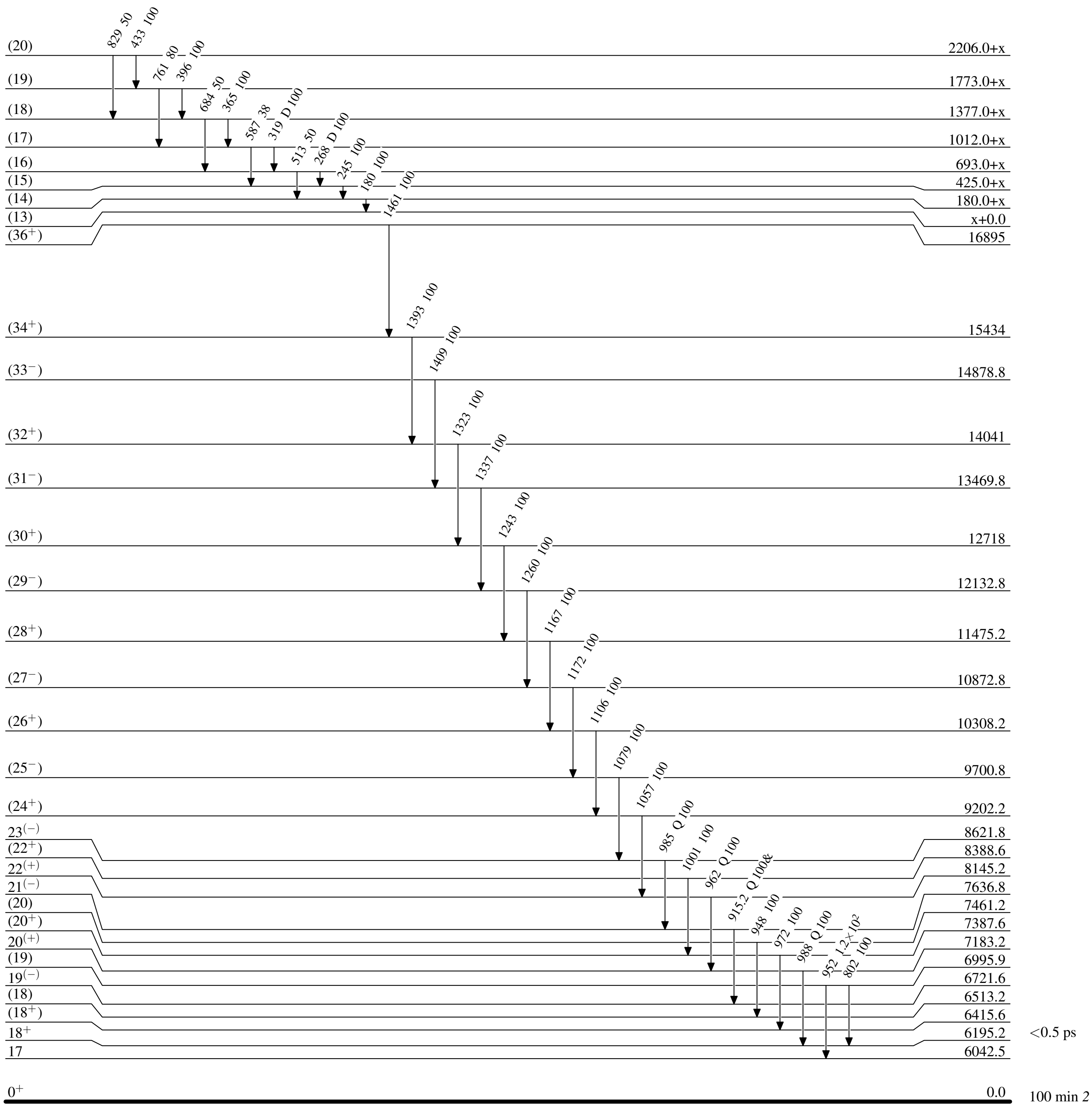
† From av of ^{126}La ε decay and (HI,xnγ) when both data are available.
‡ From $\gamma(\theta)$ and linear polariation in (HI,xnγ) and $\gamma\gamma(\theta)$ and α(K)exp in ^{126}La ε decay.
# Uncertainty of intensity was not given in (HI,xnγ).
@ Intensity was not given in (HI,xnγ).
& Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.
[a] Multiply placed with undivided intensity.
[b] Multiply placed with intensity suitably divided.

$^{126}_{56}Ba_{70}$-11

Adopted Levels, Gammas

Level Scheme

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given

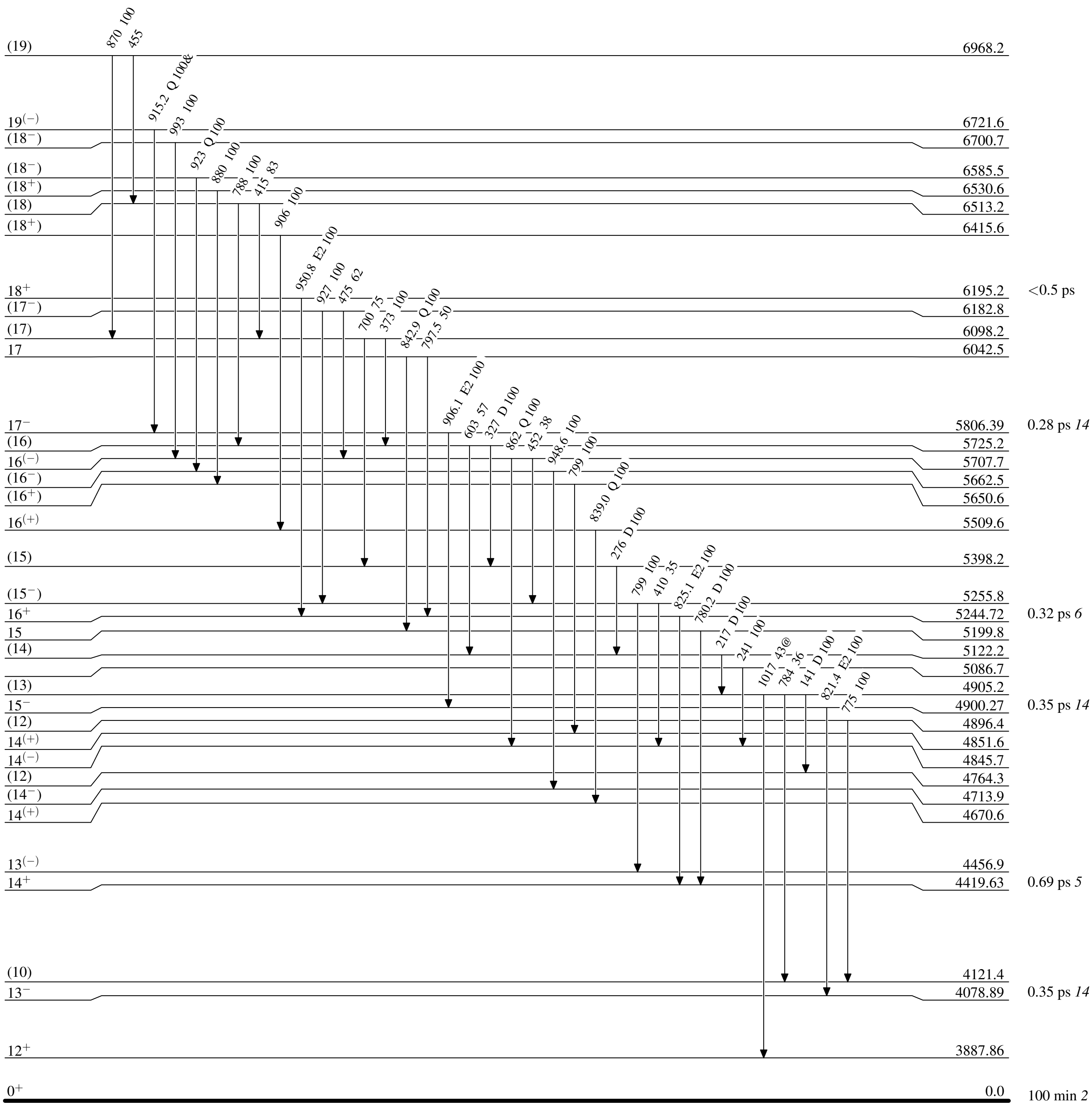


$^{126}_{56}Ba_{70}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided

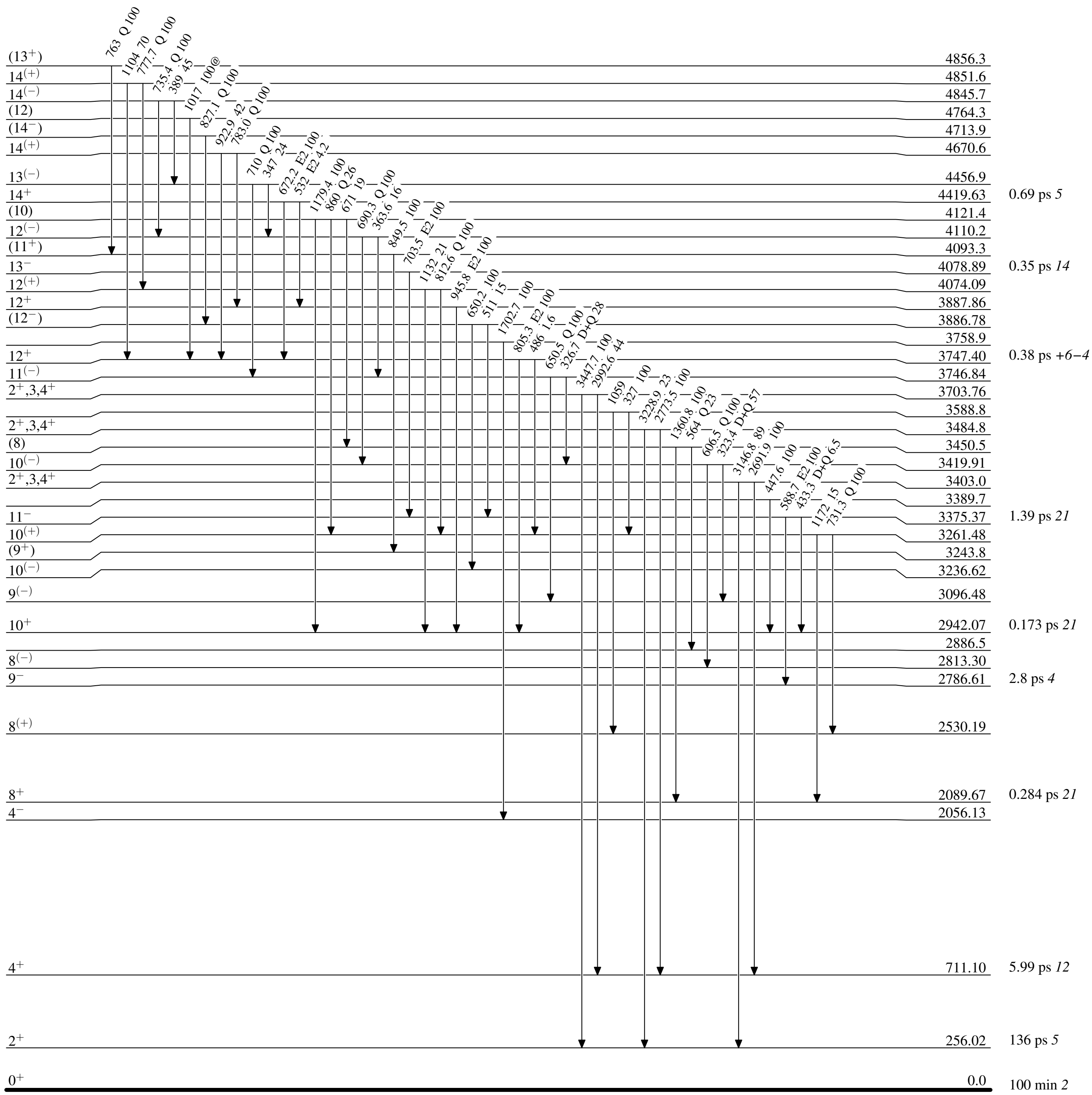


$^{126}_{56}Ba_{70}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided

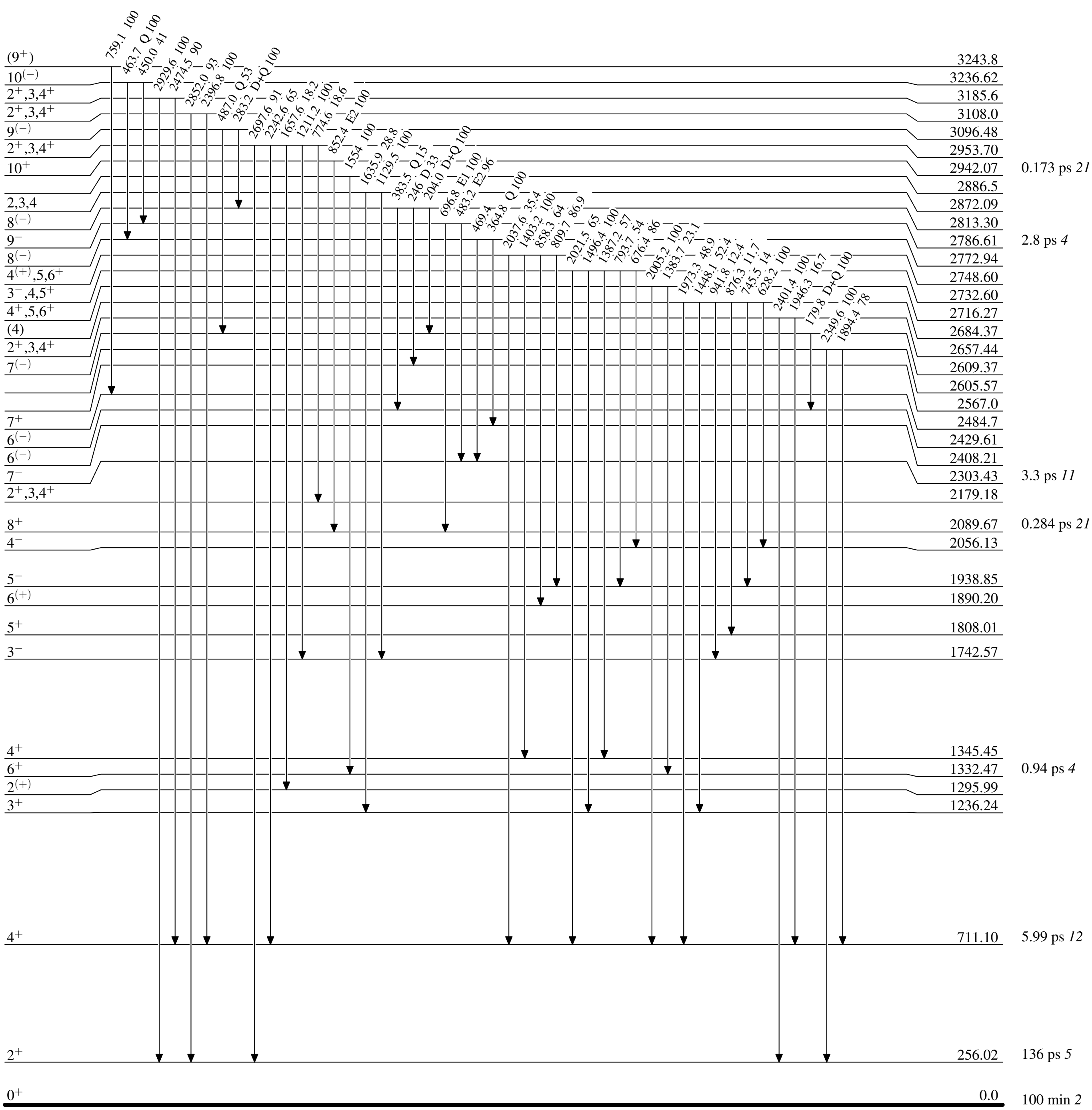


$^{126}_{56}Ba_{70}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided

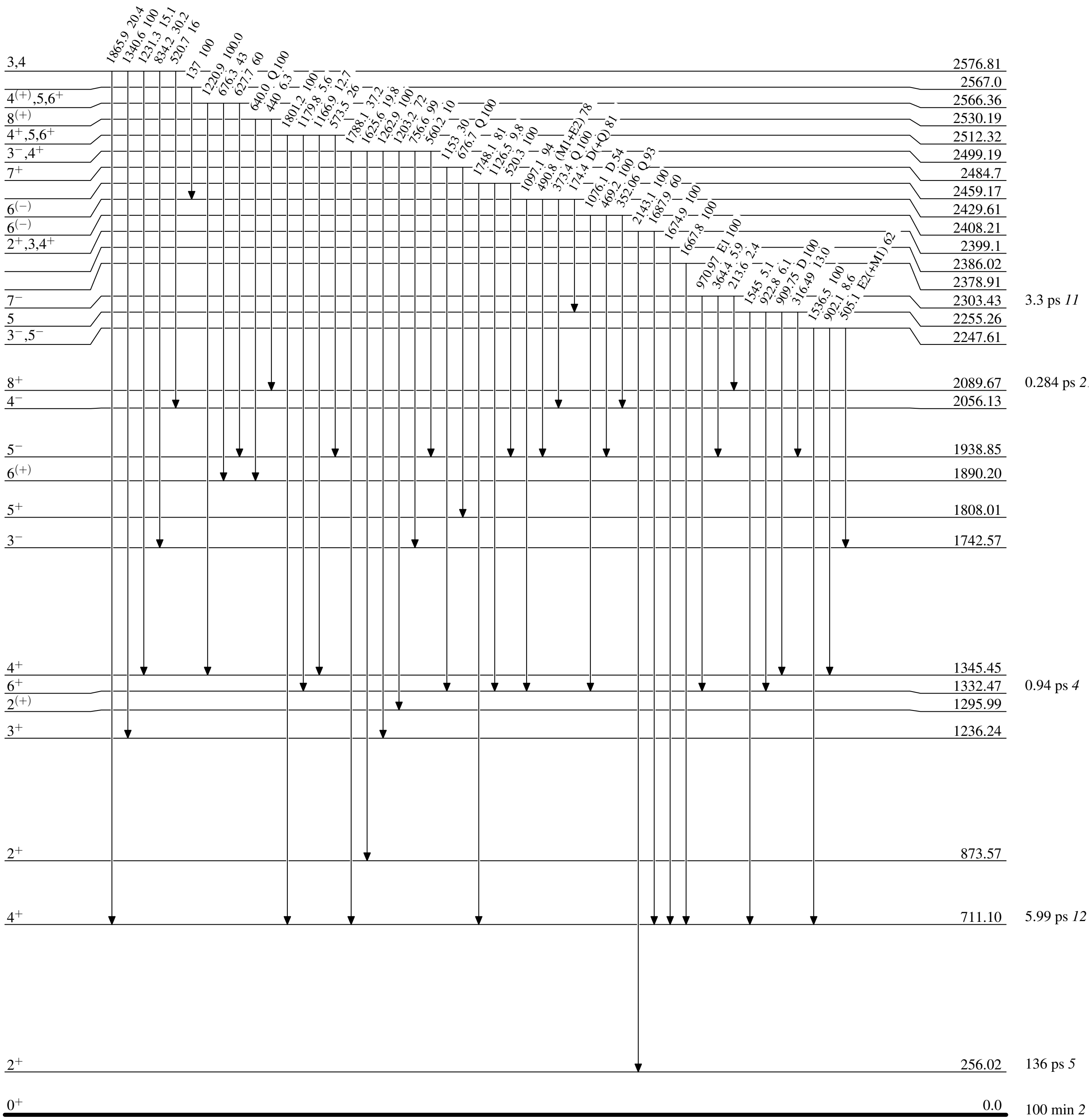


$^{126}_{56}Ba_{70}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided

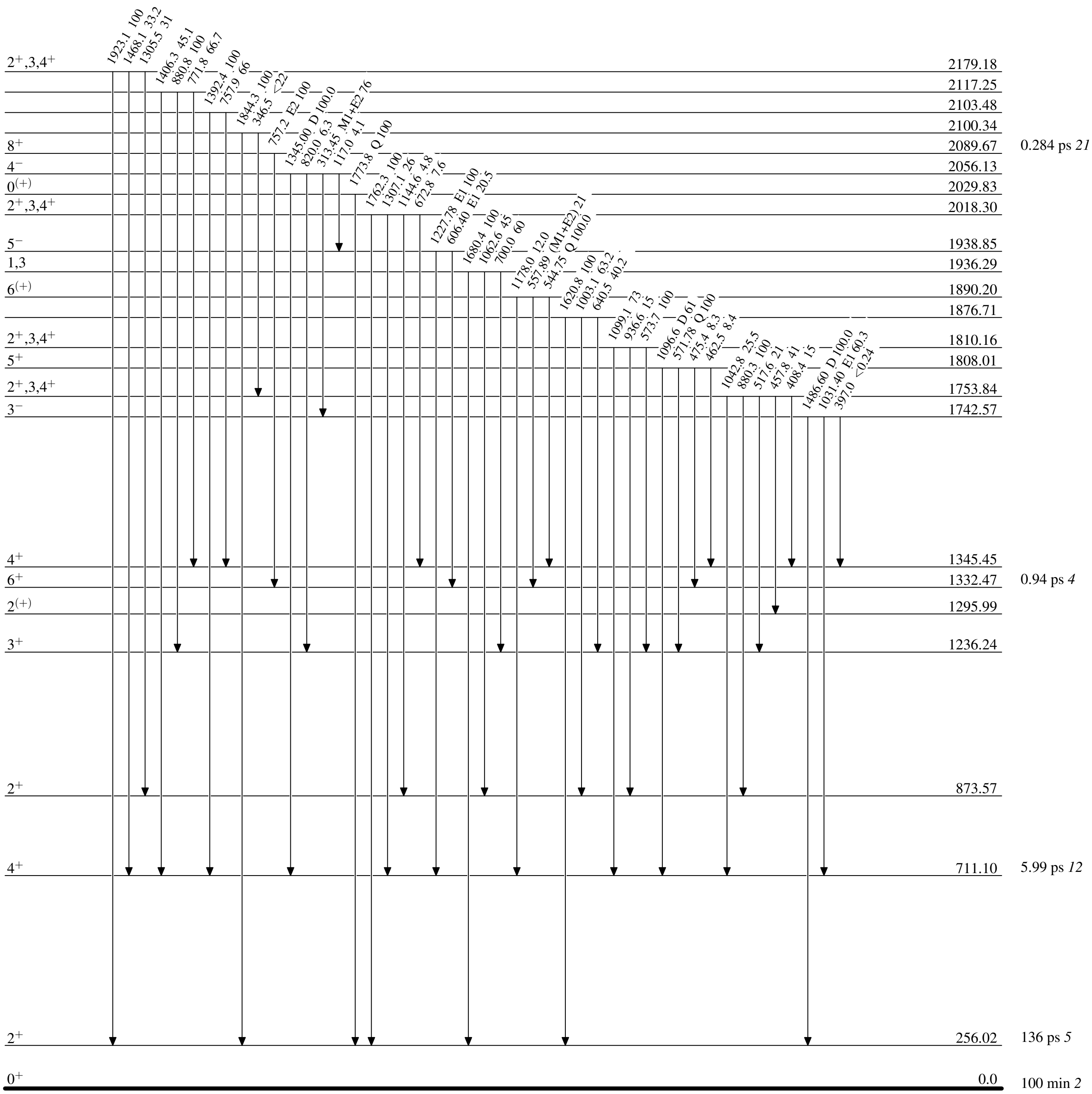


$^{126}_{56}Ba_{70}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided

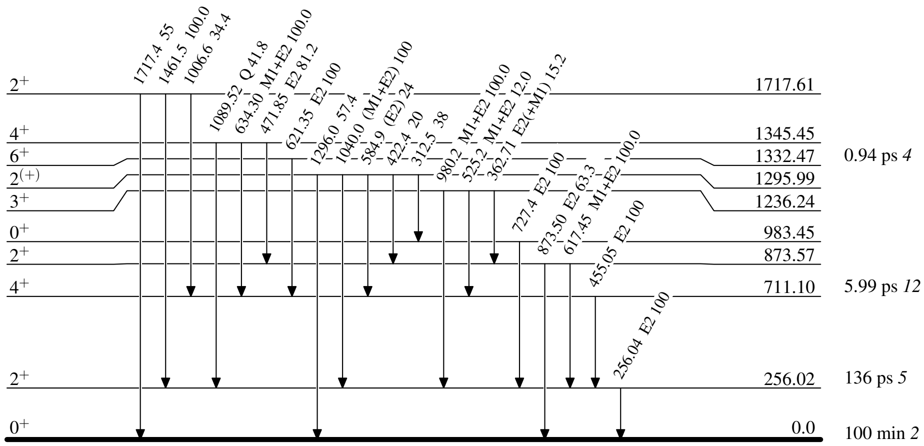


$^{126}_{56}Ba_{70}$

Adopted Levels, Gammas

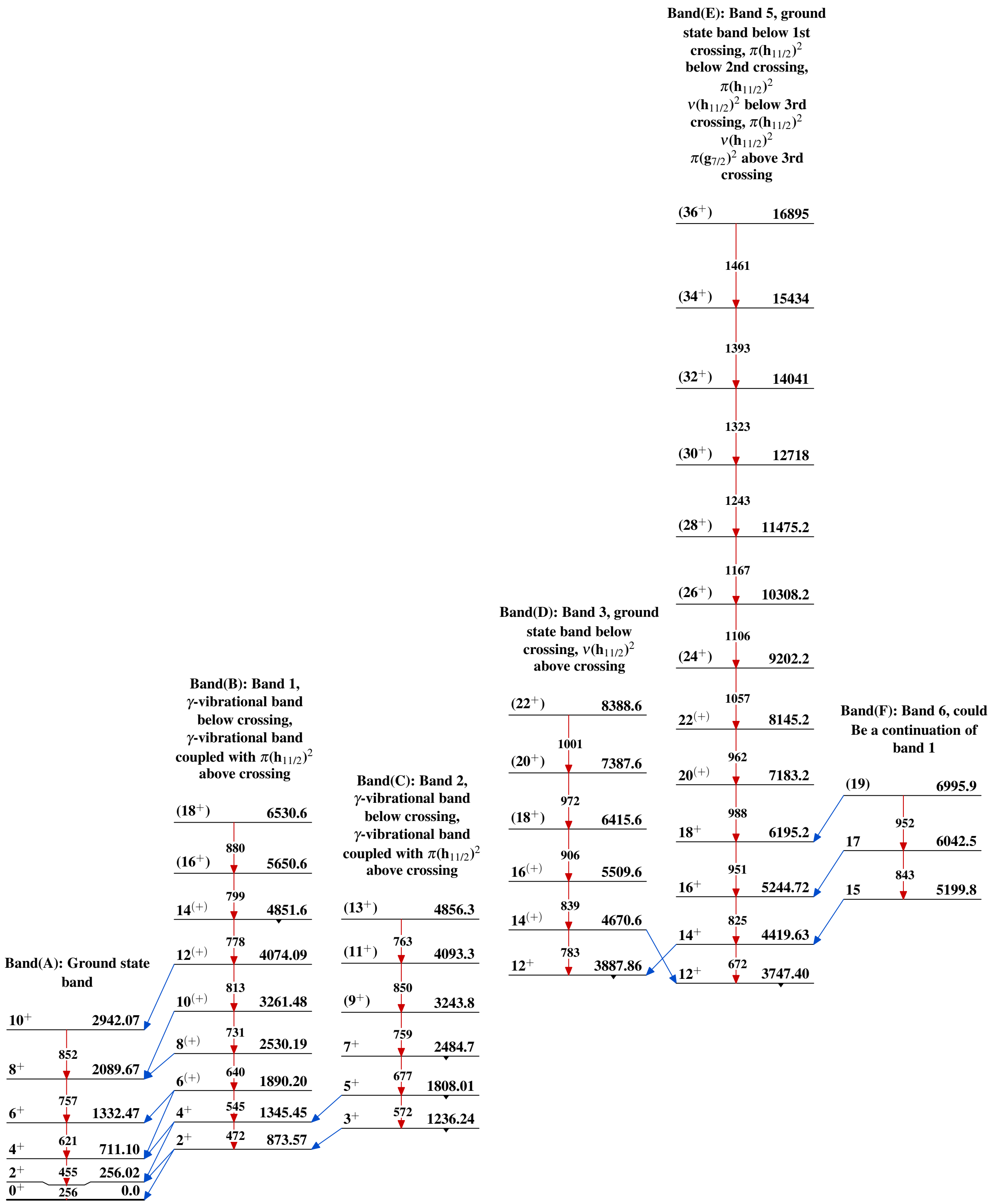
Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided



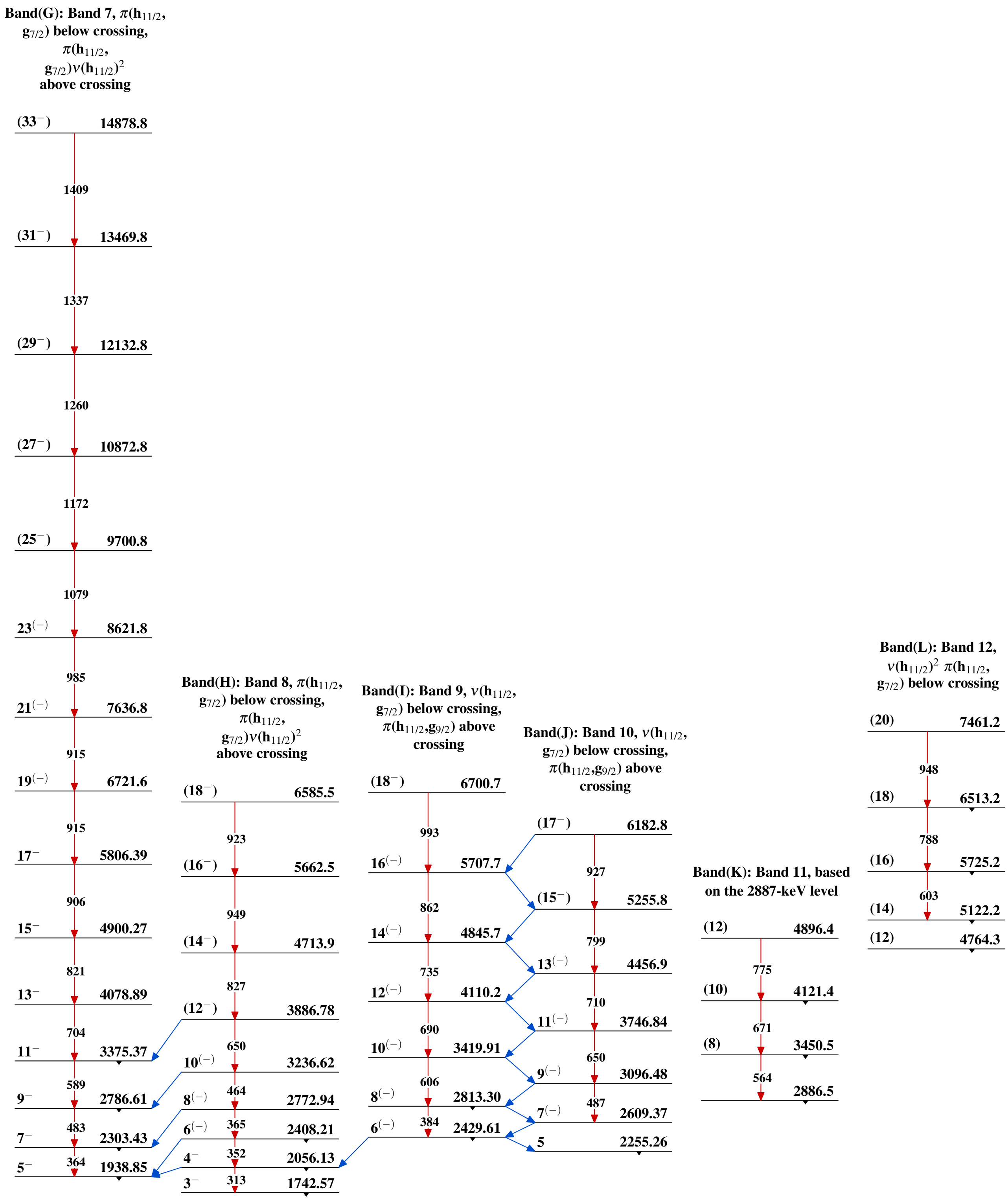
$^{126}_{56}Ba_{70}$

Adopted Levels, Gammas



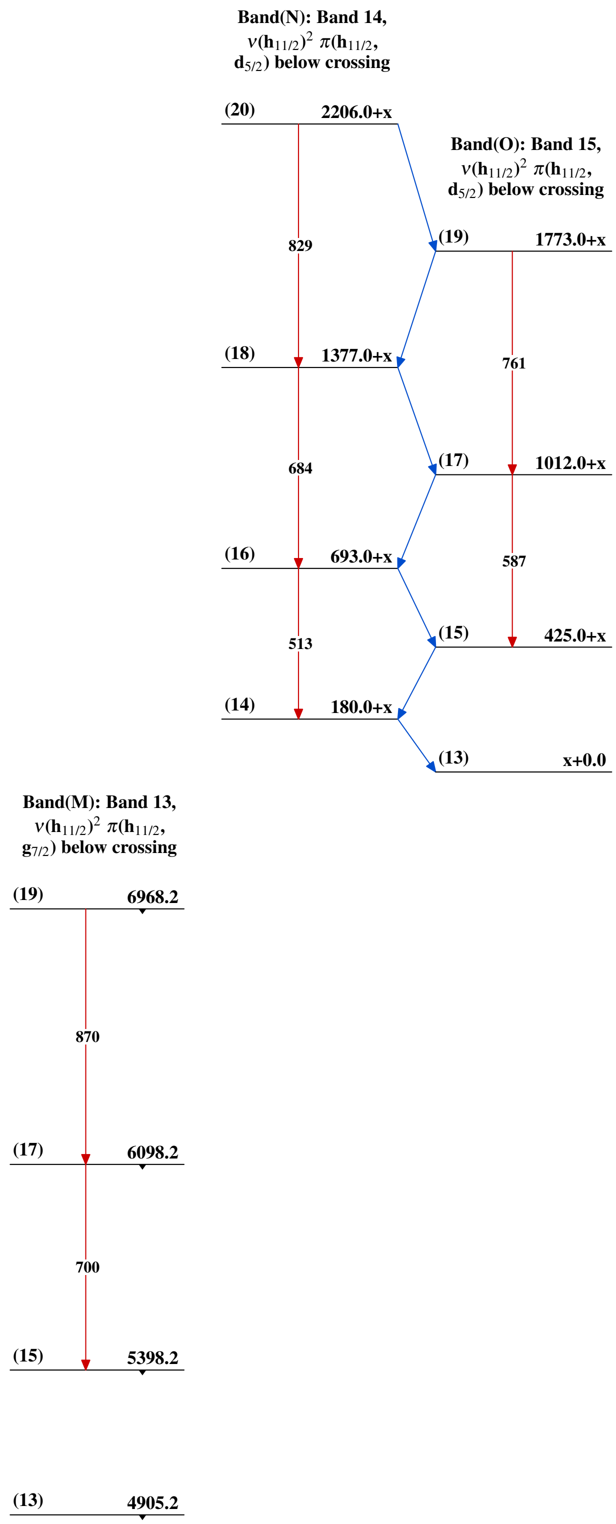
$^{126}_{56}Ba_{70}$

Adopted Levels, Gammas (continued)



$^{126}_{56}Ba_{70}$

Adopted Levels, Gammas (continued)



$^{126}_{56}Ba_{70}$

Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Zoltan Elekes and Janos Timar	NDS 129, 191 (2015)	28-Feb-2015

Q(β^-)=−6750 *50*; S(n)=10632 *13*; S(p)=6428 *8*; Q(α)=−143 *6* 2012Wa38
S(2n)=18852 *14*, S(2p)=10811 *6* (2012Wa38).
α: Additional information 1.

^{128}Ba Levels

Cross Reference (XREF) Flags

A	^{128}La ε decay (<1.4 min)
B	^{128}La ε decay (5.18 min)
C	(HI,xnγ)
D	^{130}Ba(p,t)

E(level)[†]	J$^\pi$[‡]	T$_{1/2}$[@]	XREF	Comments
0.0[d]	0$^+$	2.43 d *5*	ABCD	%ε=100 J$^\pi$: L=0 in (p,t). T$_{1/2}$: from γ(t) (1963Ya05). Other: 2.4 d *1* (1950Fi11).
284.00[d] *8*	2$^+$	105 ps *9*	ABCD	J$^\pi$: E2 γ to 0$^+$; L=2 in (p,t).
763.32[d] *11*	4$^+$	5.34 ps *24*	ABCD	J$^\pi$: L=4 in (p,t); consistent with E2 γ to 2$^+$.
884.50[a] *12*	2$^+$	3.4 ps *4*	ABCD	J$^\pi$: E2 γ to 0$^+$; L=2 in (p,t).
942.1 *5*	0$^+$		AB D	J$^\pi$: L=0 in (p,t); E2 γ to 2$^+$.
1321.0 *4*	2$^+$		AB D	J$^\pi$: L=2 in (p,t); γ's to 0$^+$ and 4$^+$.
1324.37[&] *14*	3$^+$		BC	J$^\pi$: M1+E2 γ's to 2$^+$ and 4$^+$.
1372.33[a] *13*	4$^+$	3.3 ps *3*	BCD	J$^\pi$: L=4 in (p,t); E2 γ to 2$^+$, M1+E2 γ to 4$^+$.
1406.88[d] *17*	6$^+$	1.33 ps *12*	BC	J$^\pi$: in-band E2 γ to 4$^+$.
1710.0 *10*	0$^+$		AB D	J$^\pi$: L=0 in (p,t);consistent with $\gamma\gamma(\theta)$.
1799.56 *16*	4$^+$		B	J$^\pi$: From $\gamma\gamma(\theta)$ of 2002Wo10, γ to 2$^+$, β^-feeding from (5$^+$).
1833.75 *18*	4$^+$		B D	J$^\pi$: From $\gamma\gamma(\theta)$ of 2002Wo10, γ to 2$^+$, β^-feeding from (5$^+$); contradiction with L=3 in (p,t).
1907.5 *4*	4$^+$		B D	J$^\pi$: L=4 in (p,t).
1931.34[&] *22*	5$^+$		BC	J$^\pi$: E2 γ to 3$^+$; M1 γ to 4$^+$.
1939.34[a] *18*	6$^+$	1.86 ps *22*	BC	J$^\pi$: E2 γ to 4$^+$ in band, γ to 6$^+$.
1953.9 *5*			D	
2008.9 *5*			B	
2039.35 *21*	(1$^+$ to 4$^+$)		B	J$^\pi$: γ's to 2$^+$ and 3$^+$.
2039.49[f] *19*	5$^-$	1.12 ps *17*	BC	J$^\pi$: E2 γ from 7$^-$ in band.
2054.6 *7*	2$^+$		D	J$^\pi$: L=2 in (p,t).
2175.6 *3*	(4 to 6)		B	J$^\pi$: log *ft*=6.81 from (5$^+$).
2188.51[d] *19*	8$^+$	0.53 ps *7*	C	J$^\pi$: E2 γ to 6$^+$ in band.
2192.5 *6*	(4$^+$)		B	J$^\pi$: from log *ft*=7.37 from (5$^+$) and γ to 2$^+$.
2197.7 *3*	3$^-$,4$^+$		D	J$^\pi$: L=4 in (p,t).
2203.4 *3*	(3$^-$,4$^+$)		B	J$^\pi$: γ's to 2$^+$, β^-feeding from (5$^+$).
2218.8 *5*	0$^+$		AB D	J$^\pi$: L=0 in (p,t); $\gamma\gamma(\theta)$.
2246.7 *5*	(4 to 6$^+$)		B	J$^\pi$: log *ft*=7.07 from(5$^+$) and γ's to 4$^+$ and 5$^+$.
2250.6 *9*	4$^+$		D	J$^\pi$: L=4 in (p,t).
2347.2 *5*	2$^+$		A D	J$^\pi$: L=2 in (p,t).
2395.81[h] *23*	(7)$^-$	6.1 ns *2*	BC	J$^\pi$: E1 γ to 6$^+$, no γ to (3,4$^+$). T$_{1/2}$: from beam-γ(t) (1992Pe06).
2412.87[f] *18*	7$^-$	3.6 ps *3*	BC	J$^\pi$: E1 γ's to 6$^+$ and 8$^+$.

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Adopted Levels, Gammas (continued)

^{128}Ba Levels (continued)

E(level)[†]	J^{π}[‡]	$T_{1/2}$[@]	XREF	Comments
2425.45 *15*	$(4^-,5^+)$		B	J^{π}: $\gamma\gamma(\theta)$ suggests J=4,5; γ to 3^+, no γ to 2^+.
2444.5 *2*	0^+		D	J^{π}: L=0 in (p,t).
2451.4 *3*	$(3^-$ to $6^+)$		B	J^{π}: γ's to 4^+ and 5^-.
2474.0 *10*	$(2^+$ to $6^+)$		B	J^{π}: γ to 4^+.
2486.2 *10*			D	
2511.2 *7*			D	
2531.5 *4*	$(4^+$ to $7^-)$		B	J^{π}: γ's to 5^- and 6^+.
2551.5 *7*	4^+		D	J^{π}: L=4 in (p,t).
2571.4 *4*	$(4^+$ to $7^-)$		B	J^{π}: γ's to 5^- and 6^+.
2589.7 *7*	2^+		D	J^{π}: L=2 in (p,t).
2600.27[a] *19*	8^+	0.8 ps *3*	C	J^{π}: E2 γ to 6^+ in band.
2612.83[h] *25*	$(8)^-$	119 ps *5*	C	J^{π}: M1+E2 γ to $(7)^-$ in band.
2627.0 *3*			B	This level is split up into two levels in 1997Ha30. However, evaluators do not see any published experimental fact that would contradict a one-level assumption.
2629.0 *10*	0^+		A D	J^{π}: L=0 in (p,t); $\gamma\gamma(\theta)$.
2631.3[&] *5*	7^+		C	J^{π}: Q γ to 5^+ in band.
2659 *1*	(3^-)		D	J^{π}: L=(3) in (p,t).
2669.5 *5*			B	
2710 *1*	(2^+)		D	J^{π}: L=(2) in (p,t).
2721.1 *3*	$(5,6^+)$		B	J^{π}: γ's to 4^+ and 6^+; no γ to 2^+.
2746.2 *7*			B	
2749 *1*			D	
2770 *1*	0^+		D	J^{π}: L=0 in (p,t).
2804 *1*			D	
2840 *1*	0^+		D	J^{π}: L=0 in (p,t).
2848.6 *4*			B	
2860.78[g] *20*	(8^-)	25 ps *3*	C	J^{π}: D(+Q) γ to 7^-, no γ to 5^-; parity from configuration.
2870 *1*			D	
2878.41 *24*	$(5^-,6^+)$		B	J^{π}: E2,D γ to 4^+, γ to $(7)^-$.
2906.29[f] *19*	9^-	3.8 ps *3*	C	J^{π}: E2 γ to 7^- in band, E1 γ to 8^+.
2923 *1*	0^+		D	J^{π}: L=0 in (p,t).
2927.0[h] *3*	$(9)^-$	11.8 ps *8*	C	J^{π}: M1+E2 γ to $(8)^-$, E2 γ to $(7)^-$.
2929.9 *5*			B	
2950 *1*			D	
2975.3 *6*			B	
2977.89 *25*	(4,5)		B	J^{π}: $\gamma\gamma(\theta)$ for the 1605γ488γ suggests J=4,5.
3039 *1*			D	
3082.31[d] *21*	10^+	0.40 ps *6*	C	J^{π}: E2 γ to 8^+ in band.
3086 *1*	(3^-)		D	J^{π}: L=(3) in (p,t).
3116.9 *5*			B	
3127 *1*			D	
3204 *1*			D	
3246 *1*			D	
3292.5[h] *3*	$(10)^-$	2.6 ps *6*	C	J^{π}: M1+E2 γ to $(9)^-$, cross-over γ to $(8)^-$ in band.
3334.39[g] *20*	(10^-)	3.4 ps *3*	C	J^{π}: D(+Q) γ to 9^-, E2 γ to (8^-) in band.
3341 *3*	(4^+)		D	J^{π}: L=(4) in (p,t).
3345.78[a] *21*	10^+	0.63 ps *19*	C	J^{π}: E2 γ to 8^+ in band.
3387.2[&] *7*	(9^+)		C	J^{π}: γ to 7^+ in E2 band.
3474 *3*	(3^-)		D	J^{π}: L=(3) in (p,t).
3506.7[f] *4*	11^-		C	J^{π}: γ to 9^- in E2 band.
3521.71[c] *24*	10^+	2.4 ps *3*	C	J^{π}: γ to 10^+, E2 γ to 8^+.
3536 *3*			D	
3611 *3*	(3^-)		D	J^{π}: L=(3) in (p,t).

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Adopted Levels, Gammas (continued)

^{128}Ba Levels (continued)

E(level)[†]	J^{π}[‡]	$T_{1/2}$[@]	XREF	Comments
3683.2[h] *4*	(11$^-$)	1.1 ps *4*	C	J^{π}: γ's to (10)$^-$ and (9)$^-$ in band.
3985.29[g] *23*	(12$^-$)		C	J^{π}: Q γ to (10$^-$) in band and γ to 11$^-$.
3988.19[e] *22*	12$^+$	0.58 ps *19*	C	J^{π}: E2 γ to 10$^+$; no γ to lower-spin states.
4017.74[c] *24*	12$^+$	0.70 ps *12*	C	J^{π}: E2 γ to 10$^+$ in band.
4112.2[d] *3*	12$^+$		C	J^{π}: Q γ to 10$^+$ in band.
4116.1[h] *4*	(12)$^-$	0.7 ps *3*	C	J^{π}: E2 γ to (10)$^-$, γ to (11$^-$).
4194.8[a] *3*	12$^+$		C	J^{π}: Q γ to 10$^+$ in band.
4218.2[f] *4*	13$^-$		C	J^{π}: Q γ to (11$^-$) in band.
4556.8[h] *5*	(13$^-$)		C	J^{π}: Q γ to (11$^-$), γ to (12)$^-$ in band.
4645.92[e] *24*	14$^+$	0.89 ps *18*	C	J^{π}: E2 γ to 12$^+$ in band.
4650.7[b] *6*	12$^+$		C	J^{π}: M1+E2 γ from 13$^+$, γ from 14$^+$ in band.
4720.37[c] *24*	14$^+$	0.44 ps *9*	C	J^{π}: γ to 12$^+$ in E2 band.
4815.7[g] *4*	(14$^-$)[#]	0.23 ps *3*	C	
4901.6? *3*	(13$^+$)		C	J^{π}: γ to 12$^+$, γ from 14$^+$.
4956.07[b] *25*	13$^+$	1.00 ps *9*	C	J^{π}: $\gamma\gamma(\theta)$ suggests13-12 spin sequence for the 843γ and 968γ. Parity from M1+E2 γ to 12$^+$.
5036.1[a] *3*	14$^+$		C	J^{π}: γ to 12$^+$ in E2 band.
5040.0[h] *5*	(14$^-$)		C	J^{π}: γ's to (12$^-$), (13$^-$) in band.
5052.2[f] *6*	15$^-$		C	J^{π}: Q γ to 13$^-$ in band.
5233.4[b] *3*	14$^+$	1.6 ps *3*	C	J^{π}: $\gamma\gamma(\theta)$ suggests 14-13 spin sequence for the 277γ and M1+E2 γ to 13$^+$.
5384.0[i] *8*	(15$^+$)		C	J^{π}: γ to 14$^+$, no γ to lower-spin states.
5495.9[e] *4*	16$^+$	0.46 ps *4*	C	J^{π}: γ to 14$^+$ in E2 band.
5499.5[h] *8*	(15$^-$)[#]		C	
5529.7[b] *3*	15$^+$	1.06 ps *15*	C	J^{π}: M1+E2 γ to 14$^+$, γ to 13$^+$ in band.
5551.0[c] *4*	(16$^+$)		C	J^{π}: γ to 14$^+$ in E2 band.
5753.7[g] *5*	(16$^-$)	0.27 ps *3*	C	J^{π}: γ to (14$^-$) in band, γ to 15$^-$.
5853.0[b] *3*	16$^+$	0.68 ps *23*	C	J^{π}: M1+E2 γ to 15$^+$, γ to 14$^+$ in band.
5997.8[f] *8*	17$^-$		C	J^{π}: Q γ to 15$^-$ in band.
6011.0[h] *11*	(16$^-$)[#]		C	
6214.8[b] *3*	17$^+$	0.49 ps *6*	C	J^{π}: M1+E2 γ to 16$^+$, γ to 15$^+$ in band.
6240.0[i] *8*	(17$^+$)		C	J^{π}: γ to 16$^+$, γ to (15$^+$) in band.
6436.3[e] *5*	18$^+$	0.19 ps *4*	C	J^{π}: γ to 16$^+$ in E2 band.
6493.0[c] *11*	(18$^+$)[#]		C	
6608.4[b] *3*	18$^+$	0.34 ps *5*	C	J^{π}: M1+E2 γ to 17$^+$, γ to 16$^+$.
6732.7[g] *11*	(18$^-$)[#]		C	
6993.8[f] *13*	(19$^-$)[#]		C	
7036.1[b] *3*	19$^+$	0.21 ps *3*	C	J^{π}: M1+E2 γ to 18$^+$, γ to 17$^+$ in band.
7178.2[i] *8*	(19$^+$)		C	J^{π}: γ to 18$^+$, γ to (17$^+$) in band.
7443.2[e] *10*	20$^+$[#]	0.16 ps *4*	C	J^{π}: γ to 18$^+$ in E2 band.
7493.9[b] *3*	20$^+$		C	J^{π}: M1+E2 γ to 19$^+$, γ to 18$^+$ in band.
7530.0[c] *15*	(20$^+$)[#]		C	
7928.8[f] *16*	(21$^-$)[#]		C	
7980.8[b] *3*	21$^+$		C	J^{π}: M1+E2 γ to 20$^+$, γ to 19$^+$ in band.
8163.4[i] *10*	(21$^+$)		C	J^{π}: γ to 20$^+$, γ to (19$^+$) in band.
8484.9[e] *12*	22$^+$[#]		C	J^{π}: γ to 20$^+$ in E2 band.
8497.2[b] *4*	22$^+$		C	J^{π}: γ to 20$^+$ and γ to 21$^+$ in band.
8659.0[c] *18*	(22$^+$)[#]		C	

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Adopted Levels, Gammas (continued)

^{128}Ba Levels (continued)

E(level)[†]	J^{π}[‡]	XREF	Comments
8934.8[f] *19*	(23^-)[#]	C	
9032.3[b] *4*	23^+	C	J^π: γ's to 21^+ and 22^+ in band.
9167.6[i] *13*	(23^+)	C	J^π: γ to 22^+, γ to (21^+) in band.
9563.9[e] *16*	(24^+)[#]	C	
9601.1[b] *7*	24^+	C	J^π: γ's to 22^+ and 23^+ in band.
9814.0[c] *20*	(24^+)[#]	C	
10023.8[f] *21*	(25^-)[#]	C	
10167.7[b] *9*	25^+	C	J^π: γ's to 23^+ and 24^+ in band.
10237.6[i] *16*	(25^+)[#]	C	
10649.9[e] *19*	(26^+)[#]	C	
10785.1[b] *12*	(26^+)	C	J^π: γ to 24^+ in band.
11055.0[c] *23*	(26^+)[#]	C	
11195.8[f] *24*	(27^-)[#]	C	
11386.6[i] *19*	(27^+)[#]	C	
11775.9[e] *21*	(28^+)[#]	C	
12442[f] *3*	(29^-)[#]	C	
12590.7[i] *21*	(29^+)[#]	C	
12981.9[e] *24*	(30^+)[#]	C	
13737[f] *3*	(31^-)[#]	C	
14238[e] *3*	(32^+)[#]	C	
15062[f] *3*	(33^-)[#]	C	
15500[e] *3*	(34^+)[#]	C	
16288[f] *3*	(35^-)[#]	C	
16780[e] *3*	(36^+)[#]	C	
17653[f] *3*	(37^-)[#]	C	
18217[e] *3*	(38^+)[#]	C	

[†] E(levels) are from a least-squares fit to adopted Eγ's, except for those excited in (p,t) alone.
[‡] J^π's of band members are based on the J^π of the band head or other band member and on multipolarities of in-band transitions, unless otherwise noted.
[#] γ to J=(I−2) in band.
[@] From recoil-distance Doppler-shift (2000Pe20,2000Pe19) or DSA (1998Pe17) in (HI,xnγ), except as noted.
[&] Band(A): γ-vibrational band, odd spin.
[a] Band(B): γ-vibrational band, even spin.
[b] Band(C): magnetic-dipole band. Configuration=$\pi(h_{11/2}d_{5/2})\nu(h_{11/2}g_{7/2})$.
[c] Band(D): g.s. S band-1. Configuration=$\pi(h_{11/2})^2$.
[d] Band(E): g.s. band.
[e] Band(F): g.s. S band-2. Configuration=$\pi(h_{11/2})^2\nu(h_{11/2})^4$.
[f] Band(G): 2-quasiproton band α=0. Configuration=$\pi(h_{11/2}d_{5/2})\nu(h_{11/2})^4$.
[g] Band(H): 2-quasiproton band α=1. Configuration=$\pi(h_{11/2}d_{5/2})\nu(h_{11/2})^4$.
[h] Band(I): 2-quasineutron band. Configuration=$\nu(h_{11/2}g_{7/2})$.
[i] Band(J): Possibly γ- S band.

Adopted Levels, Gammas (continued)

$\gamma(^{128}Ba)$

E_i(level)	J_i^π	E_γ†	I_γ†	E_f	J_f^π	Mult.@	δ@&	α	Comments
284.00	2^+	284.10 *8*	100	0.0	0^+	E2		0.0539	B(E2)(W.u.)=72 *7* Mult.: from $\gamma(\theta)$ and RUL.
763.32	4^+	479.31 *10*	100	284.00	2^+	E2		0.01108	B(E2)(W.u.)=108 *5* Mult.: from $\gamma(\theta)$, $\gamma\gamma(\theta)$ and α(K)exp.
884.50	2^+	600.5 *2*	100.0 *9*	284.00	2^+	M1+E2	+13 *+16−4*	0.00606	B(E2)(W.u.)=32 *4*; B(M1)(W.u.)=0.00010 *+25−10* Mult.: from $\gamma\gamma(\theta)$ and α(K)exp.
		884.5 *2*	74 *7*	0.0	0^+	E2		0.00237	B(E2)(W.u.)=3.4 *6* I_γ: other: 64 *2* in (HI,xnγ). Mult.: from $\gamma(\theta)$ and RUL.
942.1	0^+	658.0 *6*	100	284.00	2^+	E2		0.00479	Mult.: from $\gamma\gamma(\theta)$ and linear polarization.
1321.0	2^+	378.5	100	942.1	0^+				
		436.7	<0.74	884.50	2^+				
		557.4	0.26 *22*	763.32	4^+				
		1037.1	<3.24	284.00	2^+				
		1321.6	0.9 *3*	0.0	0^+				
1324.37	3^+	439.9 *3*	21.1 *4*	884.50	2^+	[M1+E2]		0.0181	Mult.: D+Q from $\gamma\gamma(\theta)$.
		561.0 *3*	9.6 *3*	763.32	4^+	M1+E2	+3.7 *+25−12*	0.00740 *22*	Mult.,δ: D+Q from $\gamma\gamma(\theta)$, M1+E2 from large δ.
		1040.4 *2*	100.0 *10*	284.00	2^+	M1+E2	+4 *+2−1*	0.001704	α=0.001704 Mult.,δ: D+Q from $\gamma\gamma(\theta)$, M1+E2 from large δ.
1372.33	4^+	487.9 *2*	100.0 *10*	884.50	2^+	E2		0.01055	B(E2)(W.u.)=62 *6*
		609.0 *3*	79.0 *6*	763.32	4^+	M1+E2	−14 *+8−16*	0.00584 *10*	B(E2)(W.u.)=16.1 *15*; B(M1)(W.u.)=5.E−5 *+6−5* Mult.,δ: D+Q from $\gamma\gamma(\theta)$, M1+E2 from large δ. I_γ: other: 129 *3* in (HI,xnγ).
		1088.2 *2*	80.3 *8*	284.00	2^+	E2		1.51×10^{-3}	B(E2)(W.u.)=0.90 *9* Mult.: from $\gamma\gamma(\theta)$ and RUL. I_γ: other: 91 *3* in (HI,xnγ).
1406.88	6^+	643.65# *5*	100	763.32	4^+	E2		0.00506	B(E2)(W.u.)=100 *9* Mult.: from $\gamma(\theta)$ and α(K)exp.
1710.0	0^+	1426 *1*	100	284.00	2^+	[E2]		9.26×10^{-4}	Mult.: Q from $\gamma\gamma(\theta)$.
1799.56	4^+	427.4 *3*	25.5 *13*	1372.33	4^+				
		475.4 *5*	34.4 *16*	1324.37	3^+	M1+E2	+2.0 *+10−5*	0.0121 *5*	Mult.,δ: D+Q from $\gamma\gamma(\theta)$, M1+E2 from large δ.
		479	8 *3*	1321.0	2^+				
		915.0 *3*	100.0 *16*	884.50	2^+				
		1036.3 *3*	53.8 *16*	763.32	4^+	D			Mult.: from $\gamma\gamma(\theta)$.
		1515.3 *7*	21.7 *13*	284.00	2^+				
1833.75	4^+	1070.4 *2*	100.0 *15*	763.32	4^+	M1+E2	+0.65 *10*	0.00197	Mult.,δ: D+Q from $\gamma\gamma(\theta)$, M1+E2 from large δ.
		1549.7 *4*	32.9 *8*	284.00	2^+				
1907.5	4^+	1144.2 *4*	100	763.32	4^+				
1931.34	5^+	606.9 *4*	100.0 *18*	1324.37	3^+	E2		0.00588	Mult.: Q from $\gamma(\theta)$ in band.
		1168.0 *3*	73.3 *23*	763.32	4^+	D			Mult.: from $\gamma(\theta)$.
1939.34	6^+	531.3 *5*	<11.0	1406.88	6^+				
		567.0 *2*	100.0 *15*	1372.33	4^+	E2		0.00702	B(E2)(W.u.)=99 *13* Mult.: from $\gamma(\theta)$ and RUL.

From ENSDF

$^{128}_{56}Ba_{72}$-5

γ(^{128}Ba) (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[@]	α	Comments
1939.34	6^+	1176.5 *10*	30.0 *10*	763.32	4^+	E2	1.29×10^{-3} *2*	B(E2)(W.u.)=0.78 *10* Mult.: from $\gamma(\theta)$ and RUL.
2008.9		1724.9 *5*	100	284.00	2^+			
2039.35	(1^+ to 4^+)	715.2 *5*	45 *4*	1324.37	3^+			
		1154.3 *5*	36 *4*	884.50	2^+			
		1755.5 *4*	100 *4*	284.00	2^+			
2039.49	5^-	632.5 *2*	100.0 *10*	1406.88	6^+	[E1]	0.00192	B(E1)(W.u.)=0.00053 *9* Mult.: D from $\gamma(\theta)$.
		1276.1 *5*	76.4 *11*	763.32	4^+	[E1]	5.56×10^{-4}	B(E1)(W.u.)=4.9×10^{-5} *8* Mult.: D from $\gamma(\theta)$.
2175.6	(4 to 6)	1412.3 *3*	100	763.32	4^+			
2188.51	8^+	781.6[#] *1*	100	1406.88	6^+	E2	0.00316	B(E2)(W.u.)=95 *13* Mult.: from $\gamma(\theta)$ and RUL.
2192.5	(4^+)	1908.5 *6*	100	284.00	2^+			
2203.4	(3^-,4^+)	1318.9 *6*	44 *3*	884.50	2^+			
		1440.0 *5*	100 *3*	763.32	4^+			
		1919.6 *4*	73 *3*	284.00	2^+			
2218.8	0^+	1934.8 *5*	100	284.00	2^+	[E2]	7.52×10^{-4}	Q from $\gamma\gamma(\theta)$.
2246.7	(4 to 6^+)	315.8 *6*	100 *19*	1931.34	5^+			
		1482.8 *7*	90 *8*	763.32	4^+			
2347.2	2^+	2063.2 *5*	100	284.00	2^+			
2395.81	$(7)^-$	356.2[#] *3*	15 *3*	2039.49	5^-	[E2]	0.0264	B(E2)(W.u.)=0.055 *12* Mult.: Q from $\gamma(\theta)$.
		989.1[#] *2*	100.0 *18*	1406.88	6^+	E1	7.78×10^{-4}	B(E1)(W.u.)=3.91×10^{-8} *19* Mult.: from $\gamma(\theta)$ and α(K)exp.
2412.87	7^-	224.3[#] *1*	14.3 *12*	2188.51	8^+	[E1]	0.0246	B(E1)(W.u.)=0.00062 *8* Mult.: D from $\gamma(\theta)$.
		373.4[#] *1*	34.5 *12*	2039.49	5^-	[E2]	0.0229	B(E2)(W.u.)=130 *12* Mult.: Q from $\gamma(\theta)$.
		1006.0[#] *1*	100.0 *24*	1406.88	6^+	E1	7.53×10^{-4}	B(E1)(W.u.)=4.8×10^{-5} *5* Mult.: from $\gamma(\theta)$ and α(K)exp.
2425.45	(4^-,5^+)	249.8 *5*	3.8 *4*	2175.6	(4 to 6)			
		386.0 *3*	18.1 *4*	2039.35	(1^+ to 4^+)			
		493.9 *4*	12.4 *3*	1931.34	5^+			
		591.7 *4*	10.0 *4*	1833.75	4^+			
		626.0 *2*	38.6 *4*	1799.56	4^+			
		1053.15 *20*	100.0 *10*	1372.33	4^+	D+Q		Mult.: from $\gamma\gamma(\theta)$.
		1100.9 *3*	47.6 *7*	1324.37	3^+			
		1662.3 *5*	9.8 *5*	763.32	4^+			
2451.4	(3^- to 6^+)	412.0 *5*	59.6 *22*	2039.49	5^-			
		1079.0 *3*	100 *3*	1372.33	4^+			
		1688.2[‡] *10*	29.0 *20*	763.32	4^+			

$^{128}_{56}Ba_{72}$-6

$\gamma(^{128}Ba)$ (continued)

E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f	Mult.@	δ@&	α	Comments
2474.0	(2^+ to 6^+)	1710.7 *10*	100	763.32	4^+				
2531.5	(4^+ to 7^-)	491.7 *5*	49 *3*	2039.49	5^-				
		1124.9 *5*	100 *5*	1406.88	6^+				
2571.4	(4^+ to 7^-)	531.7 *4*	53 *7*	2039.49	5^-				
		1164.9 *5*	100 *5*	1406.88	6^+				
2600.27	8^+	660.9# *1*	100.0 *24*	1939.34	6^+	E2		0.00474	B(E2)(W.u.)=1.3×10^2 *5* Mult.: from $\gamma(\theta)$ and RUL.
		1193.5# *2*	15.5 *12*	1406.88	6^+	E2		1.25×10^{-3}	B(E2)(W.u.)=1.0 *4* Mult.: from $\gamma(\theta)$ and RUL.
2612.83	$(8)^-$	217.0# *1*	100	2395.81	$(7)^-$	M1+E2	0.19 +*5*−*6*	0.1152	B(E2)(W.u.)=8 *5*; B(M1)(W.u.)=0.0157 *8* Mult.: D+Q from $\gamma(\theta)$, M1+E2 from large δ.
2627.0		451.6 *7*	16 *3*	2175.6	(4 to 6)				
		587.3 *5*	48 *3*	2039.49	5^-				
		793.5 *7*	100 *8*	1833.75	4^+				
		1302.6 *6*	73.8 *22*	1324.37	3^+				
2629.0	0^+	2345 *1*	100	284.00	2^+	[E2]		8.05×10^{-4}	Mult.: Q from $\gamma\gamma(\theta)$.
2631.3	7^+	700.0# *4*	100	1931.34	5^+	E2		0.00411	Mult.: Q from $\gamma(\theta)$.
2669.5		1906.2 *5*	100	763.32	4^+				
2721.1	($5,6^+$)	681.9 *4*	91 *7*	2039.35	(1^+ to 4^+)				
		781.8‡ *5*	57 *18*	1939.34	6^+				
		1348.4‡ *6*	1.0×10^2 *3*	1372.33	4^+				
		1957.7 *8*	88 *15*	763.32	4^+				
2746.2		570.6 *6*	100	2175.6	(4 to 6)				
2848.6		673.0‡ *4*	100 *11*	2175.6	(4 to 6)				
		1049.1‡ *7*	54 *23*	1799.56	4^+				
2860.78	(8^-)	447.9# *1*	100	2412.87	7^-	[M1(+E2)]	-4×10^{-3} +*20*−*12*	0.01733	B(E2)(W.u.)=(0.0005 +*52*−*5*); B(M1)(W.u.)=(0.0096 *12*) Mult.: D(+Q) from $\gamma(\theta)$.
2878.41	($5^-,6^+$)	483.1 *4*	21.0 *8*	2395.81	$(7)^-$				
		838.9 *4*	28.9 *16*	2039.49	5^-				
		938.9 *3*	72.5 *14*	1939.34	6^+				
		1505.9 *4*	100.0 *19*	1372.33	4^+	E2,D			
2906.29	9^-	493.4# *1*	100.0 *20*	2412.87	7^-	E2		0.01022	B(E2)(W.u.)=104 *9* Mult.: from $\gamma(\theta)$ and RUL.
		717.8# *1*	26.8 *7*	2188.51	8^+	[E1]		1.47×10^{-3}	B(E1)(W.u.)=4.0×10^{-5} *4* Mult.: D from $\gamma(\theta)$.
2927.0	$(9)^-$	314.2# *1*	100 *6*	2612.83	$(8)^-$	M1+E2	0.26 +*7*−*8*	0.0427 *7*	B(E2)(W.u.)=17 *9*; B(M1)(W.u.)=0.036 *4* Mult.: from $\gamma(\theta)$ and large δ.

$^{128}_{56}Ba_{72}$-7

$\gamma(^{128}$Ba) (continued)

E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f	Mult.@	δ@&	α	Comments
2927.0	$(9)^-$	531.4# *3*	52 *4*	2395.81	$(7)^-$	E2		0.00835	B(E2)(W.u.)=9.8 *11* Mult.: from $\gamma(\theta)$ and RUL.
2929.9		1096.1 *5*	100	1833.75	4^+				
2975.3		2212.0 *6*	100	763.32	4^+				
2977.89	(4,5)	774.8 *4*	91 *3*	2203.4	$(3^-,4^+)$				
		1046.4 *5*	15 *4*	1931.34	5^+				
		1143.8 *5*	100 *3*	1833.75	4^+				
		1605.4 *4*	98 *4*	1372.33	4^+				
		1654.1‡ *7*	30 *3*	1324.37	3^+				
3082.31	10^+	893.8# *1*	100	2188.51	8^+	E2		0.00232	B(E2)(W.u.)=65 *10* Mult.: from $\gamma(\theta)$ and RUL.
3116.9		1710.0 *5*	100	1406.88	6^+				
3292.5	$(10)^-$	365.6# *3*	79 *10*	2927.0	$(9)^-$	M1+E2	0.20 *+35−5*	0.0289 *10*	B(E2)(W.u.)=15 *+49−15*; B(M1)(W.u.)=0.072 *22* Mult.: from $\gamma(\theta)$ and large δ.
		679.7# *1*	100 *3*	2612.83	$(8)^-$	[E2]		0.00442	B(E2)(W.u.)=22 *6*
3334.39	(10^-)	428.1# *1*	59 *8*	2906.29	9^-	[M1(+E2)]	-7×10^{-3} *+21−14*	0.0194	B(E2)(W.u.)=(0.005 *+33−5*); B(M1)(W.u.)=(0.030 *6*) Mult.: D(+Q) from $\gamma(\theta)$.
		473.6# *1*	100.0 *20*	2860.78	(8^-)	E2		0.01146	B(E2)(W.u.)=113 *12* Mult.: from $\gamma(\theta)$ and RUL.
3345.78	10^+	745.5# *1*	100	2600.27	8^+	E2		0.00353	B(E2)(W.u.)=1.0×10^2 *3* Mult.: from $\gamma(\theta)$ and RUL.
3387.2	(9^+)	755.9# *5*	100	2631.3	7^+				
3506.7	11^-	600.4# *4*	100	2906.29	9^-	[E2]		0.00604	
3521.71	10^+	439.4# *2*	100 *9*	3082.31	10^+	[M1(+E2)]		0.0181	
		1333.1# *3*	61 *4*	2188.51	8^+	E2		1.02×10^{-3}	B(E2)(W.u.)=0.55 *9* Mult.: from $\gamma(\theta)$ and RUL.
3683.2	(11^-)	390.8# *4*	100 *9*	3292.5	$(10)^-$	[M1(+E2)]		0.0244	
		756.0# *5*	55 *5*	2927.0	$(9)^-$	[E2]		0.00341	B(E2)(W.u.)=19 *8*
3985.29	(12^-)	479#	<74	3506.7	11^-				
		650.9# *1*	100 *2*	3334.39	(10^-)	[E2]		0.00492	Mult.: Q from $\gamma(\theta)$.
3988.19	12^+	906.0# *1*	100	3082.31	10^+	E2		0.00225	B(E2)(W.u.)=42 *14* Mult.: from $\gamma(\theta)$ and RUL.
4017.74	12^+	496.0# *2*	23.0 *19*	3521.71	10^+	E2		0.01008	B(E2)(W.u.)=1.3×10^2 *3* Mult.: from $\gamma(\theta)$ and RUL.
		935.5# *2*	100.0 *19*	3082.31	10^+	E2		0.00209	B(E2)(W.u.)=24 *5* Mult.: from $\gamma(\theta)$ and RUL.
4112.2	12^+	1029.4# *2*	100	3082.31	10^+	[E2]		1.70×10^{-3}	Mult.: Q from $\gamma(\theta)$.
4116.1	$(12)^-$	433#		3683.2	(11^-)				

$^{128}_{56}$Ba$_{72}$-8

Adopted Levels, Gammas (continued)

γ(^{128}Ba) (continued)

E_i(level)	J^{π}_i	E_{γ}[†]	I_{γ}[†]	E_f	J^{π}_f	Mult.[@]	δ[@&]	α	Comments
4116.1	$(12)^-$	823.5[#] *3*	100	3292.5	$(10)^-$	E2		0.00279	B(E2)(W.u.)=56 *24* Mult.: from $\gamma(\theta)$ and RUL.
4194.8	12^+	849.0[#] *3*	100	3345.78	10^+	[E2]		0.00261	Mult.: Q from $\gamma(\theta)$.
4218.2	13^-	711.5[#] *1*	100	3506.7	11^-	[E2]		0.00395	Mult.: Q from $\gamma(\theta)$.
4556.8	(13^-)	441[#]		4116.1	$(12)^-$				
		873.7[#] *4*	100 *5*	3683.2	(11^-)	[E2]		0.00244	Mult.: Q from $\gamma(\theta)$.
4645.92	14^+	628.3[#] *2*	67 *3*	4017.74	12^+	E2		0.00538	B(E2)(W.u.)=68 *15* Mult.: from $\gamma(\theta)$ and RUL.
		657.7[#] *1*	100 *3*	3988.19	12^+	E2		0.00479	B(E2)(W.u.)=80 *17* Mult.: from $\gamma(\theta)$ and RUL.
4720.37	14^+	702.3[#] *4*	100 *6*	4017.74	12^+	[E2]		0.00408	B(E2)(W.u.)=1.2×10^2 *3*
		732.2[#] *1*	61 *6*	3988.19	12^+	[E2]		0.00369	B(E2)(W.u.)=60 *14*
4815.7	(14^-)	597.6[#]		4218.2	13^-				
		830.4[#] *4*		3985.29	(12^-)				
4901.6?	(13^+)	790[#a]		4112.2	12^+				
		884[#a]		4017.74	12^+				
4956.07	13^+	305[#]		4650.7	12^+	M1+E2	−0.19 *9*	0.0463	Mult.: from $\gamma\gamma(\theta)$ and large δ.
		843.3[#] *2*	75 *6*	4112.2	12^+	M1+E2	−1.5 *+7−30*	0.0030 *4*	B(E2)(W.u.)=10 *4*; B(M1)(W.u.)=0.005 *4* Mult.: from $\gamma\gamma(\theta)$ and large δ.
		938[#]		4017.74	12^+				
		968.4[#] *2*	100 *7*	3988.19	12^+	M1+E2	−0.6 *+6−14*	0.0025 *4*	B(E2)(W.u.)=3 *+4−3*; B(M1)(W.u.)=0.010 *6* Mult.: from $\gamma\gamma(\theta)$ and large δ.
5036.1	14^+	840.9[#] *3*	100	4194.8	12^+	[E2]		0.00266	
5040.0	(14^-)	484[#]		4556.8	(13^-)				
		923.8[#] *4*	100	4116.1	$(12)^-$				
5052.2	15^-	834.0[#] *5*	100	4218.2	13^-	[E2]		0.00271	Mult.: Q from $\gamma(\theta)$.
5233.4	14^+	277.3[#] *2*	100	4956.07	13^+	M1+E2	−0.14 *4*	0.0596	B(E2)(W.u.)=5.E+1 *3*; B(M1)(W.u.)=0.29 *6* Mult.: from $\gamma\gamma(\theta)$ and large δ.
		331.8[#] *2*	56 *4*	4901.6?	(13^+)	(M1)		0.0373	B(M1)(W.u.)=0.096 *20*
		582[#]		4650.7	12^+				
		1038.8[#] *2*	56 *3*	4194.8	12^+				
5384.0	(15^+)	738[#]	100	4645.92	14^+				
5495.9	16^+	850.0[#] *3*	100	4645.92	14^+	[E2]		0.00260	B(E2)(W.u.)=72 *7*
5499.5	(15^-)	942.7[#] *6*	100	4556.8	(13^-)				
5529.7	15^+	296.6[#] *2*	100	5233.4	14^+	M1+E2	−0.18 *3*	0.0499	B(E2)(W.u.)=1.5×10^2 *6*; B(M1)(W.u.)=0.59 *9* Mult.: from $\gamma\gamma(\theta)$ and large δ.
		573.6[#] *2*	25 *10*	4956.07	13^+	[E2]		0.00681	B(E2)(W.u.)=43 *7*

Adopted Levels, Gammas (continued)

γ(^{128}Ba) (continued)

E$_i$(level)	J$^\pi_i$	E$_\gamma$[†]	I$_\gamma$[†]	E$_f$	J$^\pi_f$	Mult.[@]	δ[@&]	α	Comments
5529.7	15$^+$	884[#a]		4645.92	14$^+$				E$_\gamma$: estimated by evaluators.
5551.0	(16$^+$)	830.6[#] *3*	100	4720.37	14$^+$				
5753.7	(16$^-$)	701.3[#]		5052.2	15$^-$				
		938.0[#] *3*		4815.7	(14$^-$)				
5853.0	16$^+$	323.6[#] *2*	100	5529.7	15$^+$	M1+E2	−0.18 *3*	0.0397	B(E2)(W.u.)=1.3×10^2 *6*; B(M1)(W.u.)=0.60 *21* Mult.: from $\gamma\gamma(\theta)$ and large δ.
		619.4[#] *2*	30.0 *20*	5233.4	14$^+$	E2		0.00558	B(E2)(W.u.)=47 *17*
		816.7[#] *2*	19.0 *10*	5036.1	14$^+$				
		1207[#a]		4645.92	14$^+$				
5997.8	17$^-$	945.6[#] *5*	100	5052.2	15$^-$	[E2]		0.00205	Mult.: Q from $\gamma(\theta)$.
6011.0	(16$^-$)	971[#]	100	5040.0	(14$^-$)				
6214.8	17$^+$	361.7[#] *2*	100	5853.0	16$^+$	M1+E2	−0.20 *3*	0.0297	B(E2)(W.u.)=9.E+1 *3*; B(M1)(W.u.)=0.45 *6* Mult.: from $\gamma\gamma(\theta)$ and large δ.
		685.2[#] *2*	100	5529.7	15$^+$	[E2]		0.00433	B(E2)(W.u.)=98 *12*
6240.0	(17$^+$)	744[#]		5495.9	16$^+$				
		856[#]		5384.0	(15$^+$)				
6436.3	18$^+$	940.4[#] *4*	100	5495.9	16$^+$	[E2]		0.00207	B(E2)(W.u.)=105 *23*
6493.0	(18$^+$)	942[#]	100	5551.0	(16$^+$)				
6608.4	18$^+$	393.6[#] *2*	100	6214.8	17$^+$	M1+E2	−0.24 *3*	0.0238	B(E2)(W.u.)=1.2×10^2 *4*; B(M1)(W.u.)=0.50 *8* Mult.: from $\gamma\gamma(\theta)$ and large δ.
		755.5[#] *2*	45.3	5853.0	16$^+$	[E2]		0.00342	B(E2)(W.u.)=87 *13*
6732.7	(18$^-$)	979[#]	100	5753.7	(16$^-$)				
6993.8	(19$^-$)	996[#]	100	5997.8	17$^-$				
7036.1	19$^+$	427.6[#] *2*	100	6608.4	18$^+$	M1+E2	−0.22 *5*	0.0193	B(E2)(W.u.)=1.4×10^2 *7*; B(M1)(W.u.)=0.77 *12* Mult.: from $\gamma\gamma(\theta)$ and large δ.
		821.2[#] *2*	64.0 *20*	6214.8	17$^+$	[E2]		0.00281	B(E2)(W.u.)=73 *11*
7178.2	(19$^+$)	742[#]		6436.3	18$^+$				
		938[#]		6240.0	(17$^+$)				
7443.2	20$^+$	1007[#]	100	6436.3	18$^+$				
7493.9	20$^+$	457.6[#] *2*	100	7036.1	19$^+$	M1+E2	−0.20 *4*	0.01628 *24*	Mult.: from $\gamma\gamma(\theta)$ and large δ.
		885.7[#] *2*	95 *9*	6608.4	18$^+$	[E2]		0.00237	
7530.0	(20$^+$)	1037[#]	100	6493.0	(18$^+$)				
7928.8	(21$^-$)	935[#]	100	6993.8	(19$^-$)				
7980.8	21$^+$	487.2[#] *2*		7493.9	20$^+$	M1+E2	−0.18 *7*	0.01393 *22*	Mult.: from $\gamma\gamma(\theta)$ and large δ.
		944.6[#] *2*		7036.1	19$^+$	[E2]		0.00205	
8163.4	(21$^+$)	720[#]		7443.2	20$^+$				

Adopted Levels, Gammas (continued)

$\gamma(^{128}Ba)$ (continued)

E_i(level)	J^{π}_i	E_{γ}[†]	I_{γ}[†]	E_f	J^{π}_f	Mult.[@]	α
8163.4	(21^+)	985[#]		7178.2	(19^+)		
8484.9	22^+	1042[#]	100	7443.2	20^+		
8497.2	22^+	516.5[#] *2*	80	7980.8	21^+	[M1(+E2)]	0.01211 *18*
		1003.2[#] *2*	100 *5*	7493.9	20^+	[E2]	0.00180
8659.0	(22^+)	1129[#]	100	7530.0	(20^+)		
8934.8	(23^-)	1006[#]	100	7928.8	(21^-)		
9032.3	23^+	535.0[#] *2*	61	8497.2	22^+	[M1(+E2)]	0.01110
		1051.5[#] *2*	100 *6*	7980.8	21^+	[E2]	1.63×10^{-3}
9167.6	(23^+)	683[#]		8484.9	22^+		
		1004[#]		8163.4	(21^+)		
9563.9	(24^+)	1079[#]	100	8484.9	22^+		
9601.1	24^+	568[#]		9032.3	23^+	[M1(+E2)]	0.00958
		1104[#]		8497.2	22^+	[E2]	1.47×10^{-3}
9814.0	(24^+)	1155[#]	100	8659.0	(22^+)		
10023.8	(25^-)	1089[#]	100	8934.8	(23^-)		
10167.7	25^+	566[#]		9601.1	24^+	[M1(+E2)]	0.00966
		1136[#]		9032.3	23^+	[E2]	1.38×10^{-3}
10237.6	(25^+)	1070[#]	100	9167.6	(23^+)		
10649.9	(26^+)	1086[#]	100	9563.9	(24^+)		
10785.1	(26^+)	1184[#]	100	9601.1	24^+		
11055.0	(26^+)	1241[#]	100	9814.0	(24^+)		
11195.8	(27^-)	1172[#]	100	10023.8	(25^-)		
11386.6	(27^+)	1149[#]	100	10237.6	(25^+)		
11775.9	(28^+)	1126[#]	100	10649.9	(26^+)		
12442	(29^-)	1246[#]	100	11195.8	(27^-)		
12590.7	(29^+)	1204[#]	100	11386.6	(27^+)		
12981.9	(30^+)	1206[#]	100	11775.9	(28^+)		
13737	(31^-)	1295[#]	100	12442	(29^-)		
14238	(32^+)	1256[#]	100	12981.9	(30^+)		
15062	(33^-)	1325[#]	100	13737	(31^-)		
15500	(34^+)	1262[#]	100	14238	(32^+)		
16288	(35^-)	1226[#]	100	15062	(33^-)		
16780	(36^+)	1280[#]	100	15500	(34^+)		
17653	(37^-)	1365[#]	100	16288	(35^-)		
18217	(38^+)	1437[#]	100	16780	(36^+)		

Adopted Levels, Gammas (continued)

$\gamma(^{128}\mathrm{Ba})$ (continued)

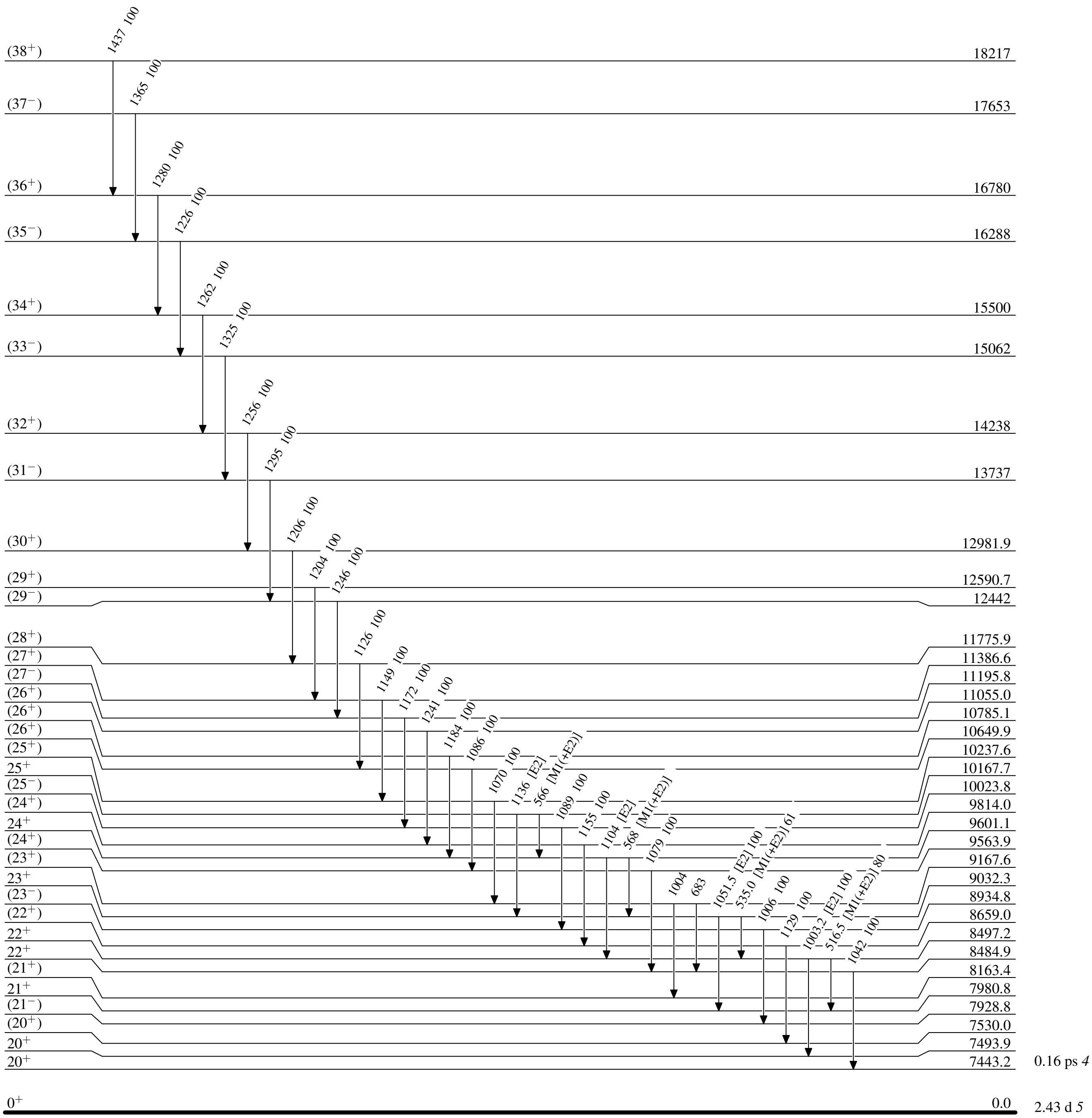
† From ^{128}La ε decay (5.18 min), unless otherwise noted.
‡ Tentatively assigned to ^{128}La ε decay (1977Zo02).
# From (HI,xnγ).
@ From ^{128}La ε decay and (HI,xnγ).
& If No value given it was assumed δ=0.10 for E2/M1, δ=1.00 for E3/M2 and δ=0.10 for the other multipolarities.
[a] Placement of transition in the level scheme is uncertain.

$^{128}_{56}\mathrm{Ba}_{72}$-12

Adopted Levels, Gammas

Level Scheme

Intensities: Relative photon branching from each level



$^{128}_{56}Ba_{72}$

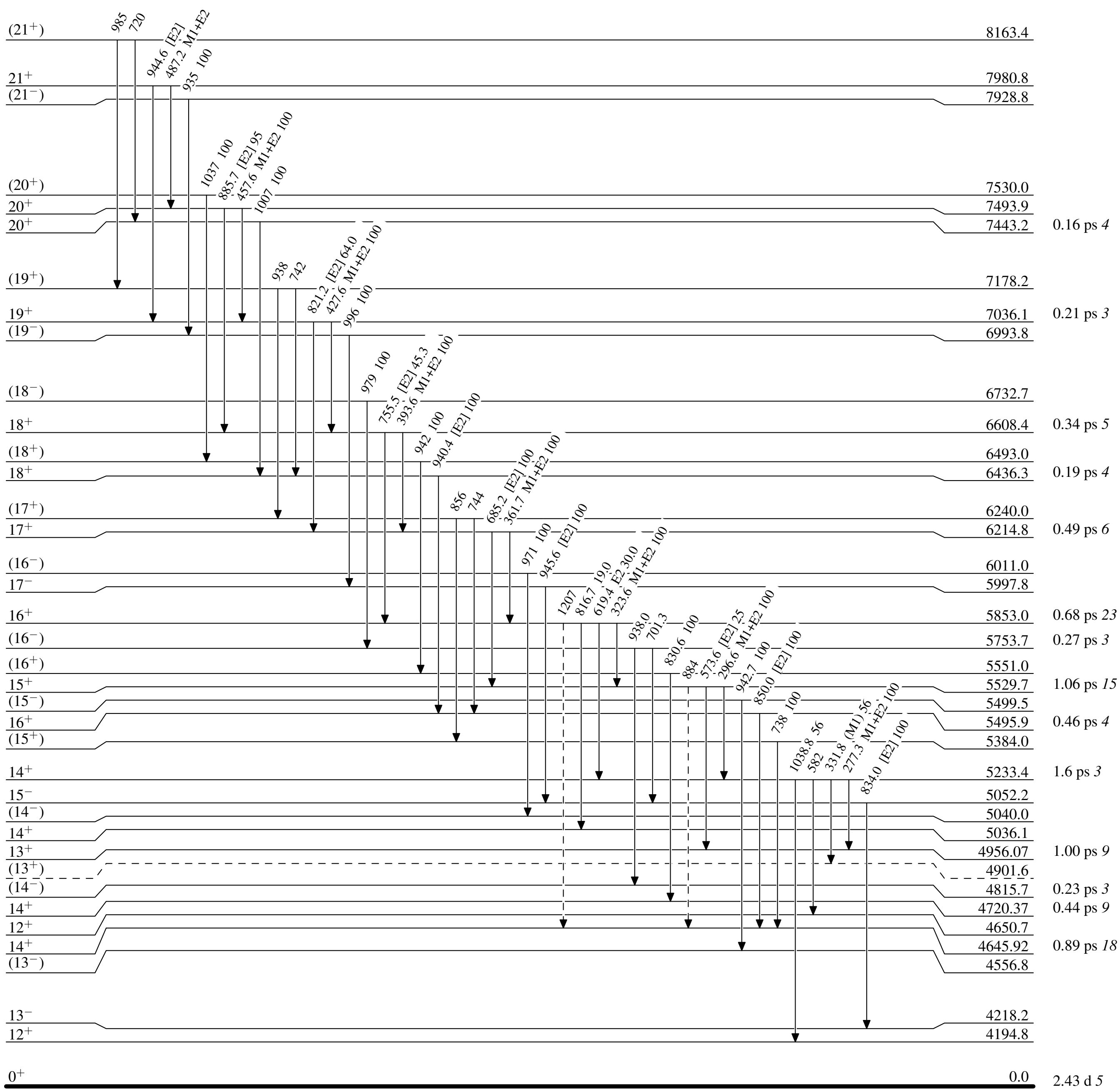
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

γ Decay (Uncertain)

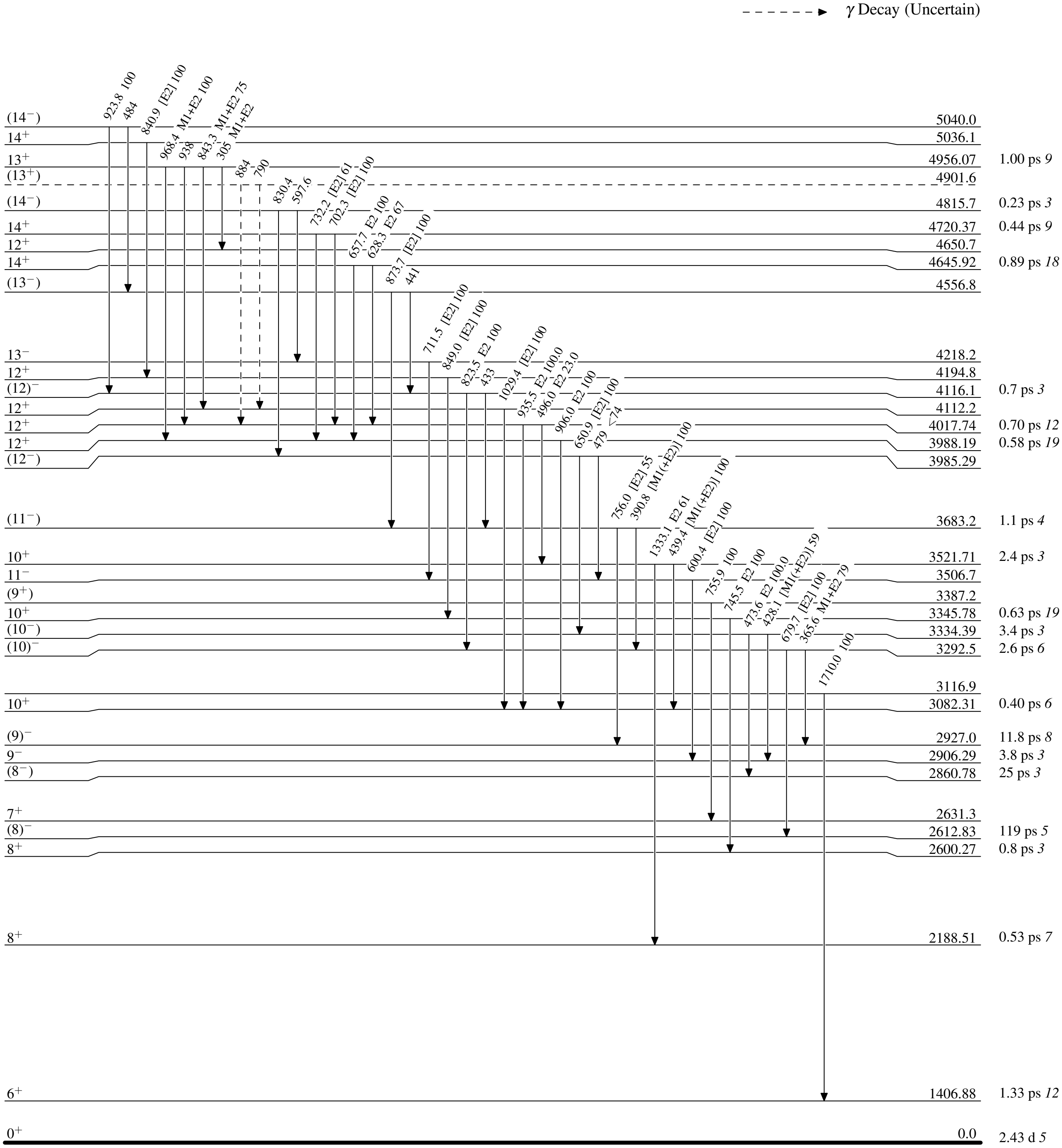


$^{128}_{56}Ba_{72}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

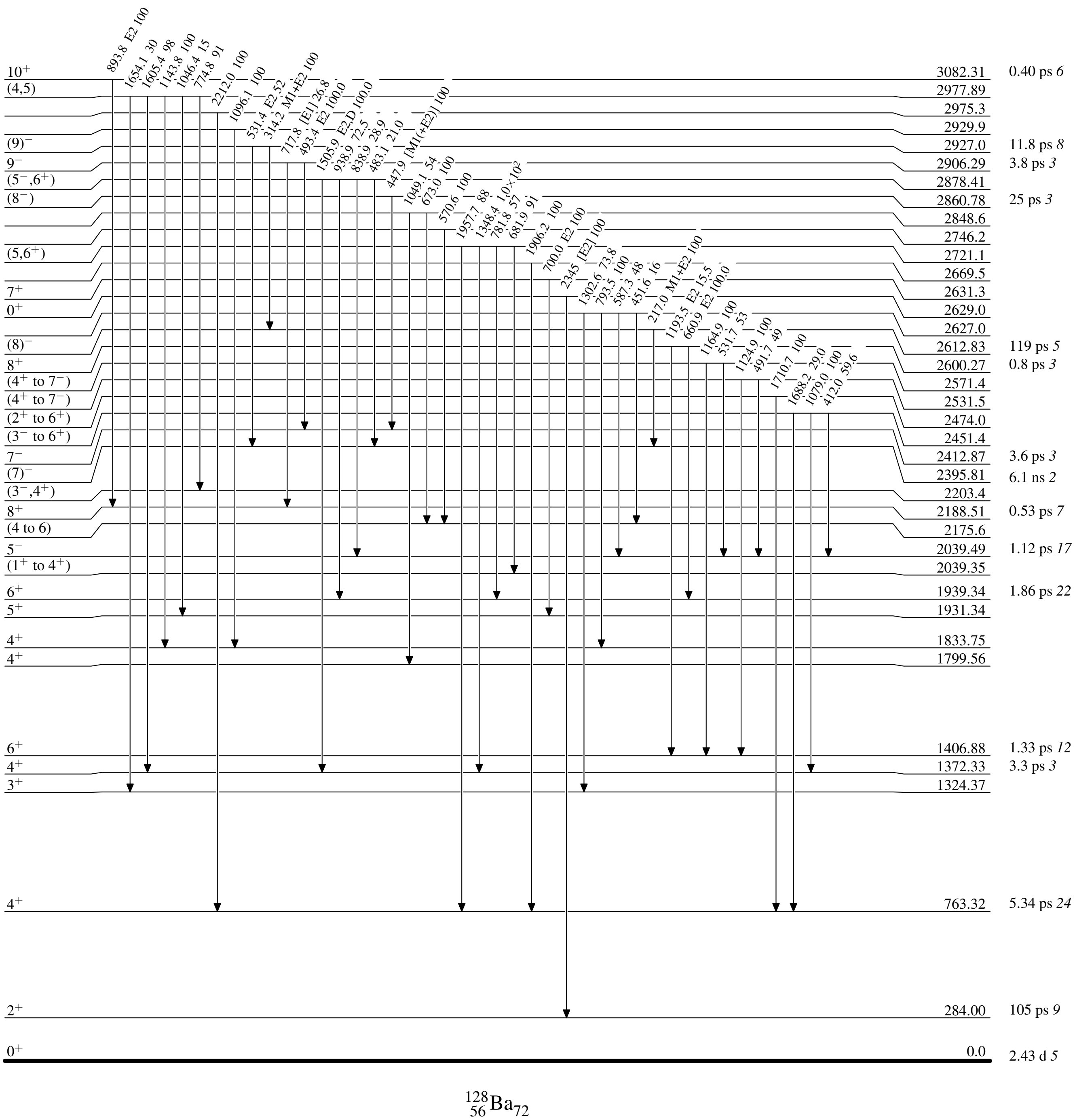


$^{128}_{56}Ba_{72}$

Adopted Levels, Gammas

Level Scheme (continued)

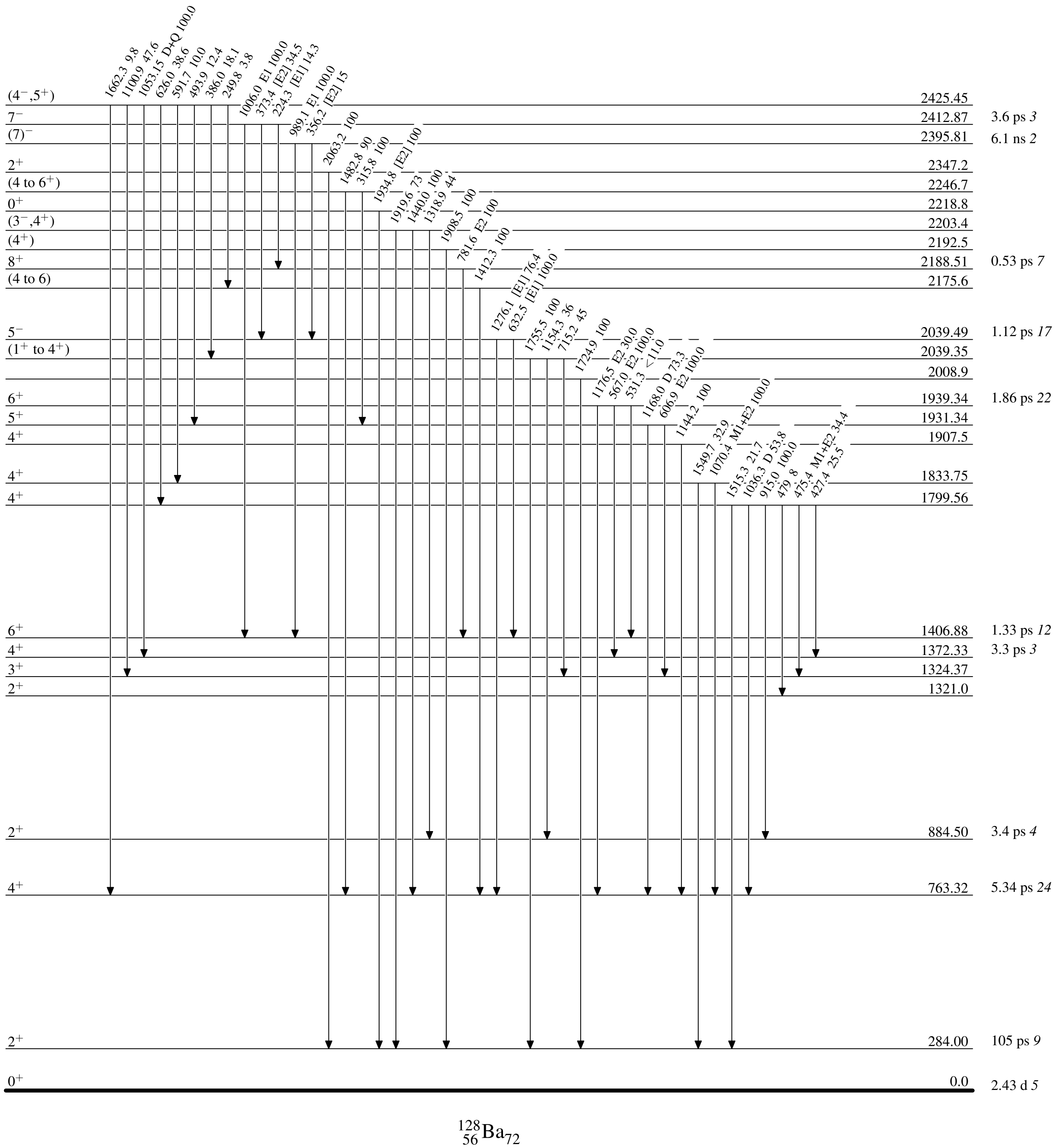
Intensities: Relative photon branching from each level



Adopted Levels, Gammas

Level Scheme (continued)

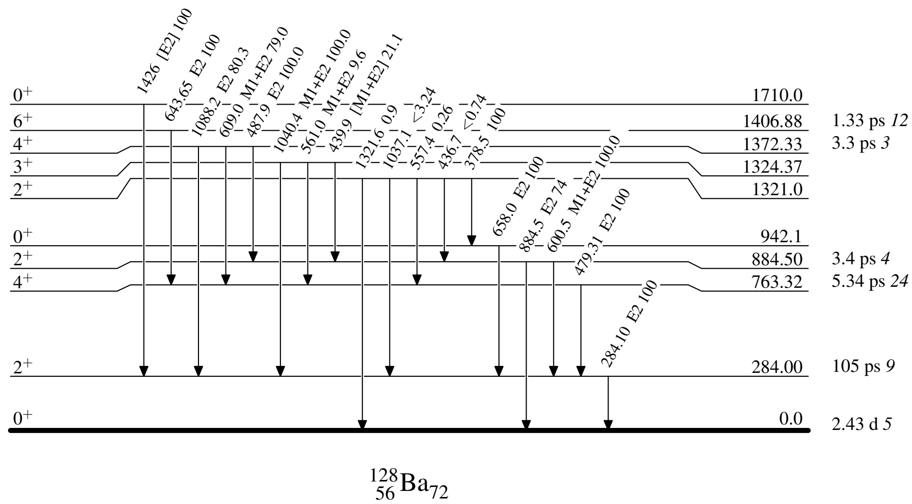
Intensities: Relative photon branching from each level



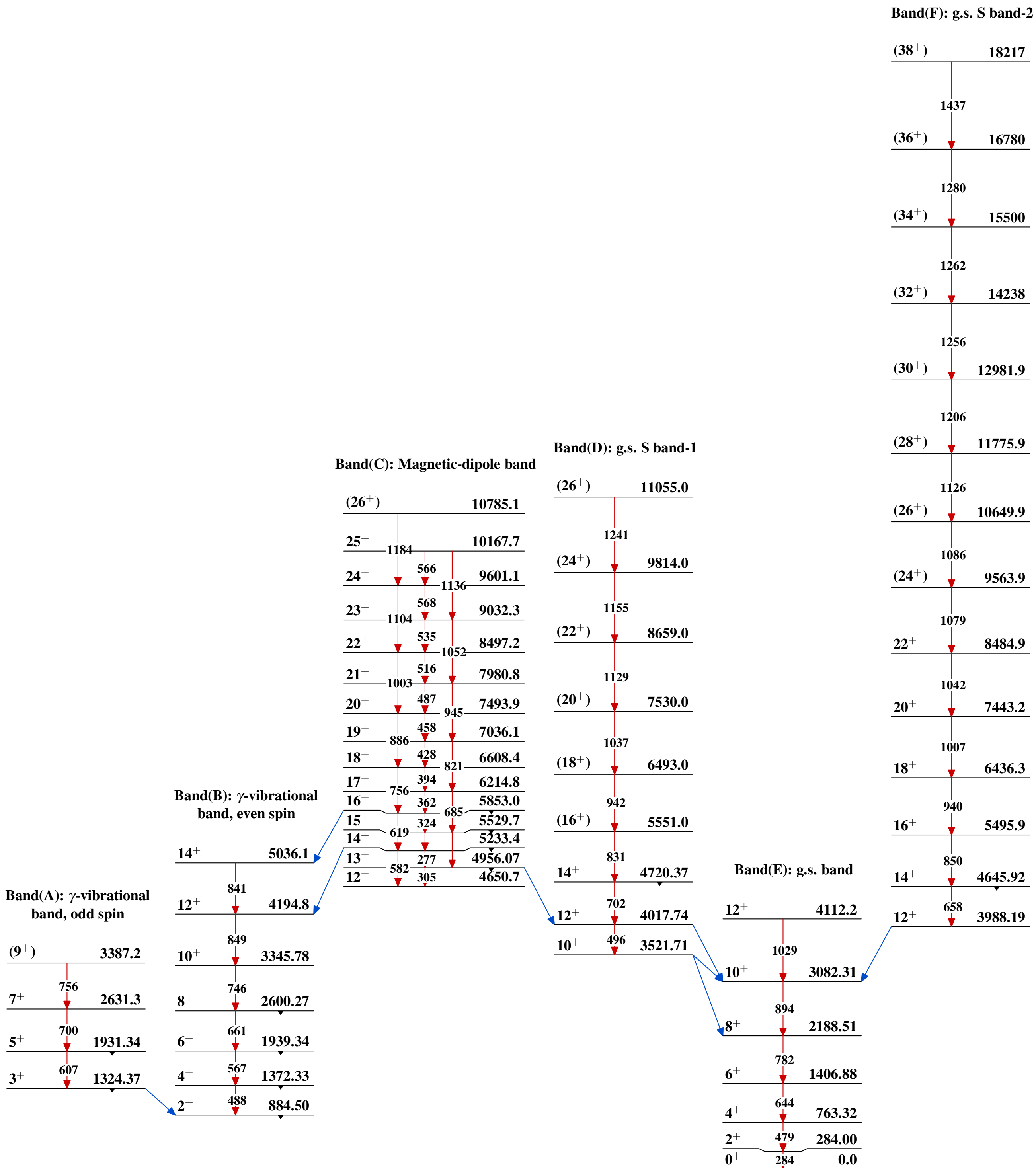
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

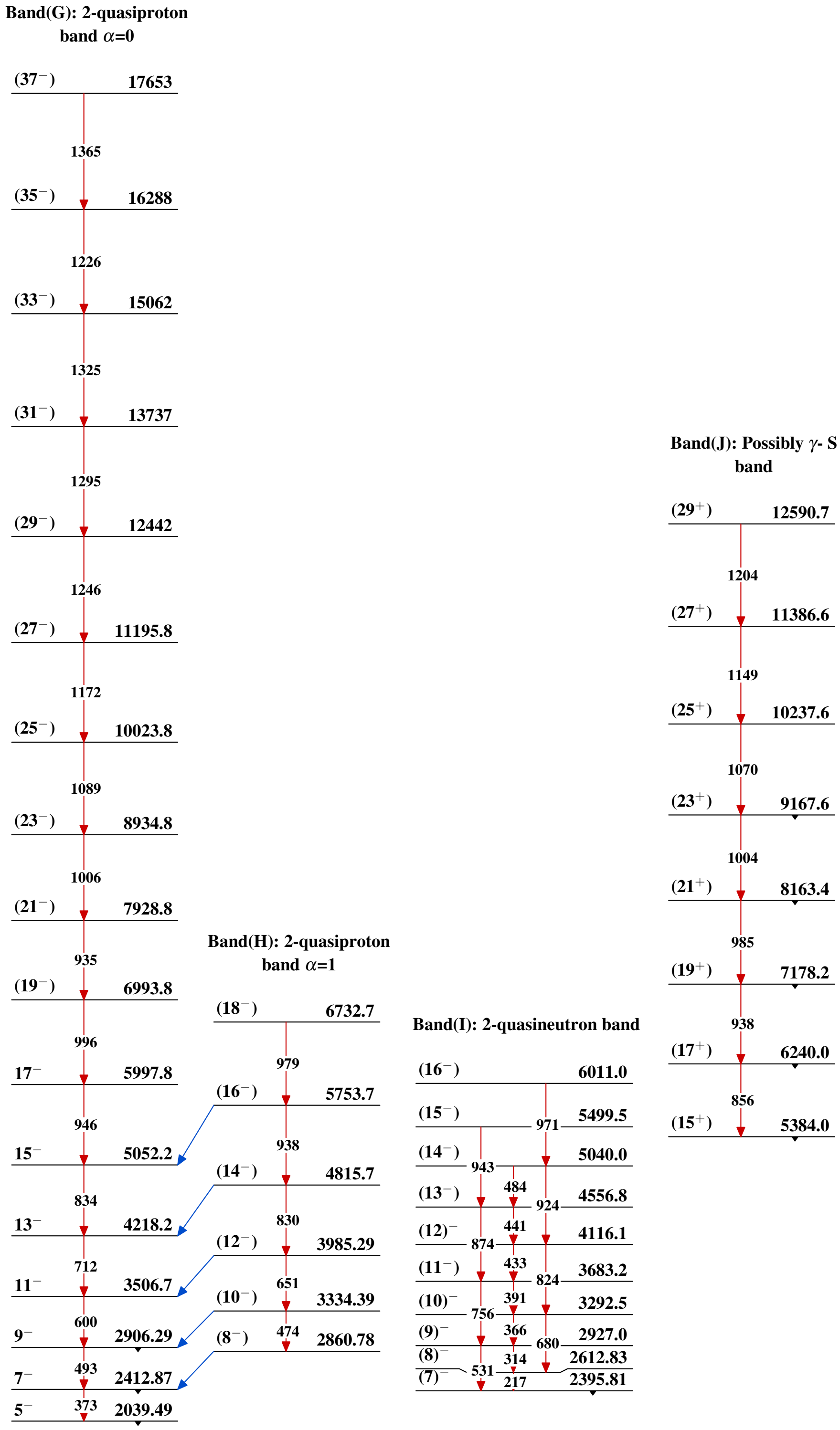


Adopted Levels, Gammas



$^{128}_{56}Ba_{72}$

Adopted Levels, Gammas (continued)



$^{128}_{56}Ba_{72}$

Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	NDS 93,33 (2001)	11-May-2001

Q(β^-)=−5.63×10^3 *3*; S(n)=10270 *11*; S(p)=7051 *6*; Q(α)=−541 *5* 2012Wa38
Note: Current evaluation has used the following Q record −5666 70 *10273* 11 *7059* 8 −523 9 1995Au04.
Q(β^-): from $\beta\gamma$ coin (1998Ko66). Systematics value=5698 *205* (1995Au04).
^{130}Ba(n,n) E=0.0005-132 eV: 1985Ko23.
Isotope shift, hyperfine structure measurements: 1988Ya13, 1988Va11, 1987Va16, 1987Al25, 1985Si24, 1984We15, 1982Gr14, 1981Wa19, 1980Si14, 1977No04.
Additional information 1.

^{130}Ba Levels

Band assignments are from 1985Su03 and 2000St07.

Cross Reference (XREF) Flags

A	^{130}Cs β^- decay (29.21 min)	D	^{120}Sn(^{13}C,3nγ),^{116}Cd(^{18}O,4nγ)
B	^{130}Ba IT decay (9.4 ms)	E	^{130}Ba(α,α')
C	^{130}La ε decay (8.7 min)	F	Coulomb excitation

E(level)	J$^\pi$	T$_{1/2}$[†]	XREF	Comments
0.0[‡]	0$^+$	stable	ABCDEF	T$_{1/2}$(^{130}Ba 2β,neutrinoless decay) limit measured: 1998Be68. Δ<r^2>(^{130}Ba−^{138}Ba)=0.091 fm^2 *16* (1982Gr14), 0.086 fm^2 33 (1979Be25,1977No04).
357.38[‡] *8*	2$^+$	41.8 ps *12*	BCDEF	μ=+0.70 *6* (1989Ra17,1980Br01) B(E2)↑=1.163 *11* g=0.35 *3* (1980Br01) Q=−1.02 *16*; Q=−0.09 *16* (1989Bu07) B(E2)↑: from Coulomb excitation. μ: transient-field integral PAC (1980Br01). Q: reorientation method. −1.02 *16* (constructive), −0.09 *16* (destructive) (1989Bu07) assuming that γ from second 2$^+$ to first 2$^+$ is predominantly E2. Others: −0.33 *24* (1974Ne15), +0.37 *18* (destructive) (1973ToXW), −1.10 *34* (1967Si03). T$_{1/2}$: weighted average of 43.2 ps *5* (RDDS in (^{18}O,4nγ)) and 40.7 ps *4* (from B(E2)=1.163 *11* in Coul. ex.). J$^\pi$: ΔJ=2, E2 γ to 0$^+$.
888.89 *22*			D	
901.85[‡] *10*	4$^+$	3.83 ps *6*	BCD	J$^\pi$: ΔJ=2, E2 γ to 2$^+$.
908.02[b] *8*	2$^+$		BCD	J$^\pi$: ΔJ=2 γ to 0$^+$.
1179.5 *2*	0$^+$		C	J$^\pi$: $\gamma\gamma(\theta)$; γ to 2$^+$.
1361.06[b] *9*	3$^{(+)}$		BCD	J$^\pi$: ΔJ=1, D+Q γ's to 2$^+$ and 4$^+$.
1477.53[b] *9*	(4$^+$)		CD	J$^\pi$: ΔJ=2 γ to 2$^+$; γ to 4$^+$.
1544.4 *3*			D	
1557.55 *10*	2$^+$		C	J$^\pi$: $\gamma\gamma(\theta)$; γ's to 4$^+$ and 0$^+$.
1592.84[‡] *16*	6$^+$	0.98 ps *6*	BCD	J$^\pi$: ΔJ=2, E2 γ to 4$^+$.
1844.65 *11*	4$^+$		C	J$^\pi$: $\gamma\gamma(\theta)$; γ to 2$^+$.
1882.97 *10*	2$^+$		C	J$^\pi$: $\gamma\gamma(\theta)$; γ's to 0$^+$ and 4$^+$.
1918.6 *2*	3		C	J$^\pi$: $\gamma\gamma(\theta)$.
1948 *5*	(3$^-$)		E	J$^\pi$: systematic trend of 3$^-$ states in ^{132}Ba (at 2070), ^{134}Ba(at 2251), ^{136}Ba (at 2529) and ^{138}Ba (at 2879).

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{130}Ba Levels (continued)

E(level)	J$^\pi$	$T_{1/2}$[†]	XREF	Comments
2012.57[b] *15*	5$^+$		B D	J$^\pi$: E3 γ from 8$^-$, γ to 4$^+$.
2053.7 *3*	(3,4$^+$)		C	J$^\pi$: $\gamma\gamma(\theta)$; γ's to 2$^+$ and 4$^+$.
2079.18 *9*	3$^{(+)}$		C	J$^\pi$: $\gamma\gamma(\theta)$; log *ft*=5.9 from 3$^{(+)}$.
2101.16[b] *15*	(6$^+$)		D	J$^\pi$: ΔJ=2 γ to 4$^+$.
2168.39[&] *17*	(5$^-$)		CD	J$^\pi$: ΔJ=1 γ to 4$^+$; γ to 6$^+$.
2182.9 *3*			D	
2229.9 *4*			D	J$^\pi$: γ to 6$^+$.
2248.17 *14*	(3,4$^+$)		C	J$^\pi$: $\gamma\gamma(\theta)$; γ's to 2$^+$ and 4$^+$.
2269.2 *2*			C	J$^\pi$: γ to 2$^+$.
2279.5 *2*			C	J$^\pi$: γ to 4$^+$.
2317.99 *18*	(3,4$^+$)		C	J$^\pi$: $\gamma\gamma(\theta)$; γ's to 2$^+$ and 4$^+$.
2346.87 *10*	3$^{(+)}$		C	J$^\pi$: $\gamma\gamma(\theta)$; log *ft*=5.9 from 3$^{(+)}$.
2395.05[‡] *18*	8$^+$	0.49 ps *14*	B D	J$^\pi$: ΔJ=2, E2 γ to 6$^+$.
2407.8 *4*			C	J$^\pi$: γ to 4$^+$.
2433.8 *4*			C	J$^\pi$: γ to 4$^+$.
2475.12 *18*	8$^-$	9.4 ms *4*	B D	%IT=100 J$^\pi$: M2+E3 γ to 6$^+$, E1 γ to 8$^+$. $T_{1/2}$: weighted average of 9.54 ms *14* (1999DeZZ), 13.5 ms *10* (1969WaZX) and 8.8 ms *2* (1966Br14). Additional information 2.
2557.1 *3*			C	J$^\pi$: γ to 2$^+$.
2568.17[&] *17*	(7$^-$)	4.16 ps *14*	D	J$^\pi$: ΔJ=1, E1 γ to 6$^+$; ΔJ=2, E2 γ to (5$^-$).
2602.1 *3*			C	J$^\pi$: γ to 2$^+$.
2645.76 *16*	3$^{(+)}$		C	J$^\pi$: $\gamma\gamma(\theta)$; log *ft*=6.0 from 3$^{(+)}$.
2733.7 *4*	(1,2$^+$)		C	J$^\pi$: γ to 0$^+$.
2784.0 *2*	(3,4$^+$)		C	J$^\pi$: $\gamma\gamma(\theta)$; γ to 2$^+$.
2799.79[b] *22*	(8$^+$)		D	J$^\pi$: ΔJ=(2) γ to (6$^+$).
2891.2 *2*	(1 to 4)		C	J$^\pi$: γ's to 3$^+$ and 2$^+$.
2928.1 *4*			D	
2928.86[a] *23*	(8$^-$)		D	J$^\pi$: ΔJ=1 γ to (7$^-$).
2935.4 *4*			C	J$^\pi$: γ to 4$^+$.
3066.92[&] *21*	(9$^-$)	5.27 ps *14*	D	J$^\pi$: ΔJ=2, E2 γ to (7$^-$); ΔJ=1 γ to 8$^+$.
3259.85[‡] *24*	10$^+$	0.55 ps *7*	D	J$^\pi$: ΔJ=2, E2 γ to 8$^+$.
3265.26? *24*			C	J$^\pi$: γ to 4$^+$.
3289.9 *4*			D	
3422.85[#] *24*	(10$^+$)		D	J$^\pi$: ΔJ=(2) γ to 8$^+$; possible γ to 10$^+$.
3434.94[a] *24*	(10$^-$)		D	J$^\pi$: ΔJ=2 γ to (8$^-$); ΔJ=1 γ to (9$^-$).
3602.52[b] *23*	(10$^+$)		D	J$^\pi$: ΔJ=(2) γ to 8$^+$.
3658.9[&] *3*	(11$^-$)	2.10 ps *9*	D	J$^\pi$: ΔJ=2, E2 γ to (9$^-$).
3660.02 *23*	(2$^+$,3,4$^+$)		C	J$^\pi$: γ's to 2$^+$ and 4$^+$.
3676.2 *4*			C	J$^\pi$: γ to (3$^+$,4$^+$).
3704.7 *4*	(2$^+$,3,4$^+$)		C	J$^\pi$: γ's to 2$^+$ and 4$^+$.
3712.0 *4*			C	J$^\pi$: γ to 4$^+$.
3789.7[@] *3*	(10$^+$)		D	J$^\pi$: ΔJ=(0) γ to 10$^+$.
3798.7 *3*			C	J$^\pi$: γ to 3$^+$.
3962.6 *4*			D	J$^\pi$: γ to 10$^+$.
3989.6[#] *3*	(12)$^+$	2.15 ps *21*	D	J$^\pi$: ΔJ=2, E2 γ to 10$^+$.
4006.8 *4*			C	J$^\pi$: γ to (3,4).
4077.9[a] *3*	(12$^-$)		D	J$^\pi$: ΔJ=(2) γ to (10$^-$); γ to (11$^-$).
4222.3[‡] *4*	(12$^+$)		D	J$^\pi$: ΔJ=2 γ to 10$^+$.
4256.1[@] *3*	(12$^+$)	1.52 ps *14*	D	J$^\pi$: ΔJ=(2) γ to 10$^+$.

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{130}Ba Levels (continued)

E(level)	J^π	$T_{1/2}$ †	XREF	Comments
4354.0& *4*	(13⁻)		D	J^π: ΔJ=(2) γ to (11⁻).
4404.1 *4*			D	J^π: γ to 10⁺.
4783.3# *4*	(14⁺)	0.41 ps *4*	D	J^π: ΔJ=(2) γ to (12)⁺. $T_{1/2}$: effective half-life.
4879.3a *4*	(14⁻)		D	J^π: ΔJ=(2) γ to (12⁻).
4885.3@ *4*	(14⁺)	3.4 ps *6*	D	J^π: ΔJ=2, E2 γ to (12⁺). $T_{1/2}$: effective half-life.
5155.4& *4*	(15⁻)		D	J^π: ΔJ=(2) γ to (13⁻).
5679.5@ *4*	(16⁺)		D	J^π: γ to (14⁺).
5730.1# *4*	(16⁺)		D	J^π: ΔJ=(2) γ to (14⁺).
5766.6a *4*	(16⁻)		D	J^π: γ to (14⁻).
6037.2& *5*	(17⁻)		D	J^π: γ to (15⁻).
6757.4# *5*	(18⁺)		D	J^π: γ to (16⁺).
6972.8& *6*			D	J^π: γ to (17⁻).
8022.8& *6*			D	

† From recoil-distance Doppler shift in (^{18}O,4nγ) (2000St07).
‡ Band(A): g.s. band.
# Band(B): first S (super) band.
@ Band(C): second S (super) band.
& Band(D): π=−,α=1.
a Band(E): π=−, α=0.
b Band(F): quasi γ-band.

γ(^{130}Ba)

δ(Q/D) given in comments are from γγ(θ) data.

E_i(level)	J^π_i	E_γ †	I_γ †	E_f	J^π_f	Mult. ‡	α #	Comments
357.38	2⁺	357.4 *1*	100	0.0	0⁺	E2	0.0262	α(K)=0.02163; α(L)=0.00365; α(M)=0.00076; α(N+..)=0.00020 B(E2)(W.u.)=57.9 *17*
888.89		531.5 *2*	100	357.38	2⁺			
901.85	4⁺	544.5 *1*	100	357.38	2⁺	E2		B(E2)(W.u.)=78.9 *13*
908.02	2⁺	550.7 *1*	100 *6*	357.38	2⁺			δ(Q/D)=−0.296 *7* or −40 *13*.
		908.0 *1*	66 *3*	0.0	0⁺			
1179.5	0⁺	271.4 *3*		908.02	2⁺			
		822.0 *3*		357.38	2⁺			
1361.06	3⁽⁺⁾	453.2 *1*	49 *2*	908.02	2⁺	D+Q		δ(Q/D)=+0.31 *2* or +13 *3*.
		459.4 *4*	9.3 *2*	901.85	4⁺			δ(Q/D)=−0.20 *7* or −2.5 *5*.
		1003.6 *1*	100 *3*	357.38	2⁺	D+Q		δ(Q/D)=−0.001 *9* or −4.6 *2*.
1477.53	(4⁺)	569.4 *1*	100 *11*	908.02	2⁺			
		575.5 *2*	71 *9*	901.85	4⁺			δ(Q/D)=−0.43 *8* or +2.4 *5*.
		1120.2 *1*	66 *6*	357.38	2⁺			
1544.4		655.5 *2*	100	888.89				
1557.55	2⁺	196.2	6.9 *11*	1361.06	3⁽⁺⁾			
		377.7 *3*		1179.5	0⁺			
		649.6 *1*	53 *6*	908.02	2⁺			δ(Q/D)=−0.01 *3* or +3.2 *4*.

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

$\gamma(^{130}Ba)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[‡]	Comments
1557.55	2^+	655.6	7.2 *11*	901.85	4^+		
		1200.1 *1*	100 *8*	357.38	2^+		δ(Q/D)=−0.31 *2* or −23 *9*.
		1557.1 *3*	<8	0.0	0^+		
1592.84	6^+	691.1 *2*	100	901.85	4^+	E2	B(E2)(W.u.)=94 *6*
1844.65	4^+	367.1 *3*	42 *17*	1477.53	(4^+)		δ(Q/D)=−1.0 *8* or +213 *167*.
		483.7 *3*	83 *17*	1361.06	$3^{(+)}$		
		936.6 *2*	83 *17*	908.02	2^+		
		942.8 *1*	100 *8*	901.85	4^+		δ(Q/D)=+0.16 *13* or +0.8 *2*.
		1487.3 *2*	78 *5*	357.38	2^+		
1882.97	2^+	325.5 *3*		1557.55	2^+		
		521.8 *5*	≈10	1361.06	$3^{(+)}$		
		703.3 *3*	5.3 *8*	1179.5	0^+		
		974.9 *1*	48 *3*	908.02	2^+		δ(Q/D)=−0.25 *3* or +45 *6*.
		981.0 *3*		901.85	4^+		
		1525.7 *1*	100 *8*	357.38	2^+		δ(Q/D)=+0.029 *12* or +2.8 *2*.
		1882.5 *3*		0.0	0^+		
1918.6	3	1010.5 *3*		908.02	2^+		
		1016.7 *3*		901.85	4^+		δ(Q/D)=−0.4 *2* or −1.6 *7*.
		1561.2 *3*		357.38	2^+		δ(Q/D)=+0.04 *8* or −6 *3*.
2012.57	5^+	420.3 *5*	≈70	1592.84	6^+		
		651.5 *2*	100 *11*	1361.06	$3^{(+)}$		
		1110.4 *2*	94 *11*	901.85	4^+		
2053.7	$(3,4^+)$	496.3 *3*		1557.55	2^+		
		576.2 *5*	≈70	1477.53	(4^+)		
		692.8 *7*	91 *12*	1361.06	$3^{(+)}$		
		1151.8 *3*	100 *12*	901.85	4^+		
		1695.8 *3*	121 *19*	357.38	2^+		
2079.18	$3^{(+)}$	196.1 *3*		1882.97	2^+		
		234.5 *3*	3.0 *9*	1844.65	4^+		
		521.8 *5*	≈11	1557.55	2^+		δ(Q/D)=−0.8 *4*.
		601.5 *4*	9 *4*	1477.53	(4^+)		
		718.2 *1*	74 *4*	1361.06	$3^{(+)}$		
		1171.1 *1*	100 *4*	908.02	2^+		δ(Q/D)=+0.008 *25* or −4.8 *6*.
		1177.4 *1*	59 *2*	901.85	4^+		δ(Q/D)=−0.34 *7* or −1.8 *3*.
		1721.7 *1*	50 *4*	357.38	2^+		δ(Q/D)=+0.10 *2* or −8.4 *14*.
2101.16	(6^+)	623.8 *2*	100 *5*	1477.53	(4^+)		
		1199.3 *2*	43 *5*	901.85	4^+		
2168.39	(5^-)	575.5 *2*	32 *11*	1592.84	6^+		
		1266.6 *2*	100 *6*	901.85	4^+		
2182.9		590.1 *2*	100	1592.84	6^+		
2229.9		685.5 *2*	100	1544.4			
2248.17	$(3,4^+)$	1340.2 *3*		908.02	2^+		
		1346.3 *1*		901.85	4^+		
		1890.5 *3*		357.38	2^+		
2269.2		1361.1 *3*		908.02	2^+		
		1911.6 *3*		357.38	2^+		
2279.5		360.8 *3*		1918.6	3		
		1377.7 *3*		901.85	4^+		
2317.99	$(3,4^+)$	264.1 *3*		2053.7	$(3,4^+)$		
		473.4 *3*		1844.65	4^+		
		840.1 *3*	58 *10*	1477.53	(4^+)		
		957.0 *3*	100 *20*	1361.06	$3^{(+)}$		
		1410.7 *4*	100 *20*	908.02	2^+		
		1415.9[@]	22 *10*	901.85	4^+		

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

$\gamma(^{130}Ba)$ (continued)

E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f	Mult.‡	δ	α#	Comments
2346.87	$3^{(+)}$	267.7 *1*	21 *7*	2079.18	$3^{(+)}$				
		427.9 *3*		1918.6	3				
		464.2 *2*	36 *11*	1882.97	2^+				
		502.2 *5*	8.9 *18*	1844.65	4^+				
		789.2 *3*	15 *2*	1557.55	2^+				
		869.3 *1*	71 *4*	1477.53	(4^+)				δ(Q/D)=+0.47 *11* or +3.8 *14*.
		986.4 *10*	11 *4*	1361.06	$3^{(+)}$				
		1438.8 *1*	100 *7*	908.02	2^+				δ(Q/D)=+0.63 *7* or +3.0 *5*.
		1445.0 *2*	39 *4*	901.85	4^+				δ(Q/D)=+1.1 *17*.
2395.05	8^+	802.3 *2*	100	1592.84	6^+	E2			B(E2)(W.u.)=9.E+1 *3*
2407.8		930.3 *3*		1477.53	(4^+)				
2433.8		589.2 *3*		1844.65	4^+				
2475.12	8^-	80.3 *2*	10 *1*	2395.05	8^+	E1		0.419	α(K)= 0.357; α(L)= 0.0495; α(M)=0.01009; α(N+..)=0.00259 B(E1)(W.u.)=4.0×10^{-12} *5*
		462.3 *2*	20 *2*	2012.57	5^+	E3		0.0363	α(K)= 0.0283; α(L)=0.00630; α(M)=0.00135; α(N+..)=0.00036 B(E3)(W.u.)=0.0042 *6*
		882.3 *2*	100 *7*	1592.84	6^+	M2+E3	1.1 *6*		B(M2)(W.u.)=8.E−8 *5*; B(E3)(W.u.)=0.00013 *7* δ: from α(K)exp in ^{130}Ba IT decay.
2557.1		1649.1 *3*	100	908.02	2^+				
2568.17	(7^-)	399.8 *2*	50 *2*	2168.39	(5^-)	E2			B(E2)(W.u.)=110 *7*
		467.1 *2*	5 *3*	2101.16	(6^+)	[E1]			B(E1)(W.u.)=2.0×10^{-5} *12*
		975.3 *2*	100 *2*	1592.84	6^+	E1			B(E1)(W.u.)=4.41×10^{-5} *21*
2602.1		1694.1 *3*		908.02	2^+				
2645.76	$3^{(+)}$	298.7 *3*		2346.87	$3^{(+)}$				
		327.9 *3*	≈70	2317.99	$(3,4^+)$				
		376.2 *3*		2269.2					
		397.6 *6*	60 *30*	2248.17	$(3,4^+)$				
		566.4 *3*		2079.18	$3^{(+)}$				
		592.1 *4*	50 *10*	2053.7	$(3,4^+)$				
		726.9 *3*		1918.6	3				
		801.2 *2*	100 *30*	1844.65	4^+				δ(Q/D)=−0.2 *2* or −2.4 *13*.
		1088.0 *3*		1557.55	2^+				
		1167.8 *3*		1477.53	(4^+)				
		1744.0 *3*	60 *10*	901.85	4^+				δ(Q/D)=+0.37 *7* or +4.2 *11*.
		2287.9 *3*	70 *10*	357.38	2^+				δ(Q/D)=+0.07 *5* or −6.9 *23*.
2733.7	$(1,2^+)$	1554.2 *3*		1179.5	0^+				
2784.0	$(3,4^+)$	437.2 *3*		2346.87	$3^{(+)}$				
		1306.3 *3*		1477.53	(4^+)				
		1882.0 *3*		901.85	4^+				
		2426.9 *3*		357.38	2^+				
2799.79	(8^+)	698.7 *2*	100	2101.16	(6^+)				
2891.2	(1 to 4)	1333.7 *3*		1557.55	2^+				
		1530.2 *3*		1361.06	$3^{(+)}$				
2928.1		745.2 *2*	100	2182.9					
2928.86	(8^-)	360.7 *2*	100	2568.17	(7^-)				
2935.4		1090.8 *3*		1844.65	4^+				
3066.92	(9^-)	498.8 *2*	100 *11*	2568.17	(7^-)	E2			B(E2)(W.u.)=81 *13*
		671.8 *2*	9.7 *11*	2395.05	8^+				
3259.85	10^+	864.8 *2*	100	2395.05	8^+	E2			B(E2)(W.u.)=54 *7*
3265.26?		1017.0 *3*	100 *30*	2248.17	$(3,4^+)$				
		1787.8 *3*	71 *14*	1477.53	(4^+)				

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Adopted Levels, Gammas (continued)

$\gamma(^{130}Ba)$ (continued)

E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f	Mult.‡	Comments
3289.9		1107.0 *2*	100	2182.9			
3422.85	(10^+)	163.0 *2*	<5	3259.85	10^+		
		1027.8 *2*	100 *12*	2395.05	8^+		
3434.94	(10^-)	368.0 *2*	53 *7*	3066.92	(9^-)		
		506.1 *2*	100 *5*	2928.86	(8^-)		
3602.52	(10^+)	802.8 *2*	100 *30*	2799.79	(8^+)		
		1207.4 *2*	73 *7*	2395.05	8^+		
3658.9	(11^-)	592.0 *2*	100	3066.92	(9^-)	E2	B(E2)(W.u.)=95 *4*
3660.02	$(2^+,3,4^+)$	2182.5 *5*	25 *8*	1477.53	(4^+)		
		2752.1 *3*	100 *8*	908.02	2^+		
		2757.9 *4*	50 *8*	901.85	4^+		
3676.2		1622.6 *3*		2053.7	$(3,4^+)$		
3704.7	$(2^+,3,4^+)$	2796.7 *4*	100 *13*	908.02	2^+		
		2802.8 *12*	19 *6*	901.85	4^+		
3712.0		2810.1 *3*	100	901.85	4^+		
3789.7	(10^+)	529.8 *2*	100	3259.85	10^+		
3798.7		1529.5 *3*		2269.2			
		2437.8 *3*		1361.06	$3^{(+)}$		
3962.6		539.7 *2*	100	3422.85	(10^+)		
3989.6	$(12)^+$	566.7 *2*	26 *8*	3422.85	(10^+)	[E2]	B(E2)(W.u.)=24 *8*
		729.7 *2*	100 *5*	3259.85	10^+	E2	B(E2)(W.u.)=26 *4*
4006.8		1222.8 *3*		2784.0	$(3,4^+)$		
4077.9	(12^-)	419.0 *2*	26 *9*	3658.9	(11^-)		
		643.0 *2*	100 *4*	3434.94	(10^-)		
4222.3	(12^+)	962.4 *2*	100	3259.85	10^+	Q	
4256.1	(12^+)	466.4 *2*	45 *20*	3789.7	(10^+)	[E2]	B(E2)(W.u.)=1.3×10^2 *7*
		996.2 *2*	100 *5*	3259.85	10^+	[E2]	B(E2)(W.u.)=6.7 *12*
4354.0	(13^-)	695.1 *2*	100	3658.9	(11^-)	(Q)	
4404.1		981.2 *2*	100	3422.85	(10^+)		
4783.3	(14^+)	793.7 *2*	100	3989.6	$(12)^+$	[E2]	B(E2)(W.u.)=112 *11*
4879.3	(14^-)	801.4 *2*	100	4077.9	(12^-)		
4885.3	(14^+)	629.2 *2*	100	4256.1	(12^+)	E2	B(E2)(W.u.)=43 *8*
5155.4	(15^-)	801.4 *2*	100	4354.0	(13^-)	(Q)	
5679.5	(16^+)	794.2 *2*	100	4885.3	(14^+)		
5730.1	(16^+)	946.8 *2*	100	4783.3	(14^+)		
5766.6	(16^-)	887.3 *2*	100	4879.3	(14^-)		
6037.2	(17^-)	881.8 *2*	100	5155.4	(15^-)		
6757.4	(18^+)	1027.3 *2*	100	5730.1	(16^+)		
6972.8		936.0 *2*		6037.2	(17^-)		
8022.8		1050.0 *2*		6972.8			

† For levels populated in ^{130}La ε decay, ^{130}Ba IT decay and in $^{120}Sn(^{13}C,3n\gamma)$, the values are generally taken from ^{130}La ε decay.

‡ From ce and $\gamma(\theta)$ data in $^{120}Sn(^{13}C,3n\gamma)$,$^{116}Cd(^{18}O,4n\gamma)$, except for the 8^- isomer at 2475, for which the assignments are from ce data in ^{130}Ba IT decay.

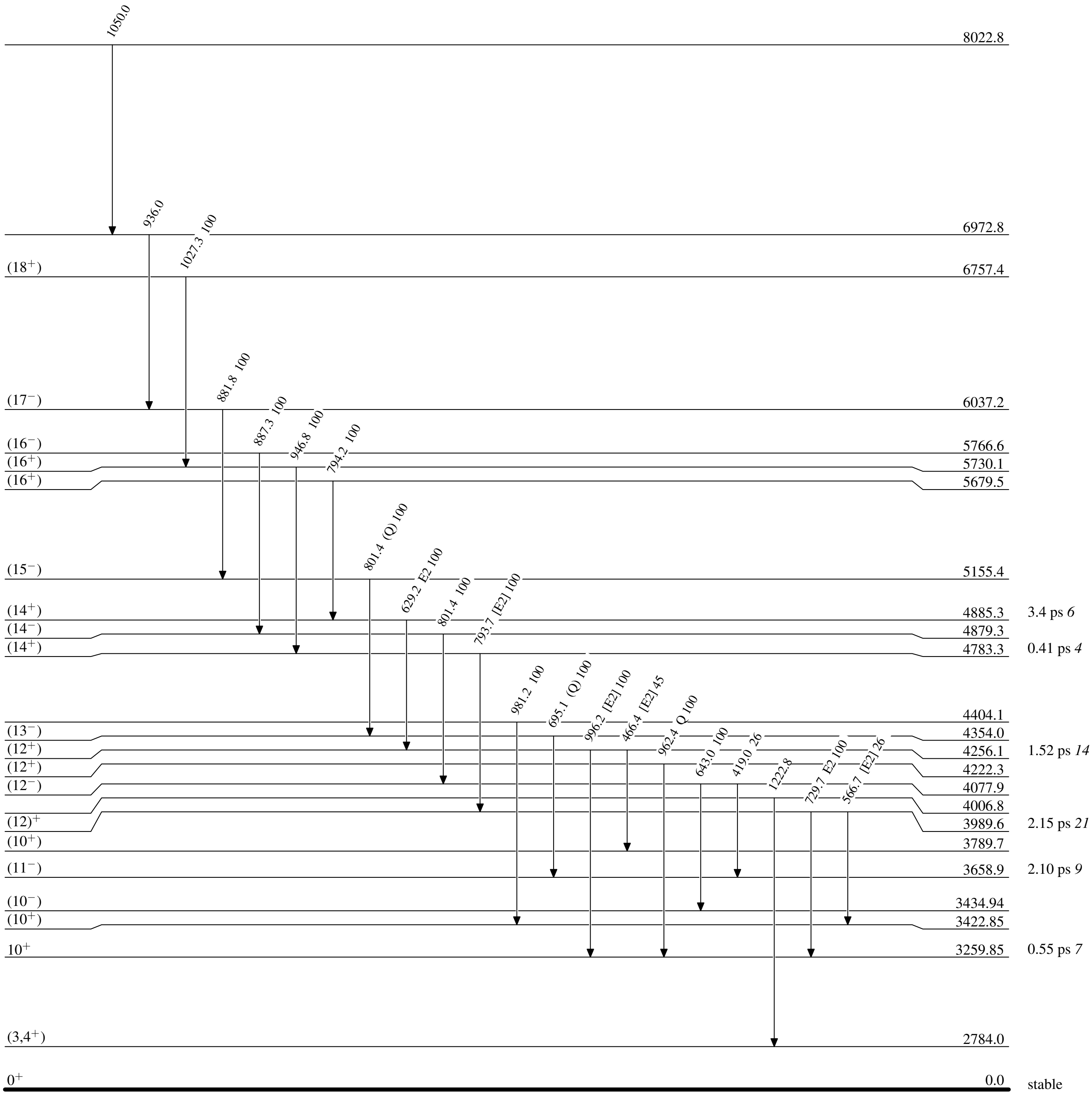
\# Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.

@ Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas

Level Scheme

Intensities: Relative photon branching from each level

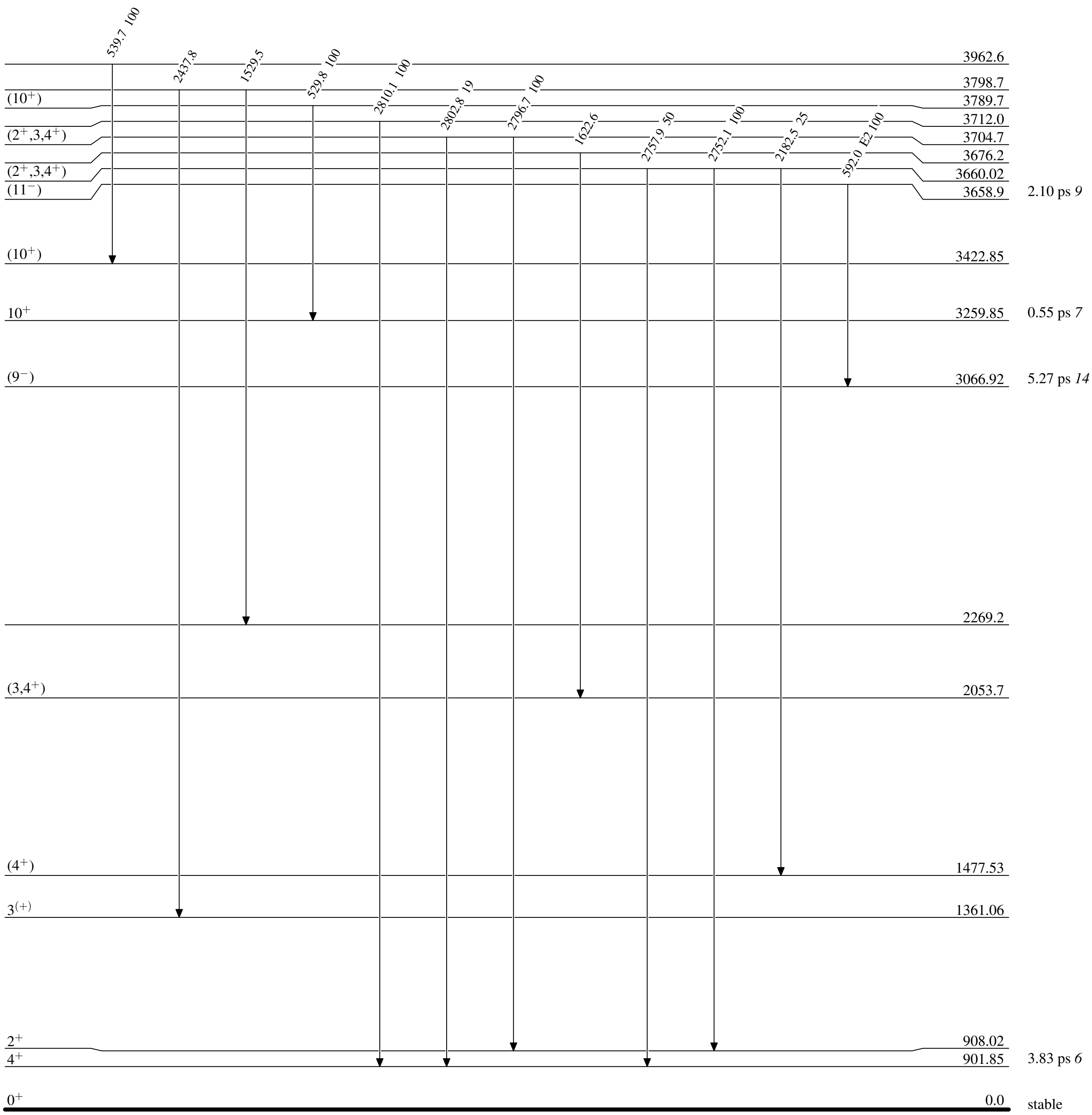


$^{130}_{56}Ba_{74}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

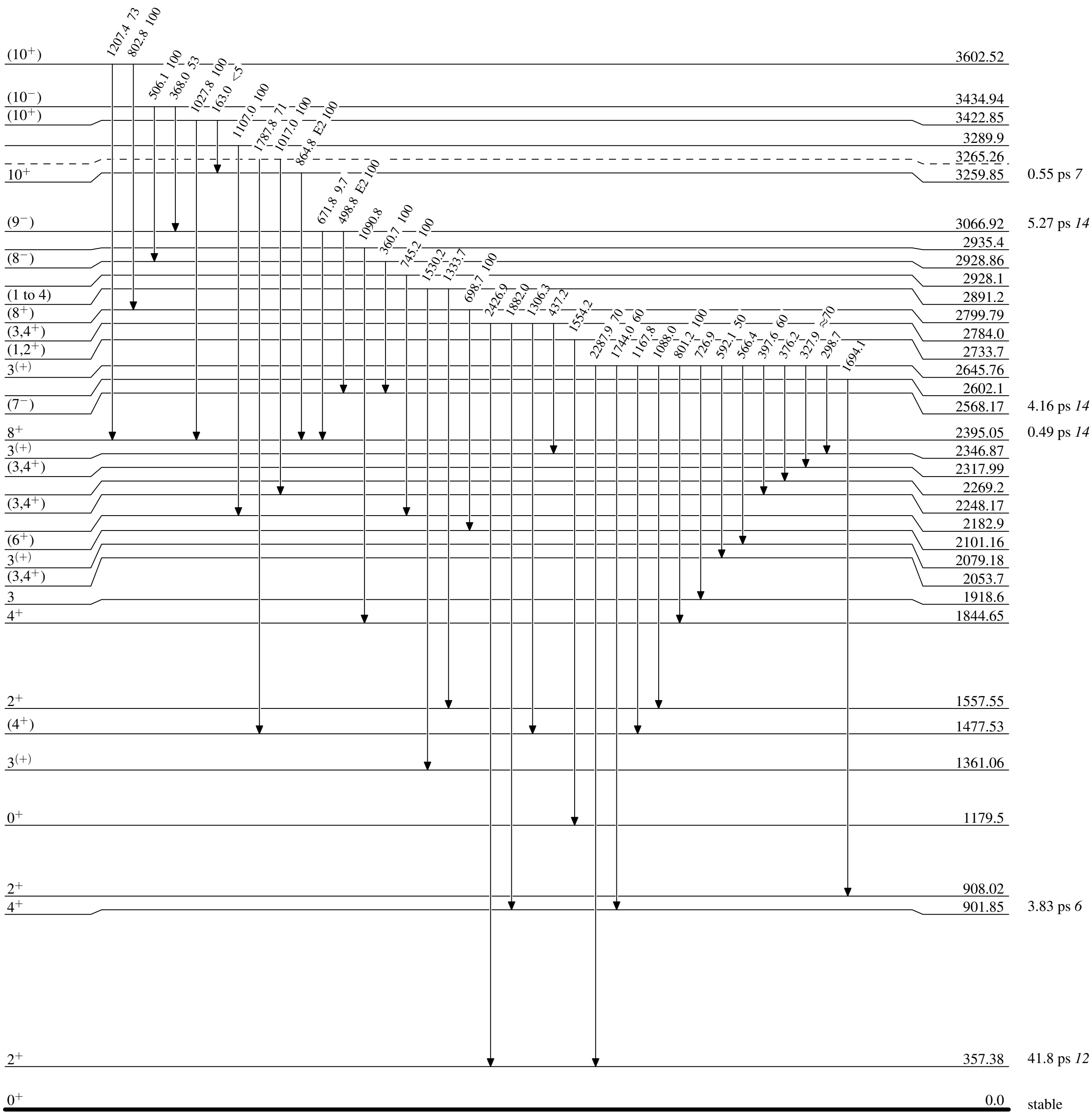


$^{130}_{56}Ba_{74}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



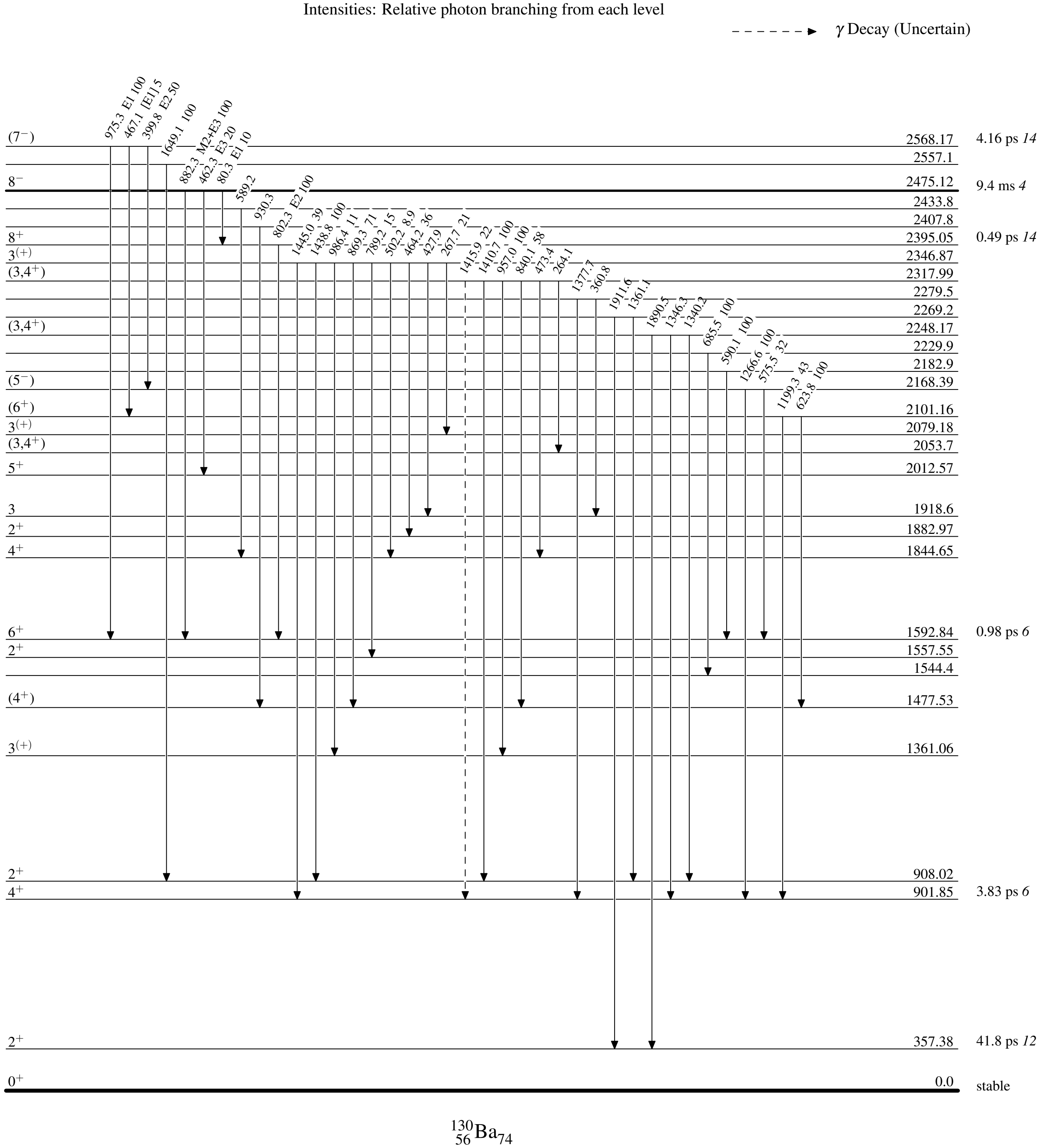
$^{130}_{56}Ba_{74}$

Adopted Levels, Gammas

Legend

Level Scheme (continued)

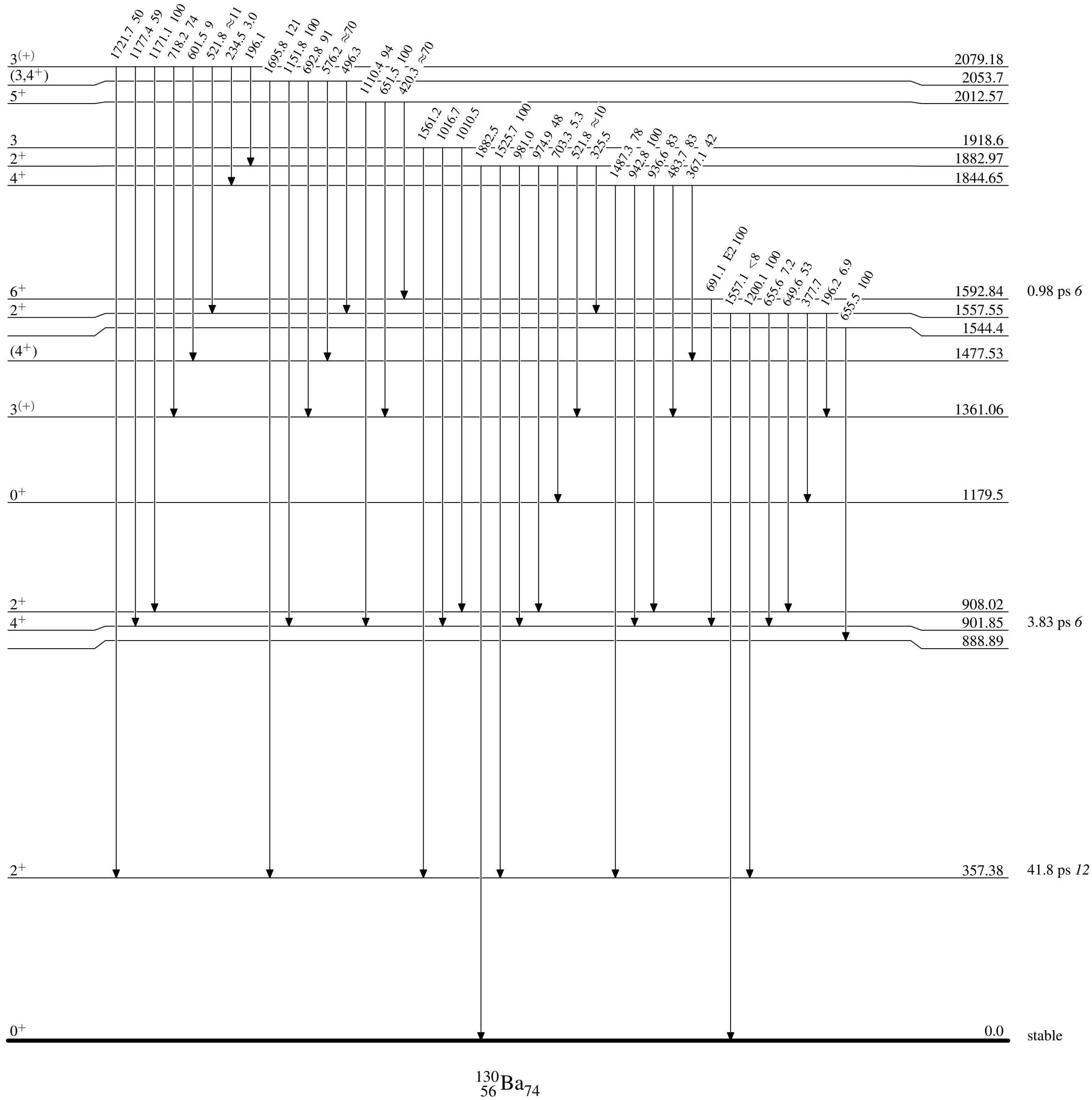
Intensities: Relative photon branching from each level



Adopted Levels, Gammas

Level Scheme (continued)

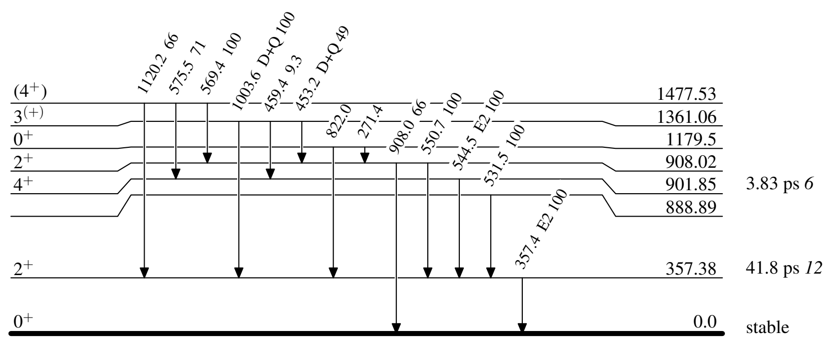
Intensities: Relative photon branching from each level



Adopted Levels, Gammas

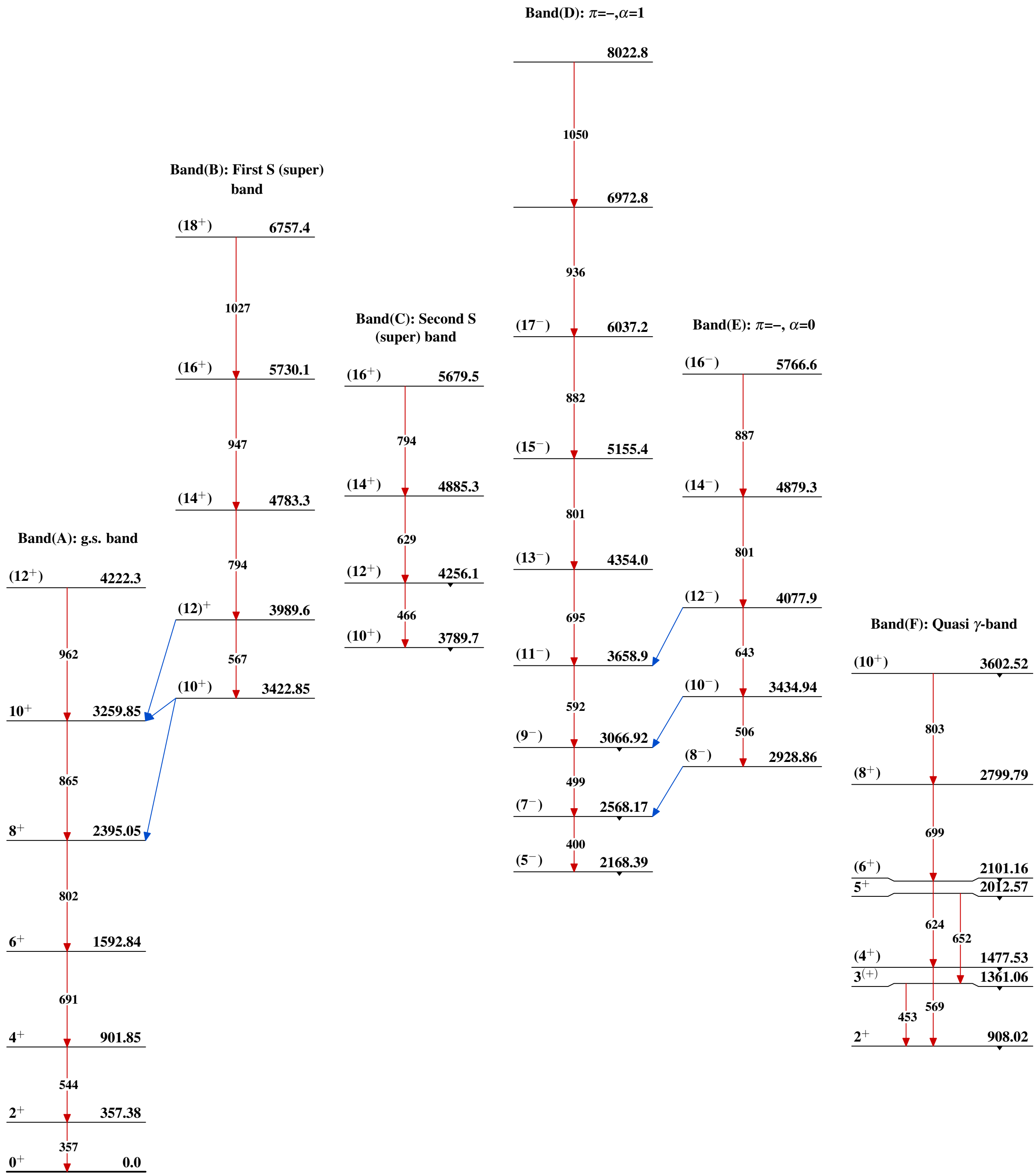
Level Scheme (continued)

Intensities: Relative photon branching from each level



$^{130}_{56}Ba_{74}$

Adopted Levels, Gammas



$^{130}_{56}Ba_{74}$

Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Yu. Khazov, A. A. Rodionov and S. Sakharov, Balraj Singh	NDS 104,497 (2005)	10-Feb-2005

Q(β^-)=−4.71×10^3 *4*; S(n)=9822 *3*; S(p)=7665 *5*; Q(α)=−999.6 *15* 2012Wa38
Note: Current evaluation has used the following Q record −4690 40 *9822.4 30* 7664 5 −999.7 *18* 2003Au03.
Measured mass: 1966Be10, 1968De17, 1986Au02.
Measured isotope shifts, charge radii, moments by atomic spectroscopy methods: 1974Fi06, 1976Ho13, 1980Si14, 1981Wa19, 1982ReZV, 1983Mu12, 1984We15, 1985Si24, 1987Al25, 1987Va16, 1988Va11, 1988Ya13.
Measured double β-decay rates: 1996Ba24, 2001Me22.
Measured isomeric ratios in (γ,n) reaction in the Giant-Dipole Resonance region: 1995ToZW, 1996Be30.
^{173}Yb(^{24}Mg,X) E=134.5 MeV; ^{176}Yb(^{23}Na,X) E=129 MeV: 2003Fo04: measured yield of ^{132}Ba by gating at 464-864 cascade; the following γ rays in ^{132}Ba were assigned: 316, 377, 663, 799, 811, 868, 890 and 935; but no level scheme was proposed.
The decay of ^{132}La is in need of further study from the point-of-view of separating inventory and intensities of γ rays from the two activities: 4.8 h and 24.3 min.
Additional 40 or so levels are reported as populated in (p,t) (1996Ca32), but data for these levels are not available.

^{132}Ba Levels

Bands: as proposed by 1995Ju09 and 1989Pa17. Others: 1995LuZZ, 1996LuZZ.

Cross Reference (XREF) Flags

A	^{132}Cs β^- decay (6.479 d)	E	^{122}Sn(^{13}C,3nγ)	I	Coulomb excitation
B	^{132}La ε decay (4.8 h)	F	^{124}Sn(^{12}C,4nγ)	J	^{133}Cs(p,2nγ)
C	^{132}La ε decay (24.3 min)	G	^{124}Sn(^{13}C,5nγ)	K	^{134}Ba(p,t)
D	^{132}La ε decay (4.8 h+24.3 min)	H	^{132}Ba(α,α')		

E(level)[†]	J$^\pi$[‡]	T$_{1/2}$	XREF	Comments
0.0[#]	0$^+$	>3.0×10^{21} y	ABCDEFGHIJK	%2β+=? T$_{1/2}$: from possible 2β^+ decay (1996Ba24).
464.508[#] *12*	2$^+$	15.1 ps *11*	ABCDEFGHIJK	B(E2)↑=0.86 *6* μ=+0.68 *6* (1980Br01,1989Ra17) μ: transient-field integral PAC (1980Br01). J$^\pi$: E2 γ to 0$^+$. T$_{1/2}$: from B(E2) in Coul. ex.
1031.672[@] *10*	2$^+$	1.08 ps *10*	ABCDEFG IJK	B(E2)↑=0.073 *3* J$^\pi$: E2 γ to 0$^+$. T$_{1/2}$: from B(E2) in Coul. ex.
1127.615[#] *18*	4$^+$		ABCDEFG JK	J$^\pi$: ΔJ=2, E2 γ to 2$^+$.
1503.63 *5*	0$^+$		B D F K	J$^\pi$: L(p,t)=0.
1511.088[&] *22*	3$^+$		BCDEFG J	J$^\pi$: M1+E2 γ's to 2$^+$ and 4$^+$.
1660.30 *4*	0$^+$		BCD K	J$^\pi$: L(p,t)=0.
1685.753 *19*	2$^+$		BCD K	J$^\pi$: M1+E2 γ's to 2$^+$; γ to 0$^+$; $\gamma\gamma(\theta)$ in ^{132}La ε.
1729.343[@] *20*	4$^+$		BCDEFG J	J$^\pi$: ΔJ=2, E2 γ to 2$^+$.
1931.91[#] *6*	6$^+$		BCDEFG J	J$^\pi$: ΔJ=2 γ to 4$^+$; yrast band member.
1944.29 *3*	(4$^+$)		BCD G JK	J$^\pi$: L=(4) in (p,t).
1998.179 *22*	2$^+$		B D	J$^\pi$: γ to 0$^+$; (M1+E2) γ to 2$^+$; $\gamma\gamma(\theta)$.
2026.943[g] *23*	4$^-$		BCDEFG J	J$^\pi$: E1 γ to 3$^+$; ΔJ=0, (E1+M2) γ to 4$^+$.
2046.23 *4*	(2$^+$)		B D	J$^\pi$: γ to 2$^+$; $\gamma\gamma(\theta)$. E(level): it should Be noted that two levels of almost the same energy are proposed by 1996Ku01 and 2002Ga01, one with

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{132}Ba Levels (continued)

E(level)[†]	J^{π}[‡]	$T_{1/2}$	XREF	Comments
				$J^{\pi}=2^+$ and the other with $J^{\pi}=4^+$. The reason for introducing two levels near this energy is not clear to the evaluators, and it is possible that these two levels are the same.
2046.48 *6*	(4^+)		BCD	J^{π}: γ's to 2^+ and 4^+; $\gamma\gamma(\theta)$ supports 4^+.
2068.553 *21*	3^-		B D HI K	B(E3)↑=0.176 *22* J^{π}: L(p,t)=3.
2119.59[d] *4*	5^-	0.40 ns *+20−10*	BCDEFG JK	J^{π}: L(p,t)=5. $T_{1/2}$: $\gamma\gamma$(t) in (^{13}C,3nγ) (1996Ko16).
2220.07 *4*	(3^-)		B D	J^{π}: γ's to 2^+ and 4^+; $\gamma\gamma(\theta)$.
2225.82[&] *9*	(5^+)		CD G	J^{π}: γ's to 2^+ and 4^+; possible band member.
2240.69[@] *7*	$6^{(+)}$		DEFG J	J^{π}: $\Delta J=2$ γ to 4^+; γ to 6^+; $\gamma\gamma(\theta)$ in ^{132}La ε.
2271 *8*	0^+		K	J^{π}: L(p,t)=0.
2287.98 *7*	$(2^+,3,4^+)$		B D	J^{π}: γ's to 2^+ and 4^+.
2312.49[f] *6*	$5^{(-)}$		BCDE G	J^{π}: $\Delta J=1$ γ to 4^-; γ's 3^+ and 6^+.
2357.62[e] *5*	(6^-)		CDEFG J	J^{π}: $\Delta J=1$ γ to 5^-; γ to 4^-.
2374.422 *20*	3^-		B D K	XREF: K(2384). J^{π}: E1(+M2) γ to 2^+, γ to 4^+; $\gamma\gamma(\theta)$.
2406 *8*	0^+		K	J^{π}: L(p,t)=0.
2422.73[g] *6*	$6^{(-)}$		DEFG J	J^{π}: $\Delta J=2$ γ to 4^-; $\Delta J=1$ γ to 5^-.
2438.93 *11*	$(2^+$ to $6^+)$		D G	J^{π}: γ to 4^+.
2452.87 *5*	(1^-)		B D	J^{π}: (E1) γ to 0^+.
2483.06[d] *6*	(7^-)	<0.2 ns	DEFG JK	J^{π}: L(p,t)=7. $T_{1/2}$: $\gamma\gamma$(t) in (^{13}C,3nγ).
2492.35 *8*	(4^+)		B D	J^{π}: γ to 4^+; $\gamma\gamma(\theta)$ in ^{132}La ε; large mixing ratio for 1364.6γ favors M1+E2 over E1+M2.
2505.34 *5*	(2)		B D	J^{π}: γ to 2^+; $\gamma\gamma(\theta)$.
2567.331 *20*	$(3)^-$		B D	J^{π}: E1 γ to 2^+, M1+E2 γ to 3^-; γ to 4^+.
2609.60 *9*	(5^-)		D	J^{π}: γ's to 5^- and 6^-; $\gamma\gamma(\theta)$.
2660 *10*	(4^+)		K	J^{π}: L=(4) in (p,t).
2693.27 *13*	$(4,5^-)$		D	J^{π}: γ's to 3^- and 5^-; $\gamma\gamma(\theta)$.
2718.17[f] *6*	$7^{(-)}$		DEFG J	J^{π}: $\Delta J=2$ γ to 5^-; $\Delta J=1$ γ to 6^-.
2736 *8*	0^+		K	J^{π}: L(p,t)=0.
2772.40 *13*	$(4^-,6^-)$		D K	XREF: K(2768). J^{π}: γ's to 5^- and 6^-; $\gamma\gamma(\theta)$.
2791.50 *9*	(5^-)		D	J^{π}: γ's to 4^- and 6^-; $\gamma\gamma(\theta)$.
2800.15[#] *7*	8^+		EFG J	J^{π}: $\Delta J=2$ γ to 6^+; yrast band member.
2855.84 *5*	$(2)^-$		B D	J^{π}: E1 γ to 2^+; $\gamma\gamma(\theta)$.
2867.02[@] *8*	(8^+)		EFG J	J^{π}: $\Delta J=2$, E2 γ to 6^+.
2876.47 *5*	(1^+)		B D	J^{π}: γ's to 0^+ and 2^+; $\gamma\gamma(\theta)$.
2886 *8*	0^+		K	J^{π}: L(p,t)=0.
2900.57[e] *7*	(8^-)		FG	J^{π}: $\Delta J=2$ γ to $6^{(-)}$; $\Delta J=1$ γ to (7^-).
2901.69[i] *9*	(7^-)		FG	J^{π}: $\Delta J=1$ γ to 6^+; possible band member.
2927.846 *23*	(3^-)		B D	J^{π}: (E1) γ to 2^+; γ to 5^-; $\gamma\gamma(\theta)$.
2934.92[&] *14*	(7^+)		G	J^{π}: γ to (5^+); possible band member.
2946.33 *13*	(5^-)		D	J^{π}: γ's to 6^- and (4^+); $\gamma\gamma(\theta)$.
2961.02 *12*	(8^-)		G	J^{π}: $\Delta J=2$ γ to (6^-).
2980.97 *13*	$(1,2^+)$		D	J^{π}: γ to 0^+.
2981.73 *20*			D	J^{π}: γ to 2^+.
3018.59 *14*	(6^-)		D	J^{π}: γ's to (6^-) and (7^-); $\gamma\gamma(\theta)$.
3021.35 *15*	$(1,2^+,3)$		D	J^{π}: γ to 2^+; $\gamma\gamma(\theta)$.
3068.79 *12*	$(1^+,2^+,3,4^+)$		D	J^{π}: γ's to 2^+ and (3^-); $\gamma\gamma(\theta)$.
3082.94 *20*			D	J^{π}: γ to 2^+.
3094.69[g] *7*	(8^-)		E G	J^{π}: $\Delta J=2$ γ to $6^{(-)}$; $\Delta J=1$ γ to (7^-).

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Adopted Levels, Gammas (continued)

^{132}Ba Levels (continued)

E(level)[†]	J^{π}[‡]	$T_{1/2}$	XREF	Comments
3104.86[j] *6*	(8^-)		G	J^{π}: $\Delta J=2$ γ to $6^{(-)}$; $\Delta J=1$ γ to (7^-).
3116.14[#] *9*	10^+	8.94 ns *14*	EFG	$\mu=-1.59$ *5* (1996Da02) μ: TDPAD method (1996Da02). Other: -1.56 *11* (IPAD,1995Ha26). $T_{1/2}$: $\gamma\gamma$(t) (1996Da02). Other: 8.7 ns *2*. J^{π}: $\Delta J=2$, E2 γ to 8^+; yrast band member.
3122.21 *12*	(8^+)		E G	J^{π}: $\Delta J=2$ γ to 6^+.
3158.01 *6*	$(1)^-$		B D	J^{π}: E1 γ to 2^+; γ to 0^+.
3188.31[d] *8*	(9^-)		EFG	J^{π}: $\Delta J=2$ γ to (7^-); $\Delta J=1$ γ to (8^-).
3196.44 *20*			D	J^{π}: γ to 2^+.
3217.10 *21*			D	J^{π}: γ to (4^+).
3219.28 *4*	(2^+)		B D k	J^{π}: γ's to 2^+ and 3^-; $\gamma\gamma(\theta)$.
3229.44 *13*	(6^+)		D k	J^{π}: γ's to (4^+) and (7^-); $\gamma\gamma(\theta)$.
3327.06 *13*	($4,5^-$)		D	J^{π}: γ's to (4^+) and 5^-; $\gamma\gamma(\theta)$.
3336.32 *15*	($3^-,5^-$)		D	J^{π}: γ to 4^-; $\gamma\gamma(\theta)$.
3340.17[i] *6*	(9^-)		E G	J^{π}: $\Delta J=2$ γ to (7^-); $\Delta J=1$ γ's to 8^+ and (8^-).
3356.27 *10*	(9^-)		FG	J^{π}: $\Delta J=1$ γ to (8^-).
3363.55 *21*	($1,2^+$)		D	J^{π}: γ to 0^+.
3381.45 *15*			D	J^{π}: γ to 2^+.
3412 *8*	0^+		K	J^{π}: L(p,t)=0.
3423.85 *4*	$(3)^-$		B D	J^{π}: E1(+M2) γ to 2^+; γ's to 4^+ and 4^-.
3434.36 *13*			D	J^{π}: γ's 2^+ and 3^-.
3445 *8*	0^+		K	J^{π}: L(p,t)=0.
3461.06 *15*	($1,2^+$)		D	J^{π}: γ to 0^+.
3482.23[f] *9*	(9^-)		G	J^{π}: $\Delta J=2$ γ to (7^-); γ to (8^-).
3494.95 *6*	($3,4^+$)		B D	J^{π}: γ's to 2^+, 4^+ and 4^-.
3505.21 *16*	(9^+)		G	J^{π}: $\Delta J=1$ γ to (8^+).
3526.65 *20*			D	J^{π}: γ to 2^+.
3545.55 *13*	(9)		G	J^{π}: $\Delta J=1$ γ to (8^+).
3561.74 *6*			B D	J^{π}: γ's to 3^- and (1).
3562.41 *7*	($1,2^+$)		B D	J^{π}: γ to 0^+.
3563.03 *6*	($1,2^+$)		B D	J^{π}: γ to 0^+.
3591.27 *15*			D	J^{π}: γ's to (1^-) and 3^-.
3598.69[b] *9*	(10^+)		E G	J^{π}: $\Delta J=2$ γ's to 8^+.
3607.46 *9*	($1,2^+$)		D	J^{π}: γ to 0^+.
3608.15 *20*			D	J^{π}: γ to 2^+.
3617.35 *20*			D	J^{π}: γ to 2^+.
3635.17 *7*	1^-		B D	J^{π}: E1 γ to 0^+.
3659.20[e] *9*	(10^-)		G	
3663.44 *5*	($1^-,2^-,3^-$)		B D	J^{π}: E1 γ to 2^+. $J^{\pi}=1^+$ in 2002Ga01 from $\gamma\gamma(\theta)$ and deduced δ(Q/D)=-0.56 for 2631.6γ is in disagreement.
3672.16 *15*			D	J^{π}: γ's to 2^+ and 3^-.
3677.87[@] *10*	(10^+)		E G	J^{π}: $\Delta J=2$ γ to 8^+.
3697 *10*			K	
3716.53 *9*			D	J^{π}: γ's to 2^+ and 3^-.
3717.48 *15*			D	J^{π}: γ to 2^+.
3721.31[j] *8*	(10^-)		G	
3734.13 *12*	($2^+,3,4^+$)		D	J^{π}: γ's to 2^+ and 4^+.
3735.45 *20*			D	J^{π}: γ to 2^+.
3751 *8*	0^+		K	J^{π}: L(p,t)=0.
3753.42 *10*	($2,3^-$)		D	J^{π}: γ's to (1^-), 2^+, 3^- and 3^+.
3768.19 *6*	(2,3)		B D	J^{π}: γ's to 2^-, 2^+, 3^- and 3^+.
3769.15 *20*			D	J^{π}: γ to 2^+.
3773.31 *12*	($1,2^+$)		D	J^{π}: γ to 0^+.
3775.58 *6*	(2^+)		B D	J^{π}: γ's to 0^+, 3^+ and 3^-.

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Adopted Levels, Gammas (continued)

^{132}Ba Levels (continued)

E(level)[†]	J^{π}[‡]	XREF	Comments
3787.75 *20*		D	J^{π}: γ to 2^+.
3805.29 *10*	(10^+)	G	
3812 *8*	0^+	K	J^{π}: L(p,t)=0.
3820.18 *12*		D	J^{π}: γ's to 2^+ and 3^-.
3821.05 *20*		D	J^{π}: γ to 2^+.
3834.78 *12*	(1,2^+)	D	J^{π}: γ to 0^+.
3849.50 *6*		D	J^{π}: γ's to 2^+ and 3^-.
3863.44 *13*		D	J^{π}: γ's to 2^+ and 3^-.
3878.75 *21*	(1,2^+)	D	J^{π}: γ to 0^+.
3882 *8*	0^+	K	J^{π}: L(p,t)=0.
3887.30 *11*	(3,4^+)	D	J^{π}: γ's to 2^+, 4^- and (4^+).
3903.17 *8*	(2^+,3,4^+)	D K	XREF: K(3904). J^{π}: γ's to 2^+ and 4^+.
3906.08 *11*	(11^+)	E G	
3907.46 *8*		D	J^{π}: γ's to 2^+ and 3^-.
3915.78[#] *9*	(12^+)	EFG	
3917.91 *15*	(2^+,3,4^+)	D	J^{π}: γ's to 2^+ and 4^+.
3943.27 *9*	(10^+)	G	
3943.30 *20*	(0^+ to 4^+)	D	J^{π}: γ to 2^+.
3950.18[i] *8*	(11^-)	E G	
3965.2? *10*		E	
3967.52 *12*	(2^+,3,4^+)	DE	J^{π}: γ's to 2^+ and 4^+.
3974.38 *12*	(3,4^+)	D	J^{π}: γ's to 2^+, 4^+ and 4^-.
3975.10 *20*		D	J^{π}: γ to 2^+.
4010.08 *20*		D	J^{π}: γ to 2^+.
4027.74 *11*	(2^+,3,4^+)	D	J^{π}: γ's to 2^+ and 4^+.
4061.49[d] *10*	(11^-)	EFG	
4090.15 *20*		D K	XREF: K(4083). J^{π}: γ to 4^+.
4107.8 *3*	(10^+)	E	
4229.2 *6*		G	
4311.56 *23*	(11^+)	E	
4361.77[@] *11*	(12^+)	E G	J^{π}: ΔJ=2 γ to 10^+.
4365.14[f] *14*	(11^-)	G	
4440.34[j] *9*	(12^-)	G	
4547.24 *12*	(12^+)	E G	J^{π}: ΔJ=2 γ to (10^+).
4556.34[e] *10*	(12^-)	G	
4564.54[b] *12*	(12^+)	G	
4689.23 *14*	(12^+)	G	
4704.33 *14*	(12^+)	G	
4711.21[i] *11*	(13^-)	E G	
4805.27[#] *12*	(14^+)	E G	
4811.18[c] *11*	(11^+)	G	
4819.94[d] *10*	(13^-)	FG	
4863.26 *24*	(11^-)	E	
4882.25 *23*	(13^+)	E	
4984.48[a] *14*	(13^+)	G	
4996.52[c] *9*	(12^+)	G	
5032.99 *13*	(12^-)	E G	J^{π}: ΔJ=1 γ to (11^-).
5085.08 *12*		E G	
5104.16 *14*	(13^-)	G	
5200.42[c] *11*	(13^+)	G	
5248.59 *24*	(13^-)	E	

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Adopted Levels, Gammas (continued)

^{132}Ba Levels (continued)

E(level)†	Jπ‡	XREF	E(level)†	Jπ‡	XREF	E(level)†	Jπ‡	XREF
5282.35^{d} *14*	(15^-)	E G	5835.90$^{\#}$ *14*	(16^+)	E G	6414.09^{h} *14*	(17^-)	G
5306.7 *3*	(14^+)	E	5870.34 *14*	(15^-)	G	6484.54^{i} *14*	(17^-)	E G
5320.79^{e} *11*	(14^-)	G	5871.97 *16*	(15^+)	G	6664.8^{c} *6*	(17^+)	G
5335.98^{j} *11*	(14^-)	G	5890.60^{h} *12*	(15^-)	G	6690.99$^{\#}$ *16*	18^+	G
5375.68 *15*	(14^+)	G	5963.5 *11*	(15^-)	E	6820.99^{h} *17*	18^-	G
5436.28^{c} *12*	(14^+)	G	5990.65^{e} *18*	(16^-)	G	6954.70 *17*	(18^+)	E G
5475.76 *12*	(14^+)	G	6106.39^{h} *13*	(16^-)	G	7143.8^{c} *8*	(18^+)	G
5539.65^{a} *14*	(15^+)	E G	6133.57 *16*	(15)	G	7238.4^{d} *3*	(19^-)	E G
5556.5 *4*	(14^-)	E	6195.82^{c} *17*	(16^+)	G	7287.0^{h} *4*	(19^-)	G
5573.88^{i} *13*	(15^-)	E G	6267.68 *18*	(16^+)	G	7396.79^{a} *18*	(19^+)	G
5630.4^{b} *4*	(14^+)	G	6274.28^{j} *15*	(16^-)	G	7623.70$^{\#}$ *19*	(20^+)	G
5720.64^{h} *11*	(14^-)	G	6294.36^{d} *25*	(17^-)	E G	7751.0^{h} *6*	(20^-)	G
5771.22^{c} *13*	(15^+)	G	6374.08^{a} *15*	(17^+)	E G	8310.4^{d} *6*	(21^-)	G

† From least-squares fit to Eγ′s, assuming Δ(Eγ)=0.2 keV when not stated and when quoted to nearest tenth of a keV.
‡ For high-spin (J>7) states, the assignments are essentially from (^{13}C,5nγ) (1995Ju09) based on authors′ $\gamma\gamma(\theta)$(DCO) data and band associations. The parentheses have been added by the evaluators since strong arguments are generally lacking for levels of spin higher than ≈8.
\# Band(A): yrast band.
@ Band(B): γ band, α=0.
& Band(b): γ band, α=1.
^{a} Band(C): band based on 13^+.
^{b} Band(D): band based on 10^+.
^{c} Band(E): ΔJ=1 band based on 11^+. Possibly a dipole magnetic-rotational structure.
^{d} Band(F): band based on 5^-.
^{e} Band(G): band based on 6^-.
^{f} Band(H): band based on 5^-.
^{g} Band(h): Band based on 4^-.
^{h} Band(I): ΔJ=1 band based on 14^-. Possibly a dipole magnetic-rotational structure.
^{i} Band(J): band based on 7^-.
^{j} Band(K): band based on 8^-.

Adopted Levels, Gammas (continued)

$\gamma(^{132}Ba)$

E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f	Mult.‡	δ‡	α#	Comments
464.508	2^+	464.52 *3*	100	0.0	0^+	E2		0.0121	B(E2)(W.u.)=43 *4* α(K)=0.0101 *3*; α(L)=0.00156 *5*; α(M)=0.00032 *1*
1031.672	2^+	567.16 *1*	100	464.508	2^+	M1+E2	+14 *+3−2*	0.00710 *1*	α(K)=0.00595 *1*; α(L)=0.00087 B(M1)(W.u.)=0.0010 *10*; B(E2)(W.u.)=144 *14* Mult.,δ: from $\gamma\gamma(\theta)$ in ^{132}La ε decay (2002Ga01). Other: +8.5 *+49−22* ($\gamma(\theta)$ in (p,2nγ)).
		1031.66 *1*	52 *2*	0.0	0^+	E2		0.00170	α(K)=0.00145 *5*; α(L)=0.00019 *1* B(E2)(W.u.)=3.9 *4*
1127.615	4^+	663.11 *2*	100	464.508	2^+	E2		0.00474	α(K)=0.00400 *12*; α(L)=0.00056 *2*
1503.63	0^+	472.05 *6*	100	1031.672	2^+				
		1039.0	10	464.508	2^+				
		1503		0.0	0^+	E0			
1511.088	3^+	383.28 *11*	6 *2*	1127.615	4^+	(M1+E2)	+6 *1*	0.0236	α(K)=0.0200 *24*; α(L)=0.00289 *1*; α(M)=0.00060 *1*; α(N+..)=0.00016
		479.47 *3*	61 *2*	1031.672	2^+	M1+E2	+4.0 *12*	0.0113	α(K)=0.0095 *2*; α(L)=0.00143 *1*; α(M)=0.00030
		1046.56 *3*	100	464.508	2^+	M1+E2	+2.19 *8*	0.00174 *11*	α(K)=0.00149 *10*; α(L)=0.00019 *1*
1660.30	0^+	628.56 *6*	34 *3*	1031.672	2^+				
		1195.82 *4*	100 *7*	464.508	2^+				
1685.753	2^+	654.03 *4*	12 *1*	1031.672	2^+	(M1+E2)	+0.28 *8*	0.00679 *9*	α(K)=0.00581 *8*; α(L)=0.00074 *1*
		1221.23 *3*	100	464.508	2^+	M1+E2	−0.25 *2*	0.00159	α(K)=0.00136; α(L)=0.00017
		1685.5 *2*	1.7 *3*	0.0	0^+				
1729.343	4^+	218.2	0.15 *3*	1511.088	3^+				
		601.75 *3*	41 *2*	1127.615	4^+	(M1+E2)	−2.6 *2*	0.00638 *5*	α(K)=0.00538 *5*; α(L)=0.00076
		697.68 *3*	100	1031.672	2^+	E2		0.00418	α(K)=0.00353 *11*; α(L)=0.00049 *2*
		1264.77 *4*	34 *1*	464.508	2^+	E2		0.00112	α(K)=0.00095 *3*; α(L)=0.00012
1931.91	6^+	804.5 *2*	100	1127.615	4^+	Q			
1944.29	(4^+)	816.6	100	1127.615	4^+	(M1(+E2))	+0.03 *6*		
		912.50 *14*	7 *1*	1031.672	2^+				
		1479.7	4 *1*	464.508	2^+				
1998.179	2^+	312.4	1.8 *5*	1685.753	2^+				
		487.1	0.8 *3*	1511.088	3^+				
		494.4	1.0 *5*	1503.63	0^+				
		966.45 *3*	28 *5*	1031.672	2^+	(M1+E2)	+0.11 *6*	0.00275 *1*	α(K)=0.00235 *1*; α(L)=0.00030
		1533.66 *4*	100	464.508	2^+	(M1(+E2))	+0.02 *2*	0.00083	α(K)=0.00083 *3*
		1998.38 *6*	31 *2*	0.0	0^+				E_γ: level-energy difference=1998.16.
2026.943	4^-	82.6	0.06 *2*	1944.29	(4^+)				
		297.6 *5*	33 *2*	1729.343	4^+				
		515.78 *9*	95 *5*	1511.088	3^+	E1		0.00306	α(K)=0.00262 *8*; α(L)=0.00033 *1*
		899.32 *3*	100	1127.615	4^+	(E1(+M2))	−0.02 *3*	0.00094	α(K)=0.00081 *3*; α(L)=9.9×10^{-5} *3*
		1562.3 *1*	0.6 *3*	464.508	2^+				
2046.23	(2^+)	1581.75 *4*	100	464.508	2^+	(M1(+E2))	−0.02 *2*		

$^{132}_{56}Ba_{76}$-6

γ(^{132}Ba) (continued)

E$_i$(level)	J$^\pi_i$	E$_\gamma$†	I$_\gamma$†	E$_f$	J$^\pi_f$	Mult.‡	δ‡	α#	Comments
2046.48	(4$^+$)	102.3	2.3 4	1944.29	(4$^+$)				
		317.1	81 8	1729.343	4$^+$				
		360.66 12	5.7 8	1685.753	2$^+$				
		386.0	0.50 8	1660.30	0$^+$				
		535.5	73 8	1511.088	3$^+$				
		918.8	100 12	1127.615	4$^+$				
		1014.7	23 8	1031.672	2$^+$				Additional information 1.
		1581.9	12.7 15	464.508	2$^+$				Additional information 2.
2068.553	3$^-$	382.8	3.0 2	1685.753	2$^+$				
		940.87 5	7.3 3	1127.615	4$^+$	(E1(+M2))	−0.03 4		
		1036.9 9	8.6 3	1031.672	2$^+$	(E1(+M2))	−0.04 16		
		1604.03 3	100	464.508	2$^+$	(E1(+M2))	+0.02 2		
		2068.6	0.15 7	0.0	0$^+$				Additional information 3.
2119.59	5$^-$	73.1	0.3 1	2046.48	(4$^+$)				
		92.7	0.6	2026.943	4$^-$				
		175.3 1	3.3 2	1944.29	(4$^+$)	(E1(+M2))	+0.01 3		B(E1)(W.u.)=2.2×10^{-6} 14
		187.7 1	5.3 3	1931.91	6$^+$	(E1(+M2))	+0.01 2	0.0399	α(K)= 0.0343; α(L)=0.00447; α(M)=0.00091; α(N+..)=0.00024 B(E1)(W.u.)=2.9×10^{-6} 12
		390.3 1	100	1729.343	4$^+$	(E1)		0.00588	α(K)=0.00507 16; α(L)=0.00064 2; α(M)=0.00013 B(E1)(W.u.)=6.1×10^{-6} +16−31
		992.1 1	68 1	1127.615	4$^+$	(E1+M2)	+0.03 1	0.004 3	α(K)=0.0031 24; α(L)=0.0004 4
		1087.9	0.06 3	1031.672	2$^+$	[E3]			B(E3)(W.u.)=0.5 +3−4
		1655.0	0.8 2	464.508	2$^+$	[E3]			B(E3)(W.u.)=0.39 +14−22
2220.07	(3$^-$)	275.9	5 1	1944.29	(4$^+$)				
		534.4	7 1	1685.753	2$^+$				
		709.1	16 1	1511.088	3$^+$				
		1092.56 10	26 3	1127.615	4$^+$				
		1188.35 5	100	1031.672	2$^+$	(E1(+M2))	−0.11 8		
		1755.5	23 5	464.508	2$^+$				
2225.82	(5$^+$)	496.4	7.3 8	1729.343	4$^+$				
		714.7	100	1511.088	3$^+$				
		1098.1	22 1	1127.615	4$^+$				
2240.69	6$^{(+)}$	308.6	5 1	1931.91	6$^+$	(M1(+E2))	−0.2 +3−4	0.0454	α(K)=0.0389 12; α(L)=0.00514 16; α(M)=0.00105 4; α(N+..)=0.00029 1
		511.3 1	78 3	1729.343	4$^+$				
		1113.2 2	100	1127.615	4$^+$				
2287.98	(2$^+$,3,4$^+$)	602.2	23 6	1685.753	2$^+$				
		776.9	28 7	1511.088	3$^+$				
		1160.08 18	43 20	1127.615	4$^+$				
		1256.38 11	52 10	1031.672	2$^+$				

γ(^{132}Ba) (continued)

E_i(level)	J_i^π	E_γ†	I_γ†	E_f	J_f^π	Mult.‡	δ‡	α#	Comments
2287.98	(2+,3,4+)	1823.5	100	464.508	2+				
2312.49	5(−)	192.8	2.8 *5*	2119.59	5−				
		265.9	1.3 *2*	2046.48	(4+)				
		285.6 *1*	100	2026.943	4−	D			
		368.2	0.7 *1*	1944.29	(4+)				
		380.4	0.04 *1*	1931.91	6+				
		583.1	8.3 *2*	1729.343	4+				
		801.5	0.13 *2*	1511.088	3+				
2357.62	(6−)	45.1 *1*		2312.49	5(−)				
		131.7	1.8 *4*	2225.82	(5+)				
		238.1 *1*	100	2119.59	5−	(M1+E2)	≈−0.2	0.091	α(K)=0.0777; α(L)= 0.0104; α(M)= 0.00214; α(N+..)= 0.00058
		330.7 *1*	14 *2*	2026.943	4−				
2374.422	3−	154.3	0.03 *1*	2220.07	(3−)				
		305.8	7.0 *1*	2068.553	3−	(M1+E2)		0.0456	α(K)=0.0387 *17*; α(L)=0.0055 *4*; α(M)=0.00113 *8*; α(N+..)=0.00031 *2* δ: −0.04 to −1.13.
		376.0	0.13 *3*	1998.179	2+				
		430.13 *6*	2.3 *1*	1944.29	(4+)				
		645.05 *4*	3.5 *3*	1729.343	4+	(E1(+M2))	+0.06 *5*	0.00192 *16*	α(K)=0.00165 *14*; α(L)=0.00021 *2*
		688.66 *3*	3.0 *1*	1685.753	2+				
		1246.81 *3*	4.1 *1*	1127.615	4+				
		1342.81 *7*	4.1 *2*	1031.672	2+	(E1(+M2))	+0.15 *14*	0.00050 *14*	α(K)=0.00043 *12*
		1909.91 *4*	100	464.508	2+	E1(+M2)	−0.02 *1*		
2422.73	6(−)	196.9	1.0	2225.82	(5+)				
		303.2 *1*	100	2119.59	5−	D+Q			
		395.7 *1*	71 *4*	2026.943	4−	Q			
2438.93	(2+ to 6+)	709.5	10	1729.343	4+				
		1311.3	100	1127.615	4+				
2452.87	(1−)	767.4	3 *1*	1685.753	2+				
		792.8	4 *1*	1660.30	0+				
		949.1	10 *1*	1503.63	0+				
		2452.74 *6*	100	0.0	0+	(E1)			
2483.06	(7−)	125.5 *1*	20 *2*	2357.62	(6−)	D+Q	≈−0.2		
		242.4 *1*	29 *2*	2240.69	6(+)	D			I_γ: value of 50 *5* from ^{132}La ε decay not used in averaging.
		363.5 *2*	100.0 *13*	2119.59	5−	E2		0.0249	α(K)=0.0206 *7*; α(L)=0.00344 *11*; α(M)=0.00072 *2*; α(N+..)=0.00019 *1*
		551.3 *1*	7 *2*	1931.91	6+				
2492.35	(4+)	179.9	18 *2*	2312.49	5(−)				
		548.0	8 *1*	1944.29	(4+)				

From ENSDF

$^{132}_{56}$Ba$_{76}$-8

$\gamma(^{132}$Ba) (continued)

E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f	Mult.‡	δ‡	α#	Comments
2492.35	(4$^+$)	1364.6	100	1127.615	4$^+$	(M1+E2)	+0.40 5	0.00122 1	α(K)=0.00104 1; α(L)=0.00013
2505.34	(2)	819.7	3.9	1685.753	2$^+$				
		2040.79 5	100	464.508	2$^+$	D+Q	−0.11 3		
2567.331	(3)$^-$	192.9 2	15 2	2374.422	3$^-$	M1,E2		0.178 19	α(K)=0.144 8; α(L)=0.027 9; α(M)=0.0056 19; α(N+..)=0.0015 5
		254.8	0.5 2	2312.49	5$^{(-)}$				
		279.3	1.0 2	2287.98	(2$^+$,3,4$^+$)				
		347.1	0.8 2	2220.07	(3$^-$)				
		498.79 3	6.9 6	2068.553	3$^-$	M1+E2		0.0117 18	α(K)=0.0099 16; α(L)=0.00137 11; α(M)=0.00028 2 δ: −0.08 to −1.03.
		520.7	0.4 1	2046.48	(4$^+$)				
		540.363 23	100	2026.943	4$^-$	M1,E2		0.0096 15	α(K)=0.0081 14; α(L)=0.00110 11
		569.1	10 2	1998.179	2$^+$	(E1+M2)	−0.06 4	0.00254 18	α(K)=0.00218 15; α(L)=0.00027 2
		623.03 3	3.4 3	1944.29	(4$^+$)	(E1+M2)	+0.06 3	0.00208 10	α(K)=0.00178 8; α(L)=0.00022 1
		837.9	1.1 4	1729.343	4$^+$				
		881.57 3	12.2 8	1685.753	2$^+$	E1		0.00098	α(K)=0.00084 3; α(L)=0.00010
		1439.80 5	3.2 3	1127.615	4$^+$				
		2102.84 5	73 5	464.508	2$^+$	(E1+M2)	−0.02 1		
2609.60	(5$^-$)	117.2	1.1 3	2492.35	(4$^+$)				
		126.6	3.6 4	2483.06	(7$^-$)				
		252.0	24 2	2357.62	(6$^-$)				
		297.1	96 3	2312.49	5$^{(-)}$				
		383.7	3 1	2225.82	(5$^+$)				
		490.0	100	2119.59	5$^-$				
2693.27	(4,5$^-$)	318.8		2374.422	3$^-$				
		573.7		2119.59	5$^-$				
2718.17	7$^{(-)}$	295.3 2	35 13	2422.73	6$^{(-)}$				
		360.5 1	15.9 10	2357.62	(6$^-$)				
		598.6 1	100 5	2119.59	5$^-$	Q			
2772.40	(4$^-$,6$^-$)	349.7		2422.73	6$^{(-)}$				
		652.8		2119.59	5$^-$				
2791.50	(5$^-$)	98.2		2693.27	(4,5$^-$)				
		368.8		2422.73	6$^{(-)}$				
		671.8		2119.59	5$^-$				
		764.4		2026.943	4$^-$				
		1664.1		1127.615	4$^+$				
2800.15	8$^+$	559.5 1	5.4 3	2240.69	6$^{(+)}$				
		868.3 1	100 2	1931.91	6$^+$	Q			
2855.84	(2)$^-$	350.4	≤2	2505.34	(2)				
		403.1	7 2	2452.87	(1$^-$)				
		787.4 3	3 1	2068.553	3$^-$				

$^{132}_{56}$Ba$_{76}$-9

Adopted Levels, Gammas (continued)

$\gamma(^{132}Ba)$ (continued)

E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f	Mult.‡	δ‡	Comments
2855.84	$(2)^-$	1169.83 *19*	6.3 *12*	1685.753	2^+			
		1824.1	60 *4*	1031.672	2^+			
		2391.35 *6*	100	464.508	2^+	E1		
2867.02	(8^+)	626.2 *1*	19 *3*	2240.69	$6^{(+)}$			
		935.1 *1*	100 *5*	1931.91	6^+			
2876.47	(1^+)	423.6	13 *3*	2452.87	(1^-)			
		1190.6	≤10	1685.753	2^+			
		1372.7	13 *3*	1503.63	0^+			
		1844.83 *9*	27 *4*	1031.672	2^+	D(+Q)	+0.02 *13*	
		2411.92 *7*	100	464.508	2^+	D+Q	−0.05 *2*	
		2877.0	10 *3*	0.0	0^+			
2900.57	(8^-)	417.5 *1*	100 *5*	2483.06	(7^-)	D+Q		
		477.8 *1*	28 *3*	2422.73	$6^{(-)}$			
		542.8 *1*	7.5 *12*	2357.62	(6^-)			
2901.69	(7^-)	969.7 *1*	100	1931.91	6^+			
2927.846	(3^-)	360.4	<74	2567.331	$(3)^-$			
		474.65 *13*	34 *6*	2452.87	(1^-)			
		553.43 *4*	77 *6*	2374.422	3^-			
		808.2	41 *4*	2119.59	5^-			
		859.31 *4*	100 *9*	2068.553	3^-	(M1+E2)		δ: +0.3 to −1.84.
		929.68 *5*	74 *6*	1998.179	2^+			
		1198.67 *10*	43 *6*	1729.343	4^+			
		1242.06 *5*	76 *5*	1685.753	2^+			
		1416.92 *15*	19 *4*	1511.088	3^+			
		1800.34 *7*	100 *8*	1127.615	4^+			
		2463.22@ *5*	<330	464.508	2^+	(E1)		
2934.92	(7^+)	709.1 *1*	100	2225.82	(5^+)			
2946.33	(5^-)	453.9		2492.35	(4^+)			
		523.7		2422.73	$6^{(-)}$			
		588.7		2357.62	(6^-)			
2961.02	(8^-)	603.4 *1*	100	2357.62	(6^-)			
2980.97	$(1,2^+)$	542.0		2438.93	$(2^+$ to $6^+)$			
		1295.3		1685.753	2^+			
		1477.3		1503.63	0^+			
2981.73		2517.2	100	464.508	2^+			
3018.59	(6^-)	246.2		2772.40	$(4^-,6^-)$			
		408.9		2609.60	(5^-)			
		535.6		2483.06	(7^-)			
3021.35	$(1,2^+,3)$	1335.5		1685.753	2^+			
		2556.9		464.508	2^+			
3068.79	$(1^+,2^+,3,4^+)$	848.7		2220.07	(3^-)			

From ENSDF

$^{132}_{56}Ba_{76}$-10

$\gamma(^{132}$Ba) (continued)

E_i(level)	J_i^π	E_γ†	I_γ†	E_f	J_f^π	Mult.‡	α#	Comments
3068.79	(1+,2+,3,4+)	1382.9		1685.753	2+			
		2604.4		464.508	2+			
3082.94		2618.4		464.508	2+			
3094.69	(8−)	376.5 *1*	80 *8*	2718.17	7(−)	D+Q		I_γ: other: 145 *22* in ^{122}Sn(^{13}C,3nγ).
		672.0 *1*	100 *7*	2422.73	6(−)	Q		
		737.2 *1*	50 *6*	2357.62	(6−)			
3104.86	(8−)	386.6 *1*	47 *4*	2718.17	7(−)			
		621.8 *1*	87 *7*	2483.06	(7−)			
		682.1 *1*	100 *13*	2422.73	6(−)			
		747.3 *1*	67 *7*	2357.62	(6−)			
3116.14	10+	249.1 *1*	4.5 *3*	2867.02	(8+)	E2	0.0830	α(K)=0.0663 *20*; α(L)=0.0132 *4*; α(M)=0.00278 *9*; α(N+..)=0.00073 *2* B(E2)(W.u.)=0.073 *7*
		316.0 *1*	100.0 *10*	2800.15	8+	E2	0.0385	α(K)=0.0315 *10*; α(L)=0.00558 *17*; α(M)=0.00117 *4*; α(N+..)=0.00031 *1* B(E2)(W.u.)=0.462 *10*
3122.21	(8+)	1190.3 *1*	100	1931.91	6+			
3158.01	(1)−	1472.5		1685.753	2+			
		1498.0		1660.30	0+			
		2693.36 *7*	100 *8*	464.508	2+	E1		
		3158.28 *19*	23 *3*	0.0	0+			
3188.31	(9−)	287.7 *1*	10 *2*	2900.57	(8−)			
		705.2 *2*	100 *4*	2483.06	(7−)	Q		
3196.44		2731.9		464.508	2+			
3217.10		1272.8		1944.29	(4+)			
3219.28	(2+)	342.7		2876.47	(1+)			
		766.3		2452.87	(1−)			
		1150.7		2068.553	3−			
		1173.12 *8*	7.5 *9*	2046.23	(2+)			
		1533.7		1685.753	2+			I_γ: expected to Be small from ^{132}La ε decay work of 1996Ku01.
		2187.55 *10*	9.5 *14*	1031.672	2+			
		2754.73 *5*	100 *6*	464.508	2+			
3229.44	(6+)	437.9		2791.50	(5−)			
		737.0		2492.35	(4+)			
		746.5		2483.06	(7−)			
3327.06	(4,5−)	834.6		2492.35	(4+)			
		888.0		2438.93	(2+ to 6+)			
		1207.7		2119.59	5−			
3336.32	(3−,5−)	1289.8		2046.48	(4+)			
		1309.4		2026.943	4−			
3340.17	(9−)	151.9 *1*	17 *3*	3188.31	(9−)			

$^{132}_{56}$Ba$_{76}$-11

$\gamma(^{132}Ba)$ (continued)

E_i(level)	J_i^π	E_γ†	I_γ†	E_f	J_f^π	Mult.‡	δ‡	Comments
3340.17	(9^-)	235.2 1	56 9	3104.86	(8^-)			
		245.5 1	26 2	3094.69	(8^-)			
		438.4 1	65 9	2901.69	(7^-)			
		540.0 1	94 5	2800.15	8^+	D		
		622.1 1	100 9	2718.17	$7^{(-)}$			
		857.3 1	76 5	2483.06	(7^-)	(Q)		
3356.27	(9^-)	455.5 1	100	2900.57	(8^-)			
3363.55	$(1,2^+)$	1859.9		1503.63	0^+			
		3363.58& 14		0.0	0^+			
3381.45		1695.5		1685.753	2^+			
		2917.1		464.508	2^+			
3423.85	$(3)^-$	856.41 8	10.5 16	2567.331	$(3)^-$			
		918.3		2505.34	(2)			
		931.7		2492.35	(4^+)			
		1355.04 10	9.5 13	2068.553	3^-			
		1396.99 6	19.4 16	2026.943	4^-			
		1737.99 16	7.6 15	1685.753	2^+			
		2296.18 10	13.5 14	1127.615	4^+			
		2959.49 9	100 7	464.508	2^+	E1(+M2)	−0.02 3	
3434.36		995.5		2438.93	$(2^+$ to $6^+)$			
		1365.8		2068.553	3^-			
		1436.1		1998.179	2^+			
3461.06	$(1,2^+)$	1775.2		1685.753	2^+			
		1957.5		1503.63	0^+			
		3461.5& 5		0.0	0^+			
3482.23	(9^-)	387.6 1	22 3	3094.69	(8^-)			
		764.0 1	100 13	2718.17	$7^{(-)}$			
3494.95	$(3,4^+)$	1467.93 24	21 7	2026.943	4^-			
		1809.4		1685.753	2^+			
		1984.0 3	17 5	1511.088	3^+			
		2367.08 7	100 7	1127.615	4^+			E_γ: level-energy difference=2367.34.
		2463.22@& 5	<400	1031.672	2^+			
		3030.81 10	71 6	464.508	2^+			E_γ: level-energy difference=3030.40.
3505.21	(9^+)	383.0 1	100	3122.21	(8^+)			
3526.65		3062.1		464.508	2^+			
		3527.8& 5		0.0	0^+			
3545.55	(9)	745.4 1	100	2800.15	8^+			
3561.74		685.3		2876.47	(1^+)			
		994.40 6		2567.331	$(3)^-$			
		1187.4		2374.422	3^-			

$\gamma(^{132}Ba)$ (continued)

E_i(level)	J^π_i	E_γ †	I_γ †	E_f	J^π_f	Mult. ‡	δ ‡	Comments
3562.41	(1,2+)	1109.2		2452.87	(1−)			
		1188.35& 5	120 10	2374.422	3−			
		1493.7		2068.553	3−			
		1516.6 3	16 6	2046.23	(2+)			
		1564.3		1998.179	2+			
		1876.67 9	100 10	1685.753	2+			
		2058.9 3	11 4	1503.63	0+			
3563.03	(1,2+)	1902.9		1660.30	0+			
		3098.45 6	100 6	464.508	2+			
		3563.12 23	7.2 9	0.0	0+			
3591.27		1138.5		2452.87	(1−)			
		1522.6		2068.553	3−			
3598.69	(10+)	731.7 1	26 3	2867.02	(8+)	(Q)		
		798.6 1	100 9	2800.15	8+	(Q)		
3607.46	(1,2+)	731.0		2876.47	(1+)			
		1102.0		2505.34	(2)			
		1921.7		1685.753	2+			
		1947.1		1660.30	0+			
		2103.8		1503.63	0+			
		2575.9		1031.672	2+			
3608.15		3143.6		464.508	2+			
		3608.02& 17		0.0	0+			
3617.35		3152.8		464.508	2+			
3635.17	1−	1949.5		1685.753	2+			
		1974.5		1660.30	0+			
		2131.2		1503.63	0+			
		3170.63 9	82 7	464.508	2+	E1(+M2)	−0.01 4	
		3635.60 19	100 9	0.0	0+	E1		
3659.20	(10−)	470.8 1	18.8 13	3188.31	(9−)			
		758.7 1	100 6	2900.57	(8−)			
3663.44	(1−,2−,3−)	1096.15 24	4.5 15	2567.331	(3)−			
		1210.7		2452.87	(1−)			
		1617.06 21	7.1 16	2046.23	(2+)			
		1977.31 19	11.6 12	1685.753	2+			
		2631.63 7	34.0 21	1031.672	2+			Mult.,δ: (M1+E2) with δ=−0.56 8 (for J=1) from $\gamma\gamma(\theta)$ data is in contradiction with E1 for 3199γ.
		3199.04 7	100 6	464.508	2+	E1		
		3665.5& 5	1.8 4	0.0	0+			
3672.16		1603.5		2068.553	3−			
		3207.7		464.508	2+			
3677.87	(10+)	810.9 1	100 12	2867.02	(8+)	Q		

$^{132}_{56}Ba_{76}$-13

$\gamma(^{132}Ba)$ (continued)

E_i(level)	J_i^π	E_γ†	I_γ†	E_f	J_f^π	Comments
3677.87	(10^+)	879& *1*	<59	2800.15	8^+	
3716.53		840.2		2876.47	(1^+)	
		1149.2		2567.331	$(3)^-$	
		1211.2		2505.34	(2)	
		1428.5		2287.98	$(2^+,3,4^+)$	
		1647.9		2068.553	3^-	
		2030.7		1685.753	2^+	
3717.48		2685.7		1031.672	2^+	
		3253.0		464.508	2^+	
		3718.7& *4*		0.0	0^+	
3721.31	(10^-)	381.1 *1*	32 *3*	3340.17	(9^-)	
		616.5 *1*	100 *5*	3104.86	(8^-)	
		626.7 *1*	63 *5*	3094.69	(8^-)	
3734.13	$(2^+,3,4^+)$	1665.4		2068.553	3^-	
		2048.4		1685.753	2^+	
		2606.6		1127.615	4^+	
3735.45		3270.9		464.508	2^+	
3753.42	$(2,3^-)$	877.1		2876.47	(1^+)	
		1300.6		2452.87	(1^-)	
		1684.6		2068.553	3^-	
		1755.2		1998.179	2^+	
		2242.4		1511.088	3^+	
3768.19	(2,3)	912.50 *14*	49 *9*	2855.84	$(2)^-$	
		1699.47 *10*	44 *9*	2068.553	3^-	
		2082.45 *9*	100 *11*	1685.753	2^+	
		2257.2	15 *7*	1511.088	3^+	
		3303.49& *16*		464.508	2^+	
3769.15		3304.6		464.508	2^+	
3773.31	$(1,2^+)$	2087.0		1685.753	2^+	
		2112.9		1660.30	0^+	
		2270.3		1503.63	0^+	E_γ: level-energy difference=2269.7.
3775.58	(2^+)	919.7		2855.84	$(2)^-$	
		1208.3	<152	2567.331	$(3)^-$	
		1487.6		2287.98	$(2^+,3,4^+)$	
		1555.59 *15*	52 *10*	2220.07	(3^-)	
		1706.47 *18*	58 *8*	2068.553	3^-	E_γ: level-energy difference=1707.0.
		2265.0	19 *5*	1511.088	3^+	
		2743.83 *10*	100 *9*	1031.672	2^+	
		3311.1		464.508	2^+	
		3775.6 *3*	32 *3*	0.0	0^+	
3787.75		3323.2		464.508	2^+	

$^{132}_{56}Ba_{76}$-14

$\gamma(^{132}Ba)$ (continued)

E_i(level)	J^{π}_i	E_{γ}†	I_{γ}†	E_f	J^{π}_f	Comments
3805.29	(10$^+$)	938.1 *1*	100 *13*	2867.02	(8$^+$)	
		1005.3 *1*	33 *7*	2800.15	8$^+$	
3820.18		1751.9		2068.553	3$^-$	
		1773.6		2046.48	(4$^+$)	
		2134.2		1685.753	2$^+$	
3821.05		3356.5		464.508	2$^+$	
3834.78	(1,2$^+$)	2148.7		1685.753	2$^+$	
		2174.5		1660.30	0$^+$	
		2331.4		1503.63	0$^+$	
3849.50		973.1		2876.47	(1$^+$)	
		1282.17 *7*	100 *10*	2567.331	(3)$^-$	
		1780.9		2068.553	3$^-$	
		2817.54 *20*	55 *8*	1031.672	2$^+$	
		3385.08 *18*	43 *5*	464.508	2$^+$	E_{γ}: level-energy difference=3385.2.
3863.44		1794.9		2068.553	3$^-$	
		2831.72 *16*		1031.672	2$^+$	
3878.75	(1,2$^+$)	2375.1		1503.63	0$^+$	
3887.30	(3,4$^+$)	1818.9		2068.553	3$^-$	
		1860.4		2026.943	4$^-$	
		1942.9		1944.29	(4$^+$)	
		2201.4		1685.753	2$^+$	
3903.17	(2$^+$,3,4$^+$)	1835.22 *21*	32 *7*	2068.553	3$^-$	
		2217.6		1685.753	2$^+$	
		2775.35 *20*	26 *5*	1127.615	4$^+$	
		2871.35 *9*	100 *7*	1031.672	2$^+$	
3906.08	(11$^+$)	789.9 *1*	100	3116.14	10$^+$	
3907.46		1838.9 *3*	21 *7*	2068.553	3$^-$	
		1861.6		2046.23	(2$^+$)	
		2875.67 *9*	100 *7*	1031.672	2$^+$	
3915.78	(12$^+$)	799.6 *1*	100	3116.14	10$^+$	
3917.91	(2$^+$,3,4$^+$)	2231.9		1685.753	2$^+$	
		2790.5		1127.615	4$^+$	
3943.27	(10$^+$)	1076.2 *1*	100 *10*	2867.02	(8$^+$)	
		1143.0 *1*	100 *14*	2800.15	8$^+$	
3943.30	(0$^+$ to 4$^+$)	2911.6		1031.672	2$^+$	
3950.18	(11$^-$)	229.0 *1*	7.0 *5*	3721.31	(10$^-$)	
		593.7 *1*	3.4 *6*	3356.27	(9$^-$)	
		610.2 *1*	100 *5*	3340.17	(9$^-$)	
3965.2?		843& *1*	100	3122.21	(8$^+$)	
3967.52	(2$^+$,3,4$^+$)	1400.39 *16*	95 *20*	2567.331	(3)$^-$	
		2281.35 *26*	53 *15*	1685.753	2$^+$	

$^{132}_{56}Ba_{76}$-15

$\gamma(^{132}$Ba) (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[‡]	Comments
3967.52	(2+,3,4+)	2839.77 20	100 24	1127.615	4+		
3974.38	(3,4+)	1947.3		2026.943	4−		
		2029.9	<74	1944.29	(4+)		
		2288.93 21	100 19	1685.753	2+		
3975.10		2943.4		1031.672	2+		
4010.08		2324.3		1685.753	2+		
4027.74	(2+,3,4+)	1959.4	34 11	2068.553	3−		
		2342.4	48 12	1685.753	2+		
		2899.67 16	100 15	1127.615	4+		E_γ: level-energy difference=2900.1.
4061.49	(11−)	402.1 1	6.6 10	3659.20	(10−)		
		873.1 2	100 5	3188.31	(9−)	Q	
4090.15		2962.5		1127.615	4+		
4107.8	(10+)	992[&] 1	100	3116.14	10+		
4229.2		724.0 5	100	3505.21	(9+)		
4311.56	(11+)	203.8 2	100	4107.8	(10+)		
4361.77	(12+)	683.8 1	55 7	3677.87	(10+)	Q	
		763.5 2	100 10	3598.69	(10+)	Q	
4365.14	(11−)	882.9 1	100	3482.23	(9−)		
4440.34	(12−)	490.2 1	20.7 21	3950.18	(11−)		
		719.0 1	100 7	3721.31	(10−)		
4547.24	(12+)	235.7 2	56 17	4311.56	(11+)		
		630.9[&] 1	35 5	3915.78	(12+)		
		948.6 1	100 12	3598.69	(10+)		
4556.34	(12−)	494.6 1	<9	4061.49	(11−)		
		897.3 1	100 9	3659.20	(10−)		
4564.54	(12+)	965.8 1	100	3598.69	(10+)		
4689.23	(12+)	783.1 1	100	3906.08	(11+)		
4704.33	(12+)	798.3 1	100	3906.08	(11+)		
4711.21	(13−)	761.1 1	100	3950.18	(11−)		
4805.27	(14+)	889.6 1	100	3915.78	(12+)		
4811.18	(11+)	1695.1 1	100	3116.14	10+		
4819.94	(13−)	758.4 1	100 6	4061.49	(11−)		
		904.0 1	10.5 8	3915.78	(12+)		
4863.26	(11−)	801[&] 1	100	4061.49	(11−)		
4882.25	(13+)	335.0 2	100	4547.24	(12+)		
4984.48	(13+)	1068.7 1	100	3915.78	(12+)		
4996.52	(12+)	185.4 1	89 11	4811.18	(11+)		
		1053.1 1	100 18	3943.27	(10+)		
		1080.7 1	44 11	3915.78	(12+)		
		1090.4 1	67 7	3906.08	(11+)		
		1318.8 1		3677.87	(10+)		

$^{132}_{56}$Ba$_{76}$-16

Adopted Levels, Gammas (continued)

γ(^{132}Ba) (continued)

E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f	Comments
5032.99	(12$^-$)	169.7 2	23 5	4863.26	(11$^-$)	
		971.7 2	100 5	4061.49	(11$^-$)	
5085.08		723.3 1	22 2	4361.77	(12$^+$)	
		1169.3 1	100 8	3915.78	(12$^+$)	
5104.16	(13$^-$)	547.0 5	37 13	4556.34	(12$^-$)	
		1042.7 1	100 13	4061.49	(11$^-$)	
5200.42	(13$^+$)	203.9 1	100	4996.52	(12$^+$)	
5248.59	(13$^-$)	215.6 2	100	5032.99	(12$^-$)	
5282.35	(15$^-$)	462.4 1	100	4819.94	(13$^-$)	
5306.7	(14$^+$)	424.5 2	100	4882.25	(13$^+$)	
5320.79	(14$^-$)	764.4 1	100 10	4556.34	(12$^-$)	
		880.5 1	51 6	4440.34	(12$^-$)	
5335.98	(14$^-$)	624.8 1	25 3	4711.21	(13$^-$)	
		895.6 1	100 7	4440.34	(12$^-$)	
5375.68	(14$^+$)	671.4 1	100 15	4704.33	(12$^+$)	
		686.4 1	54 15	4689.23	(12$^+$)	
5436.28	(14$^+$)	235.9 1	100 9	5200.42	(13$^+$)	
		871.7 1	35 9	4564.54	(12$^+$)	
		889.1 1	57 13	4547.24	(12$^+$)	
5475.76	(14$^+$)	275.3 1	100 10	5200.42	(13$^+$)	
		911.2 1	33 8	4564.54	(12$^+$)	
		928.5 1	63 13	4547.24	(12$^+$)	
5539.65	(15$^+$)	455.0 5	23.5 21	5085.08		I_γ: other: 112 12 in ^{122}Sn(^{13}C,3nγ).
		734.6 1	100 7	4805.27	(14$^+$)	
5556.5	(14$^-$)	307.9 2	100	5248.59	(13$^-$)	
5573.88	(15$^-$)	862.7 1	100	4711.21	(13$^-$)	
5630.4	(14$^+$)	1066.0 5	100 18	4564.54	(12$^+$)	
		1083.0 5	79 21	4547.24	(12$^+$)	
5720.64	(14$^-$)	900.5 1	68 7	4819.94	(13$^-$)	
		915.5 1	100 14	4805.27	(14$^+$)	
5771.22	(15$^+$)	295.4 1	39 3	5475.76	(14$^+$)	
		335.0 1	100 9	5436.28	(14$^+$)	
5835.90	(16$^+$)	296.0 1	10 3	5539.65	(15$^+$)	
		1030.4 1	100 8	4805.27	(14$^+$)	
5870.34	(15$^-$)	837.4 1	100	5032.99	(12$^-$)	
5871.97	(15$^+$)	1066.7 1	100	4805.27	(14$^+$)	
5890.60	(15$^-$)	169.9 1	100 7	5720.64	(14$^-$)	
		608.0 5	11 4	5282.35	(15$^-$)	
		857.6 1	59 4	5032.99	(12$^-$)	
5963.5	(15$^-$)	407 1	100	5556.5	(14$^-$)	
5990.65	(16$^-$)	708.3 1	100	5282.35	(15$^-$)	
6106.39	(16$^-$)	215.7 1	100 6	5890.60	(15$^-$)	

$^{132}_{56}$Ba$_{76}$-17

$\gamma(^{132}Ba)$ (continued)

E_i(level)	J^{π}_i	E_{γ}[†]	I_{γ}[†]	E_f	J^{π}_f	Comments
6106.39	(16⁻)	236.1 *1*	14 *4*	5870.34	(15⁻)	
6133.57	(15)	1328.3 *1*	100	4805.27	(14⁺)	
6195.82	(16⁺)	424.6 *1*	100	5771.22	(15⁺)	
6267.68	(16⁺)	892.0 *1*	100	5375.68	(14⁺)	
6274.28	(16⁻)	938.3 *1*	100	5335.98	(14⁻)	
6294.36	(17⁻)	1012.0 *2*	100	5282.35	(15⁻)	
6374.08	(17⁺)	537.8 *1*	100 *7*	5835.90	(16⁺)	E_{γ}: level-energy difference=538.2.
		834.9 *1*	60 *5*	5539.65	(15⁺)	E_{γ}: level-energy difference=834.4.
6414.09	(17⁻)	307.7 *1*	100 *6*	6106.39	(16⁻)	
		840.2 *1*	29 *6*	5573.88	(15⁻)	
6484.54	(17⁻)	378.1 *1*	47 *4*	6106.39	(16⁻)	
		910.7 *1*	100 *6*	5573.88	(15⁻)	
6664.8	(17⁺)	469.0 *5*	100	6195.82	(16⁺)	
6690.99	18⁺	317.0 *1*	50 *10*	6374.08	(17⁺)	
		855.0 *1*	100 *20*	5835.90	(16⁺)	
6820.99	18⁻	406.9 *1*	100	6414.09	(17⁻)	
6954.70	(18⁺)	1118.8 *1*	100	5835.90	(16⁺)	
7143.8	(18⁺)	479.0 *5*	100	6664.8	(17⁺)	
7238.4	(19⁻)	944.0 *1*	100	6294.36	(17⁻)	
7287.0	(19⁻)	466.0 *5*		6820.99	18⁻	
		873.0[&] *5*		6414.09	(17⁻)	
7396.79	(19⁺)	1022.7 *1*	100	6374.08	(17⁺)	
7623.70	(20⁺)	932.7 *1*	100	6690.99	18⁺	
7751.0	(20⁻)	930.0[&] *5*		6820.99	18⁻	
8310.4	(21⁻)	1072.0 *5*		7238.4	(19⁻)	

[†] For levels below 2500, most values are from ^{132}La ε decay; above this energy separate levels are populated in ε decay and in in-beam γ-ray studies. Most extensive in-beam γ-ray data are from (^{13}C,3nγ) (1989Pa17) and (^{13}C,5nγ) (1995Ju09). In ^{132}La ε decay, averaged values from 1996Ku01 and 1975WiZJ were adopted, assuming 0.2 keV uncertainty for $E\gamma'$s from 1996Ku01. Intensities are relative photon branchings from each level.

[‡] Mainly from ce and $\gamma\gamma(\theta)$ in ^{132}La ε decay; mult=D or D+Q are from $\gamma\gamma(\theta)$ and $\gamma(\theta)$ data in in-beam γ-ray studies.

[#] Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.

[@] Multiply placed.

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

$^{132}_{56}Ba_{76}$-18

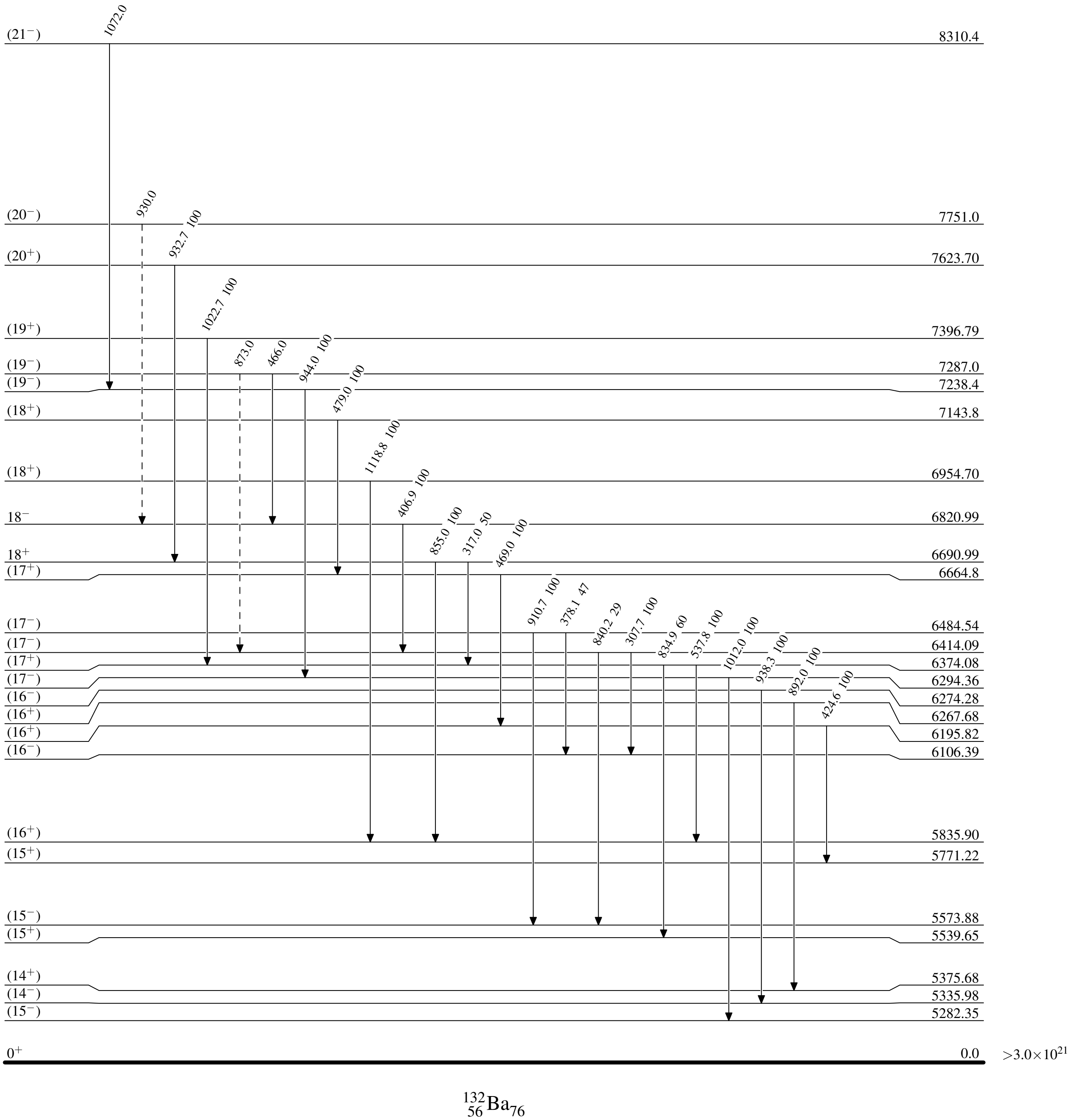
Adopted Levels, Gammas

Legend

Level Scheme

Intensities: Relative photon branching from each level

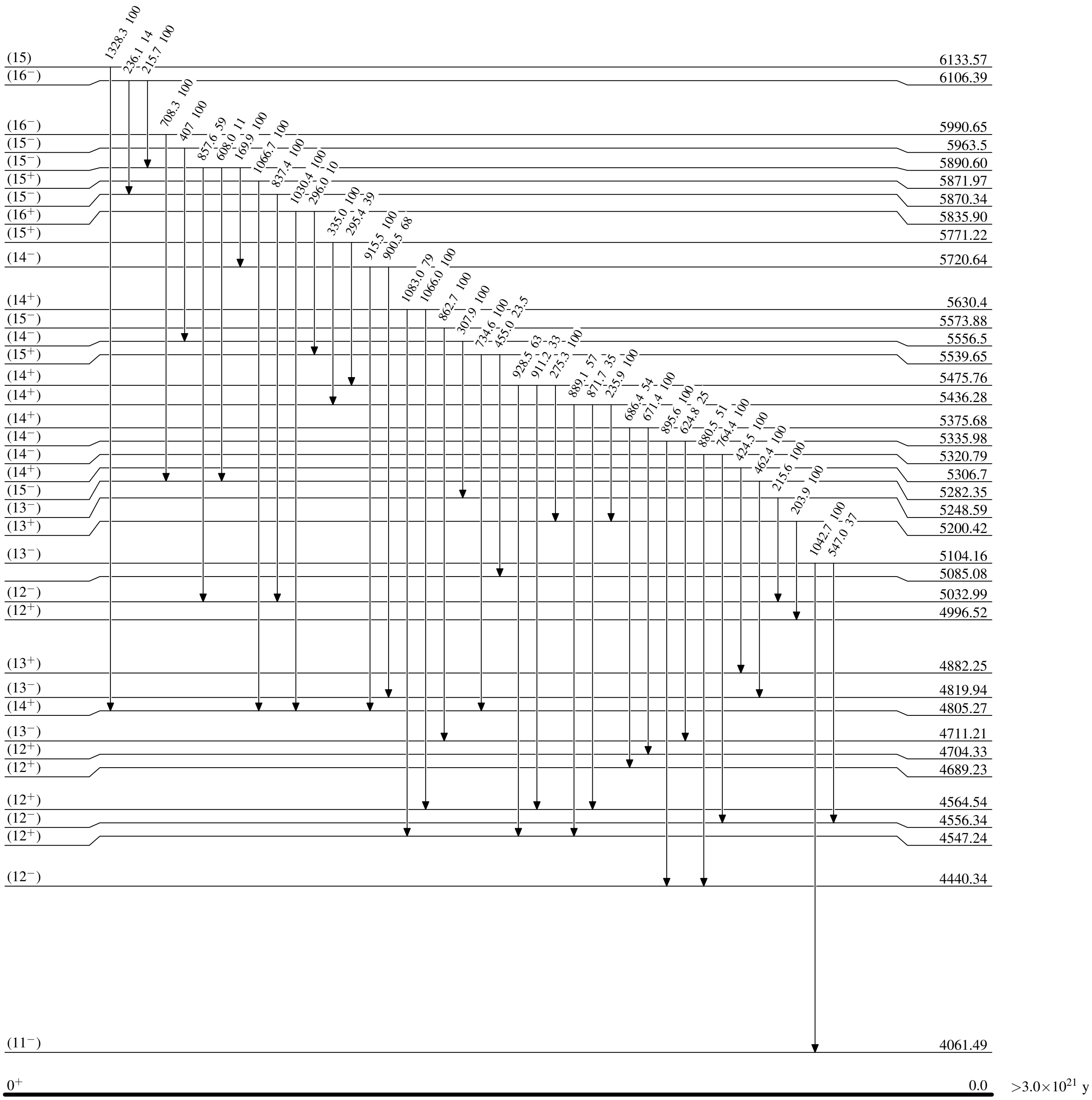
γ Decay (Uncertain)



Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



$^{132}_{56}Ba_{76}$

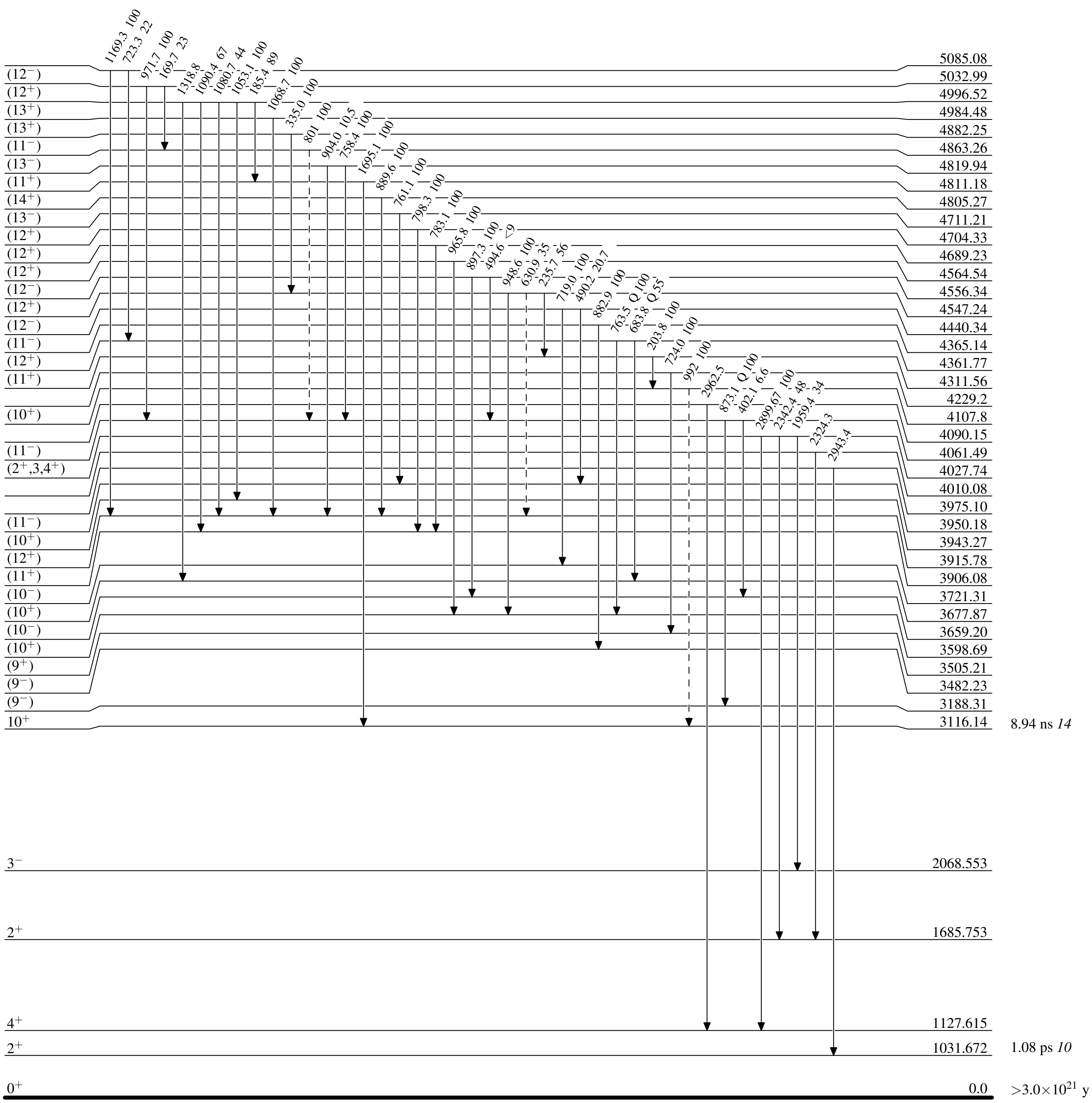
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

γ Decay (Uncertain)

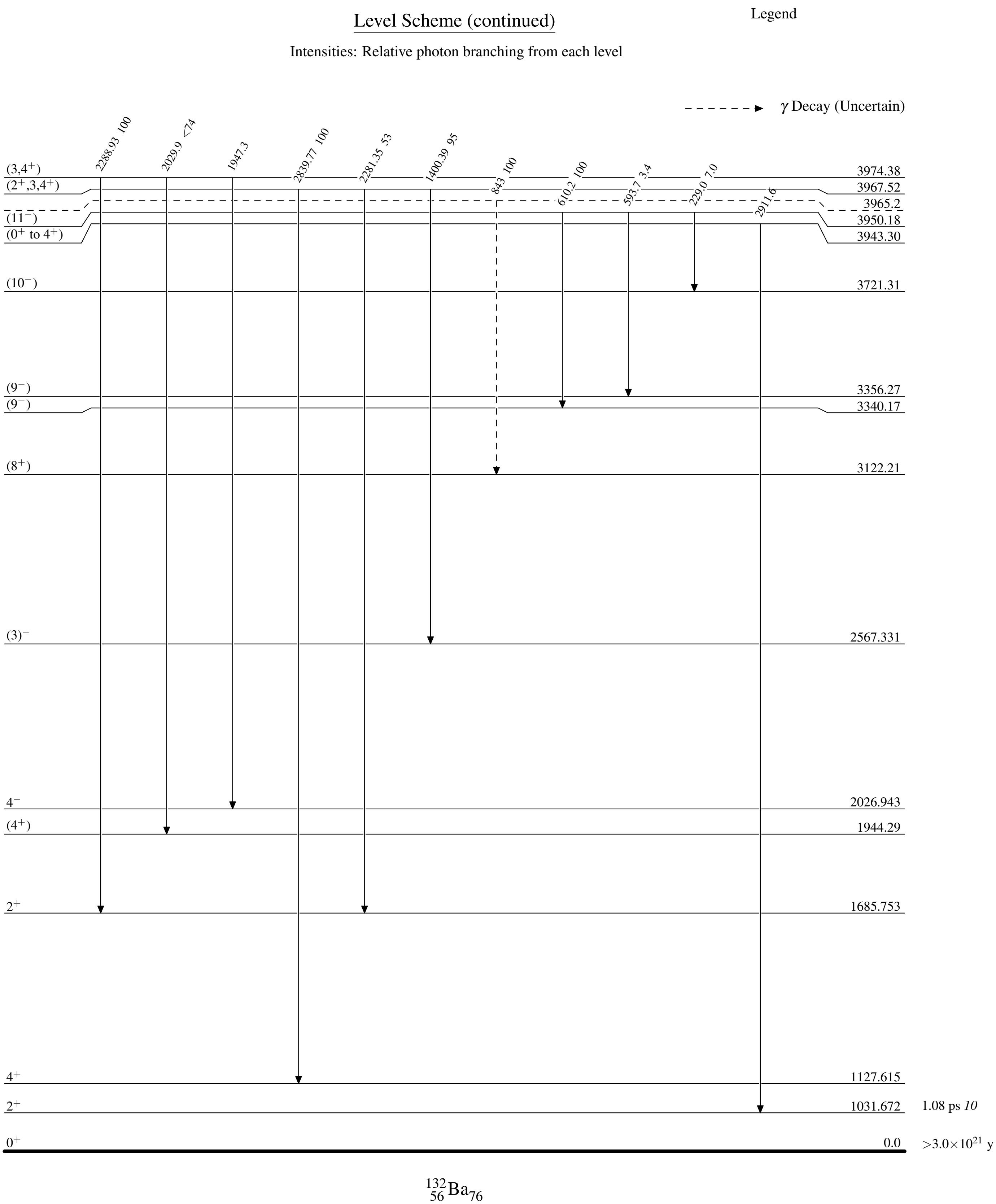


$^{132}_{56}Ba_{76}$

Adopted Levels, Gammas

Level Scheme (continued)

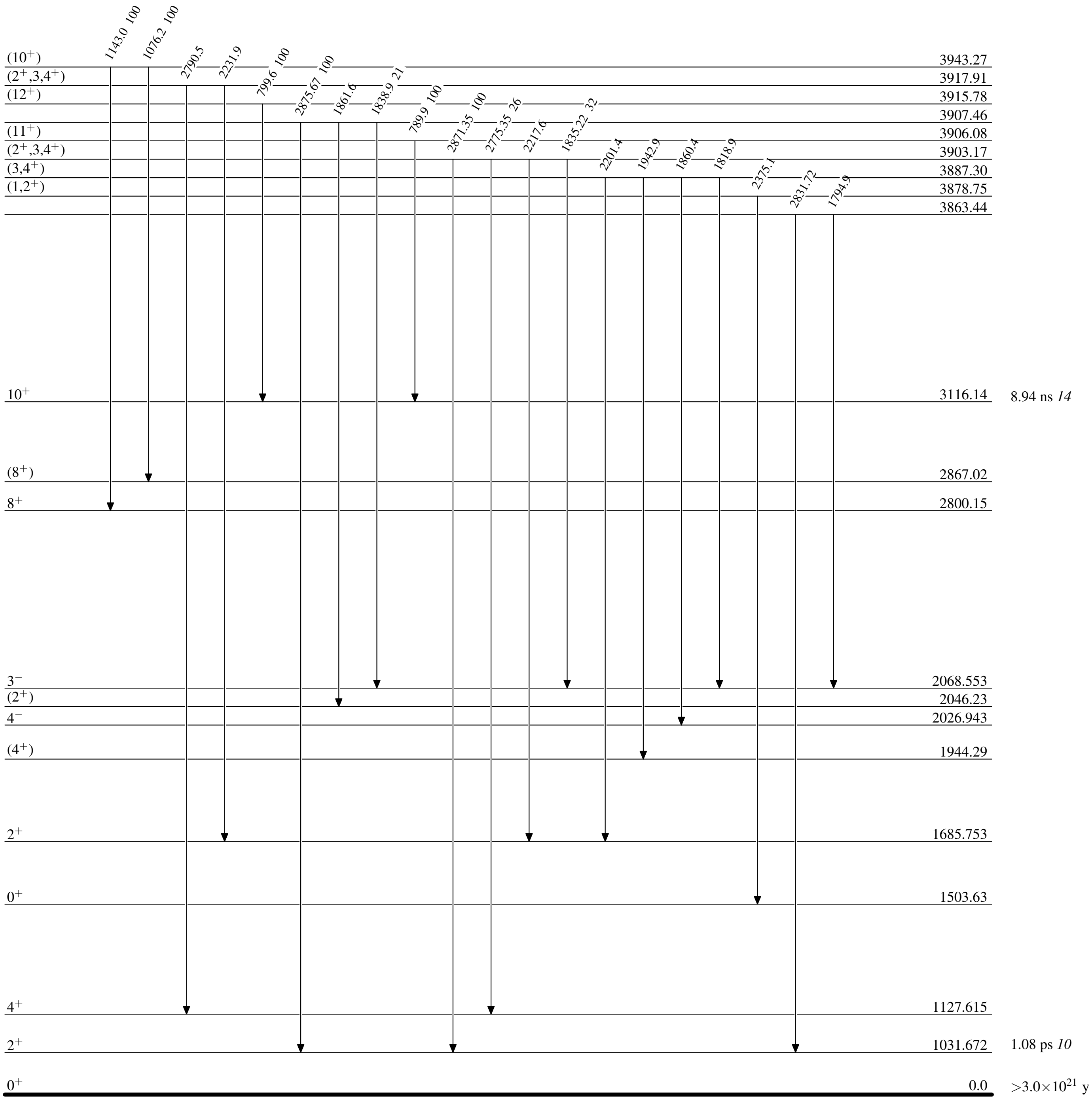
Intensities: Relative photon branching from each level



Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

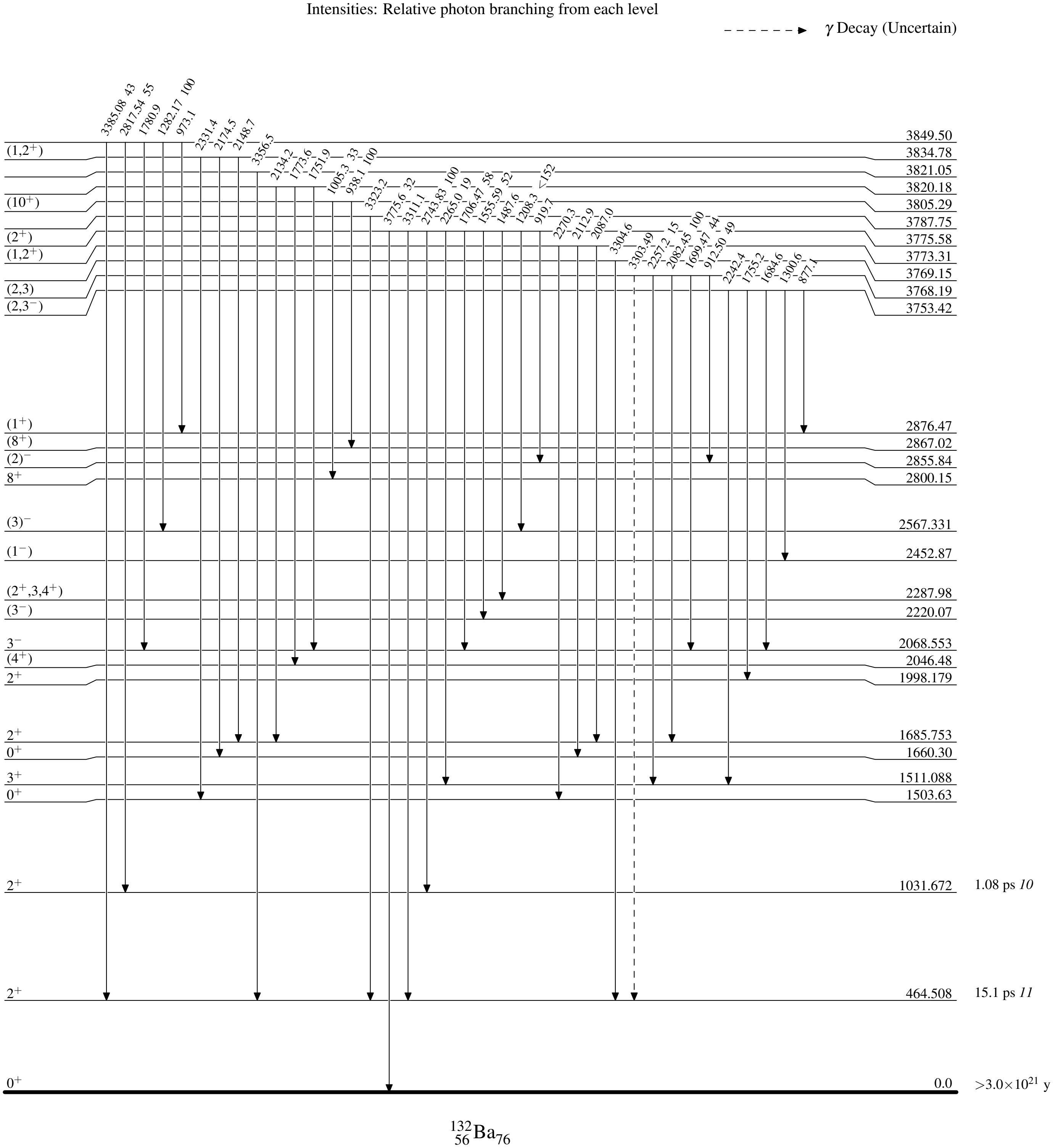


$^{132}_{56}Ba_{76}$

Adopted Levels, Gammas

Level Scheme (continued)

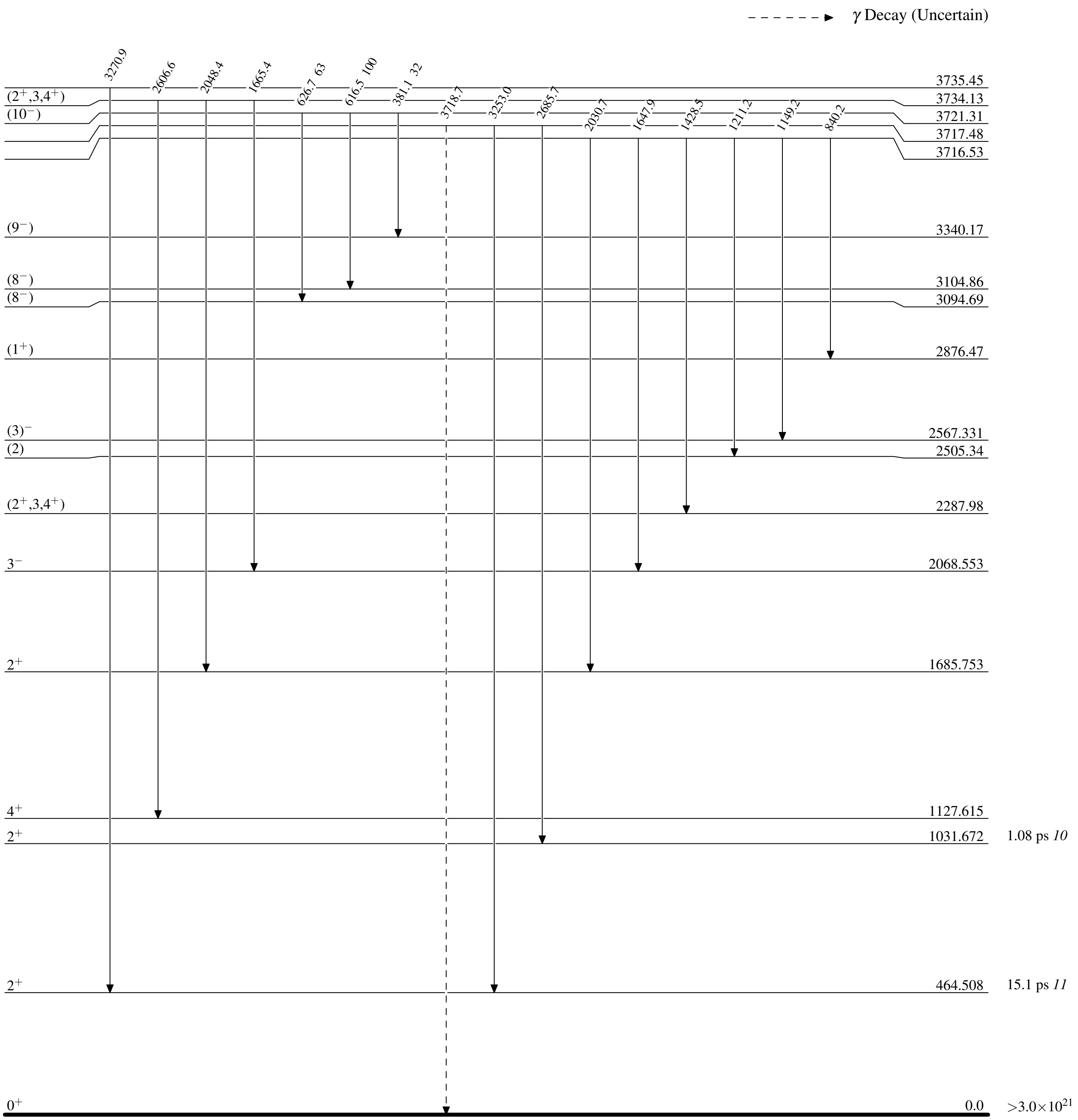
Intensities: Relative photon branching from each level



Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

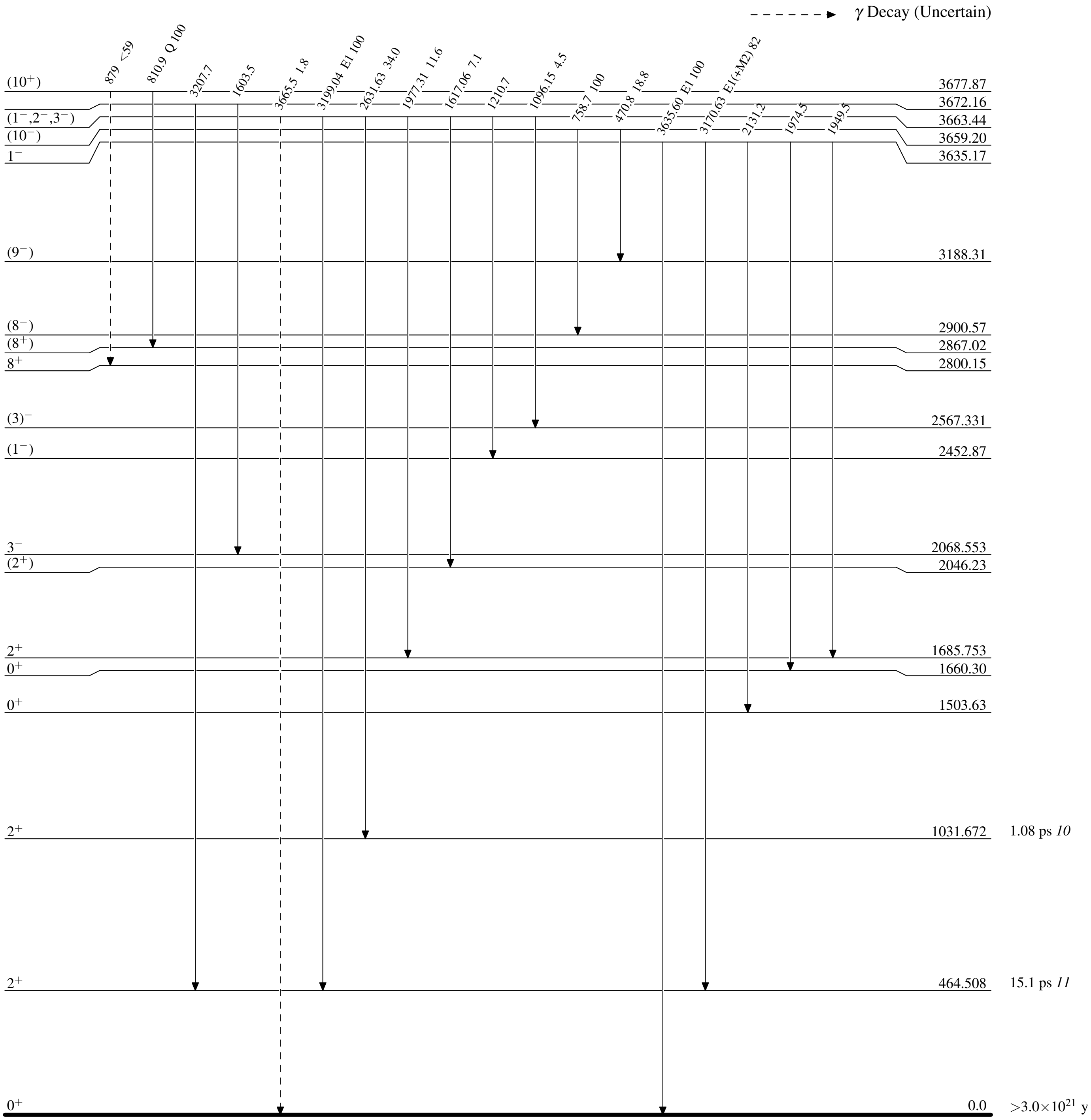


$^{132}_{56}Ba_{76}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

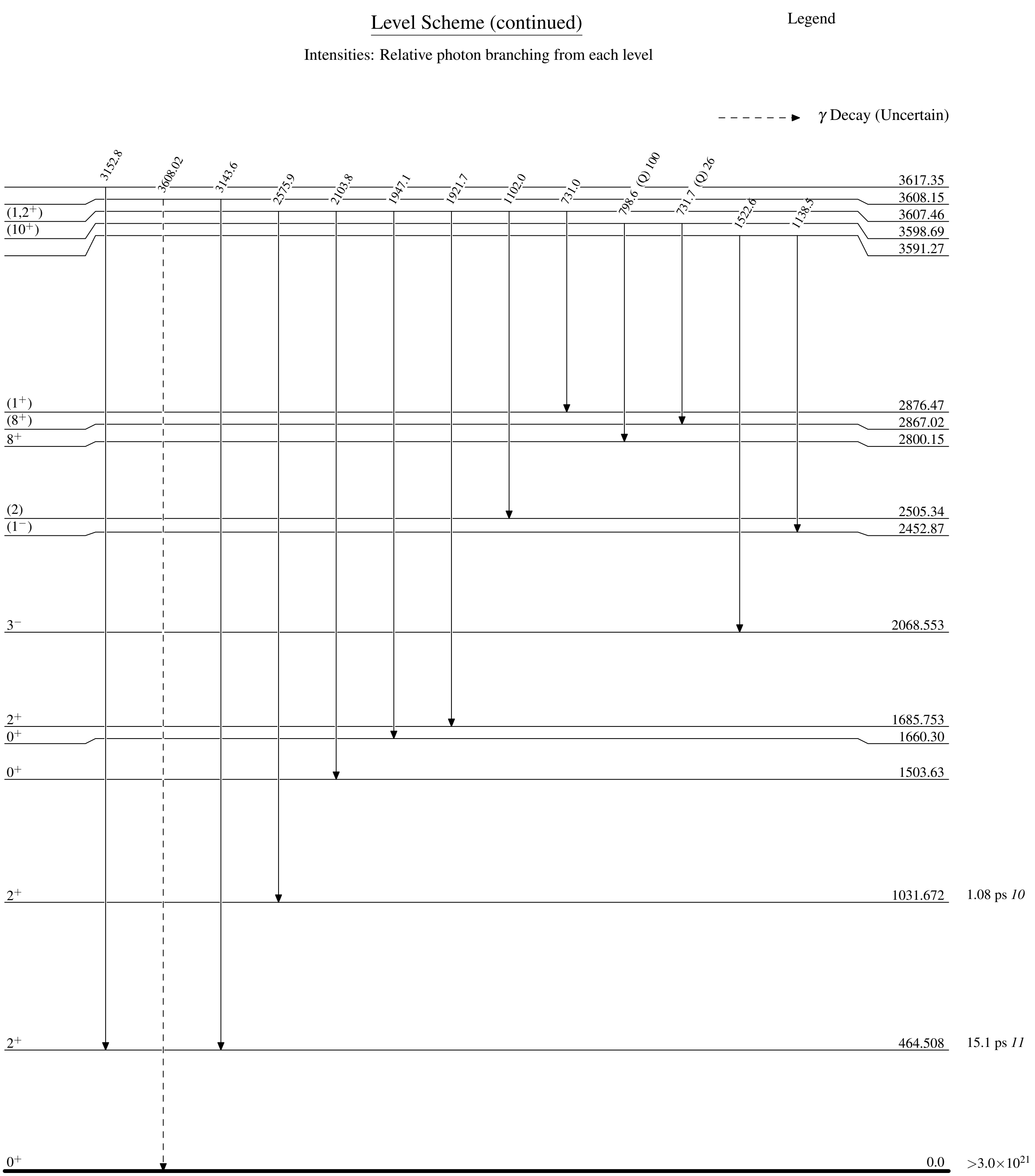


$^{132}_{56}Ba_{76}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

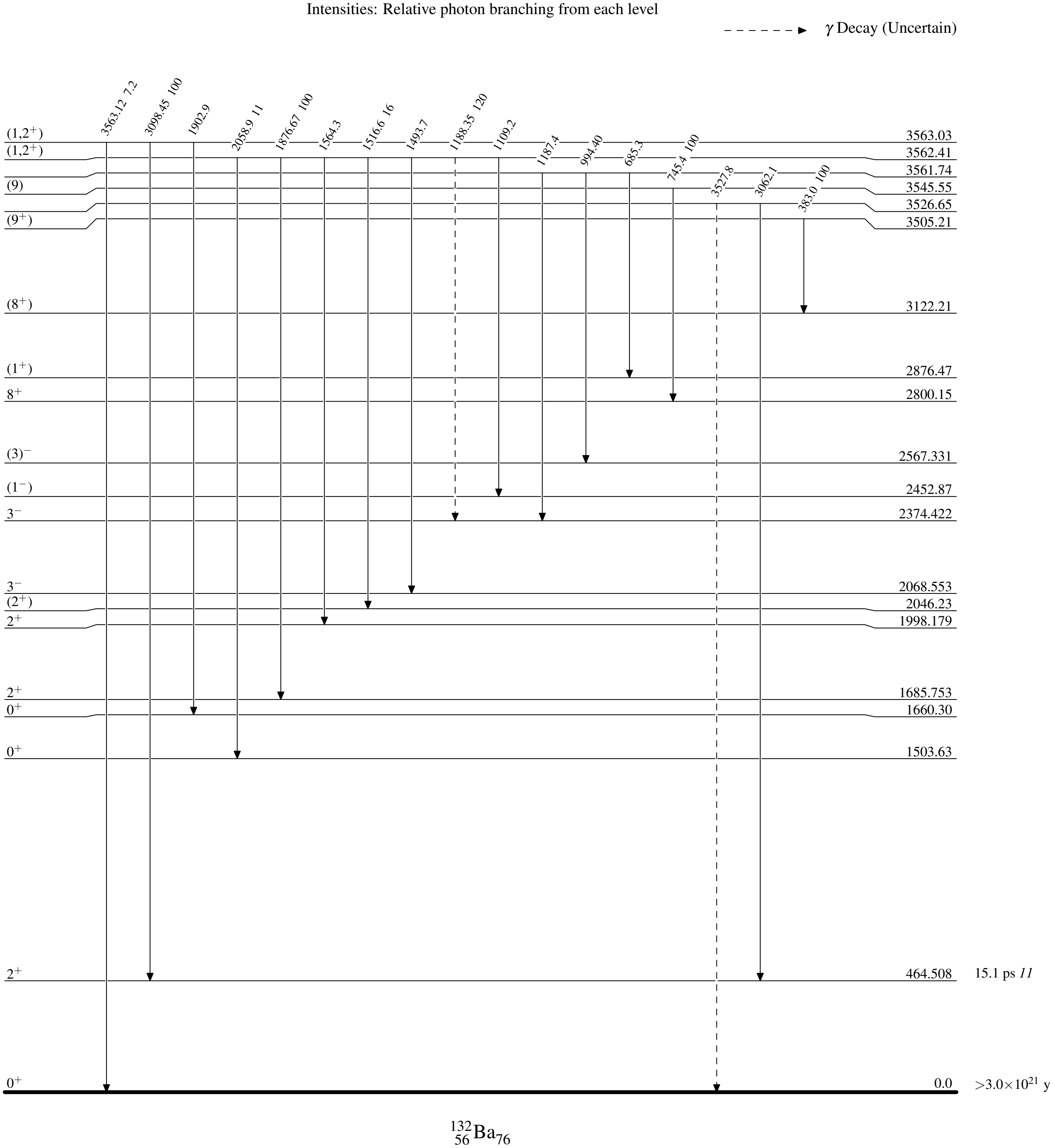


$^{132}_{56}Ba_{76}$

Adopted Levels, Gammas

Level Scheme (continued)

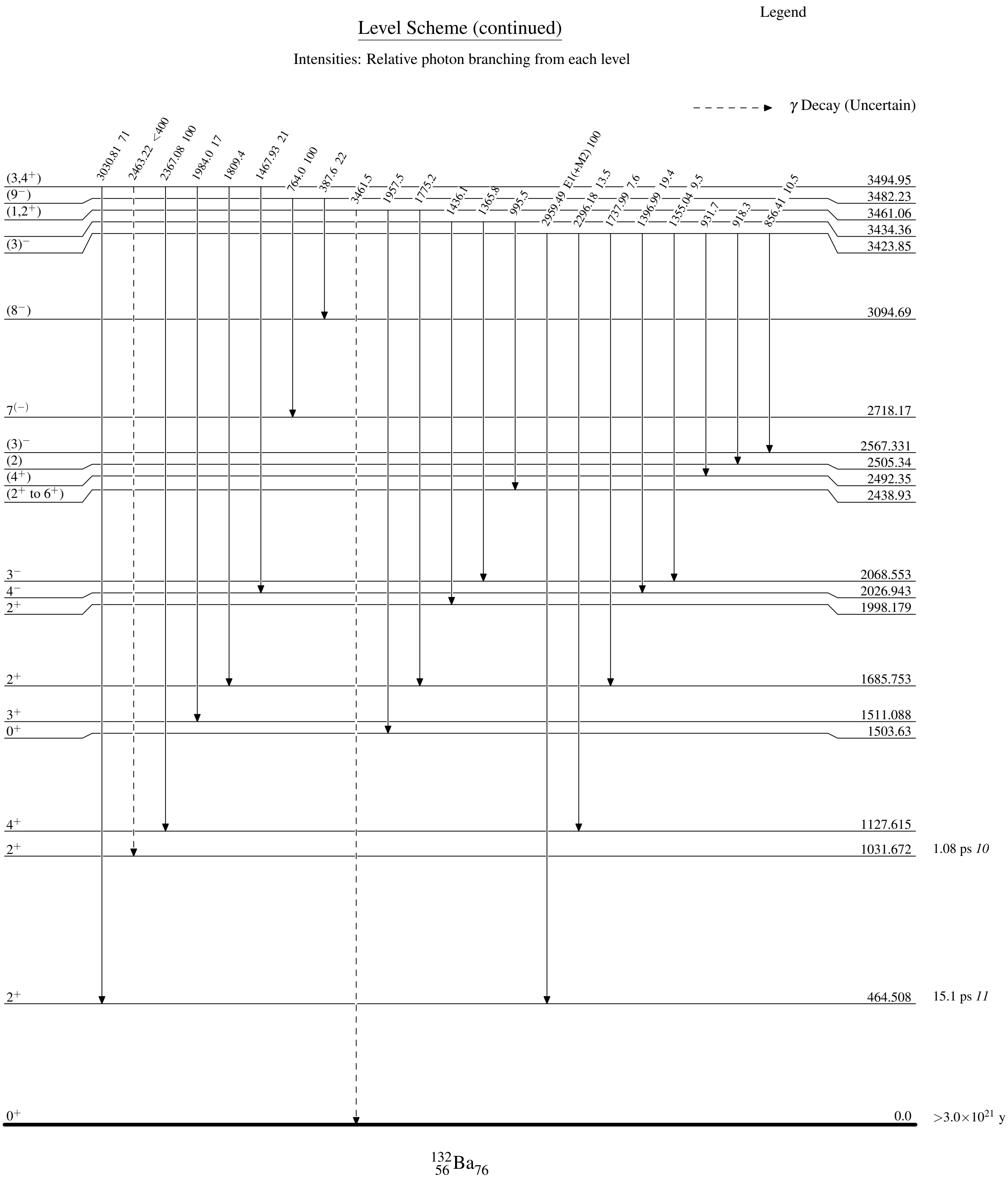
Intensities: Relative photon branching from each level



Adopted Levels, Gammas

Level Scheme (continued)

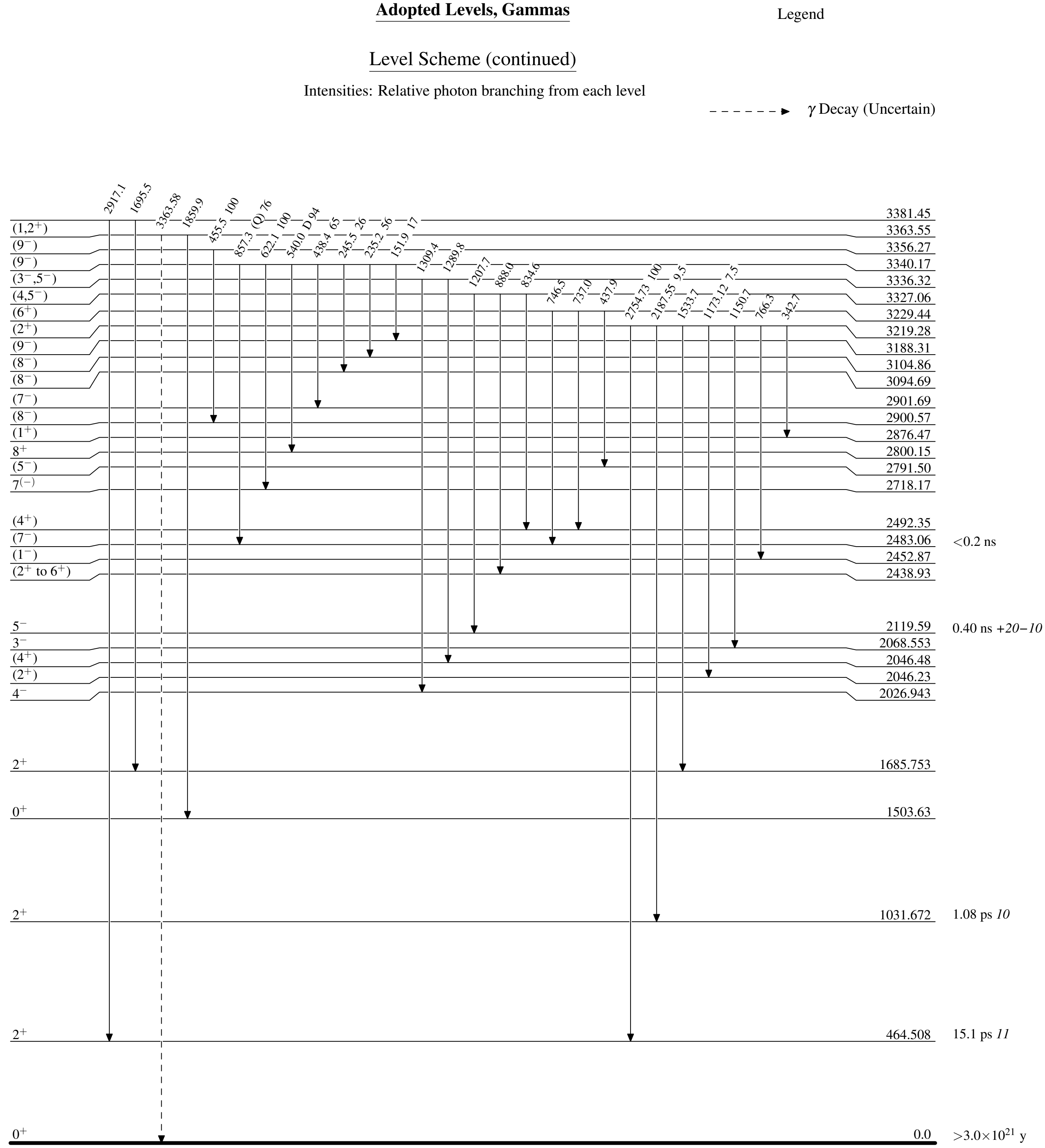
Intensities: Relative photon branching from each level



Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

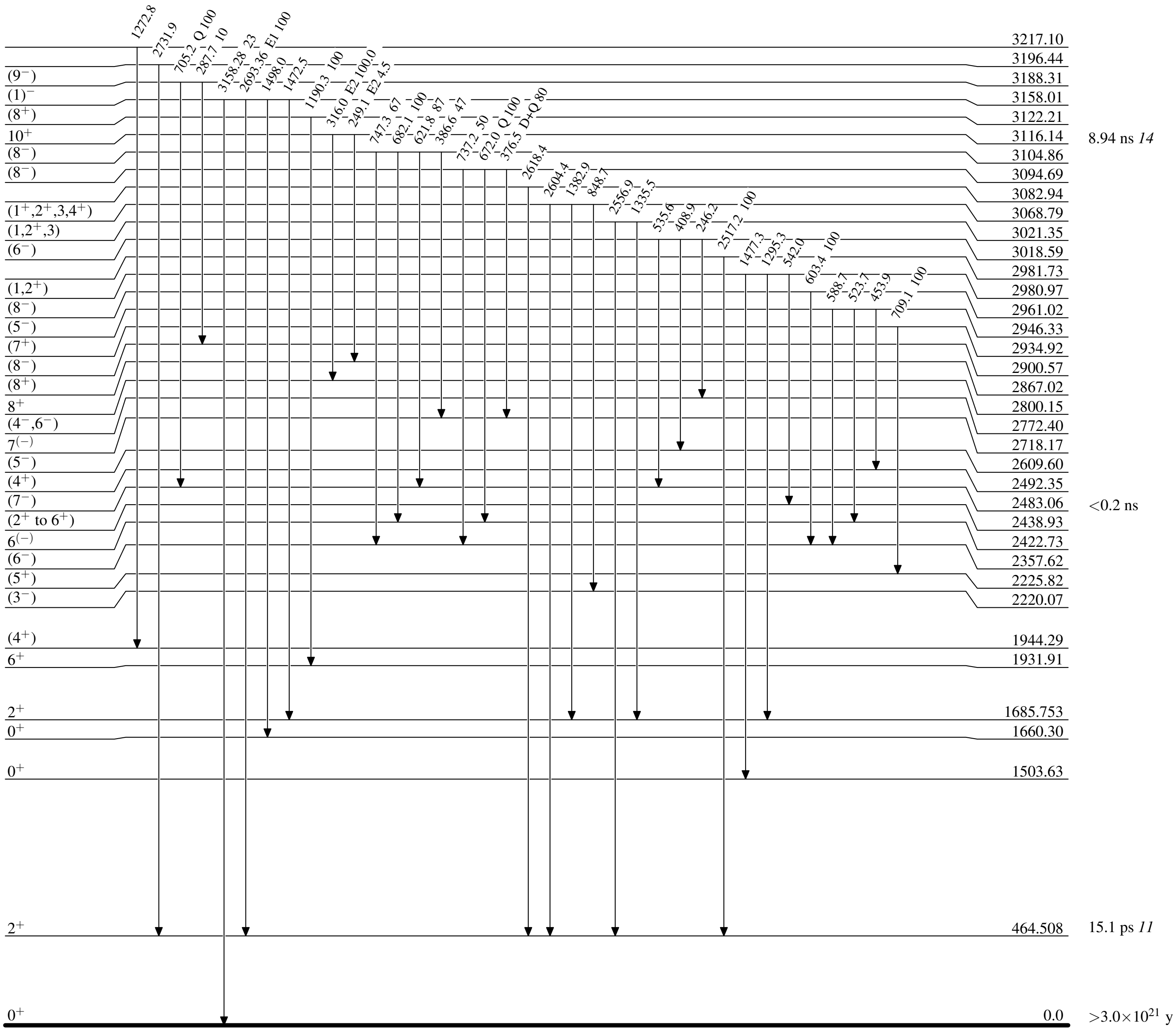


$^{132}_{56}Ba_{76}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

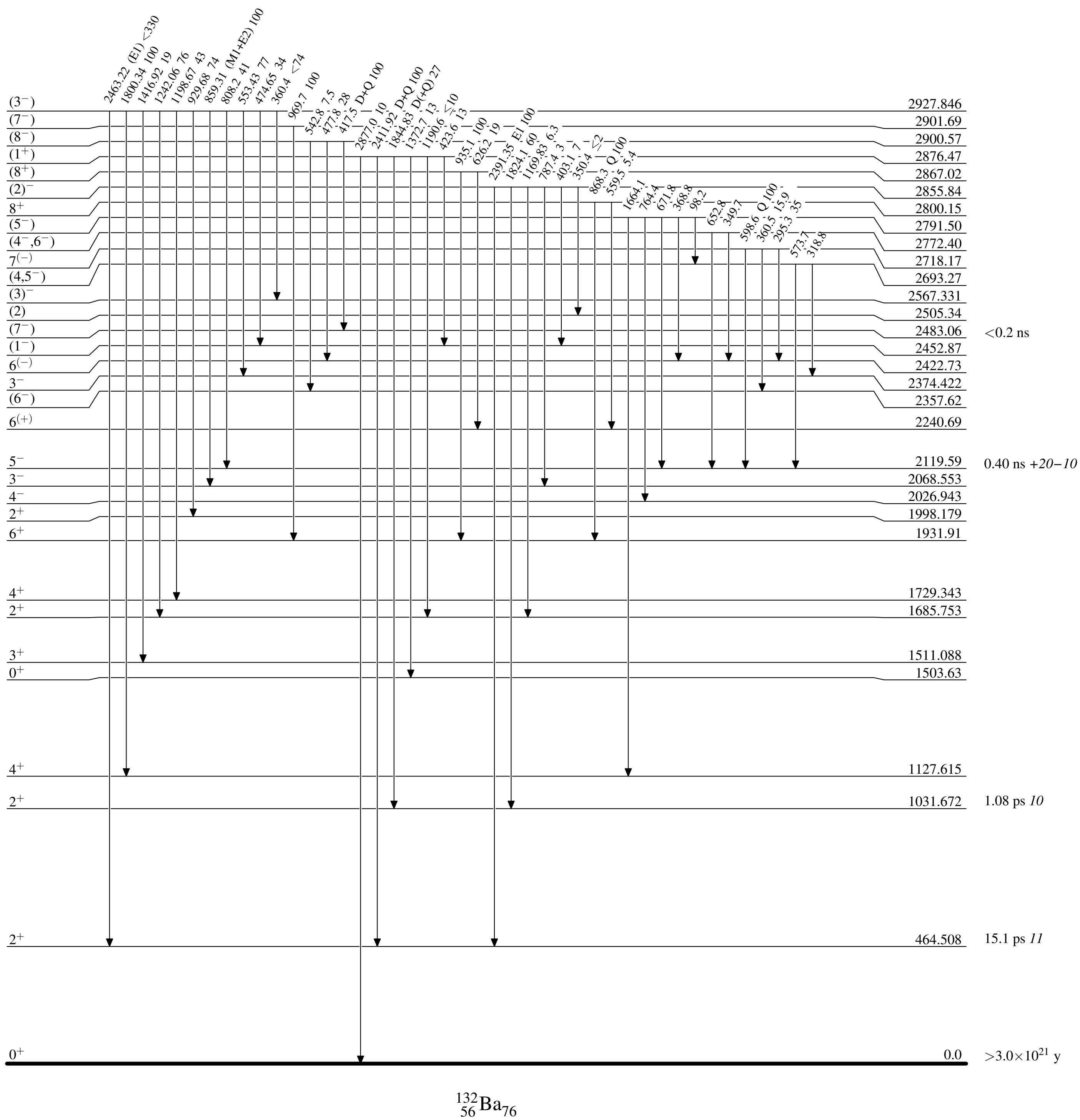


$^{132}_{56}Ba_{76}$

Adopted Levels, Gammas

Level Scheme (continued)

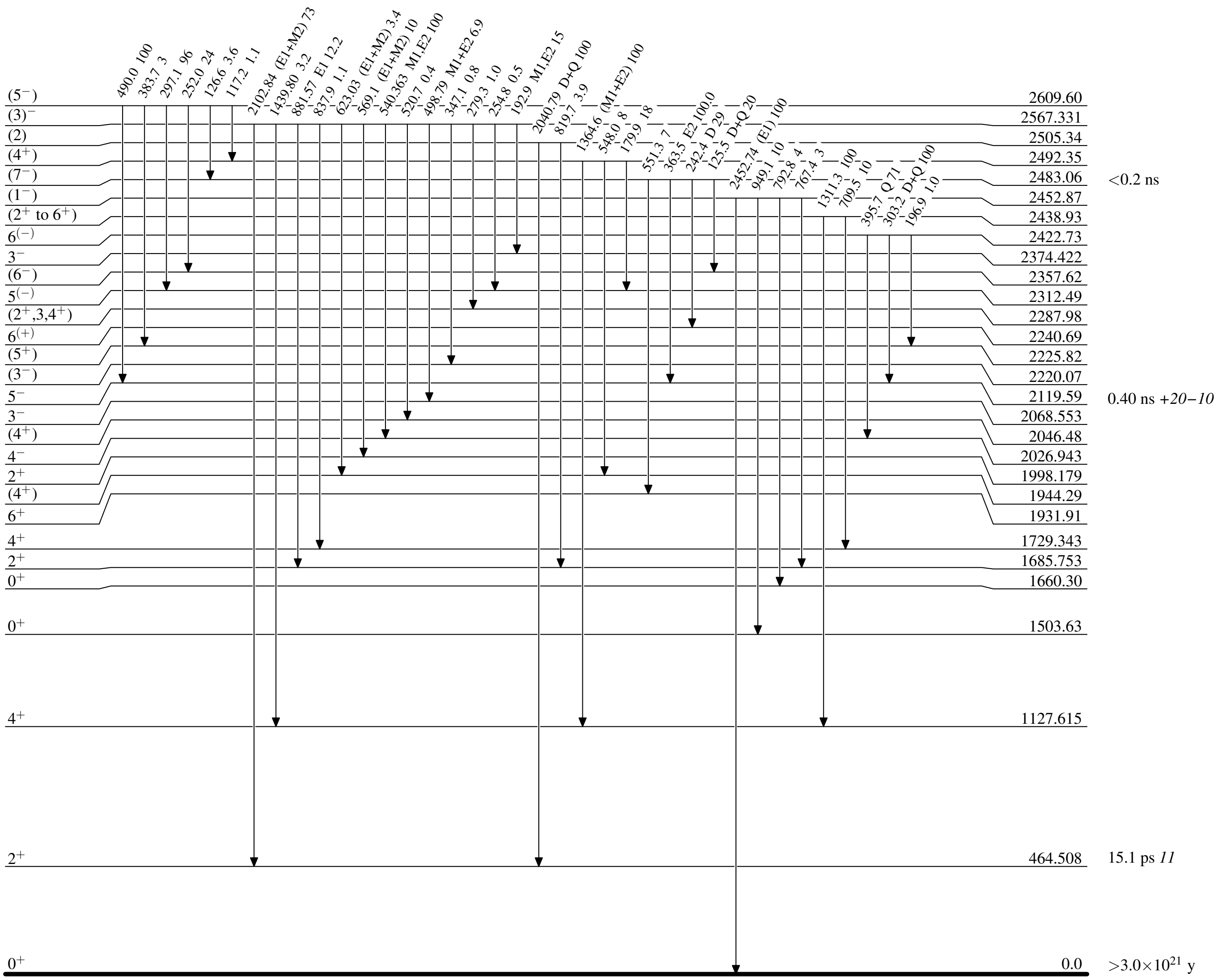
Intensities: Relative photon branching from each level



Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

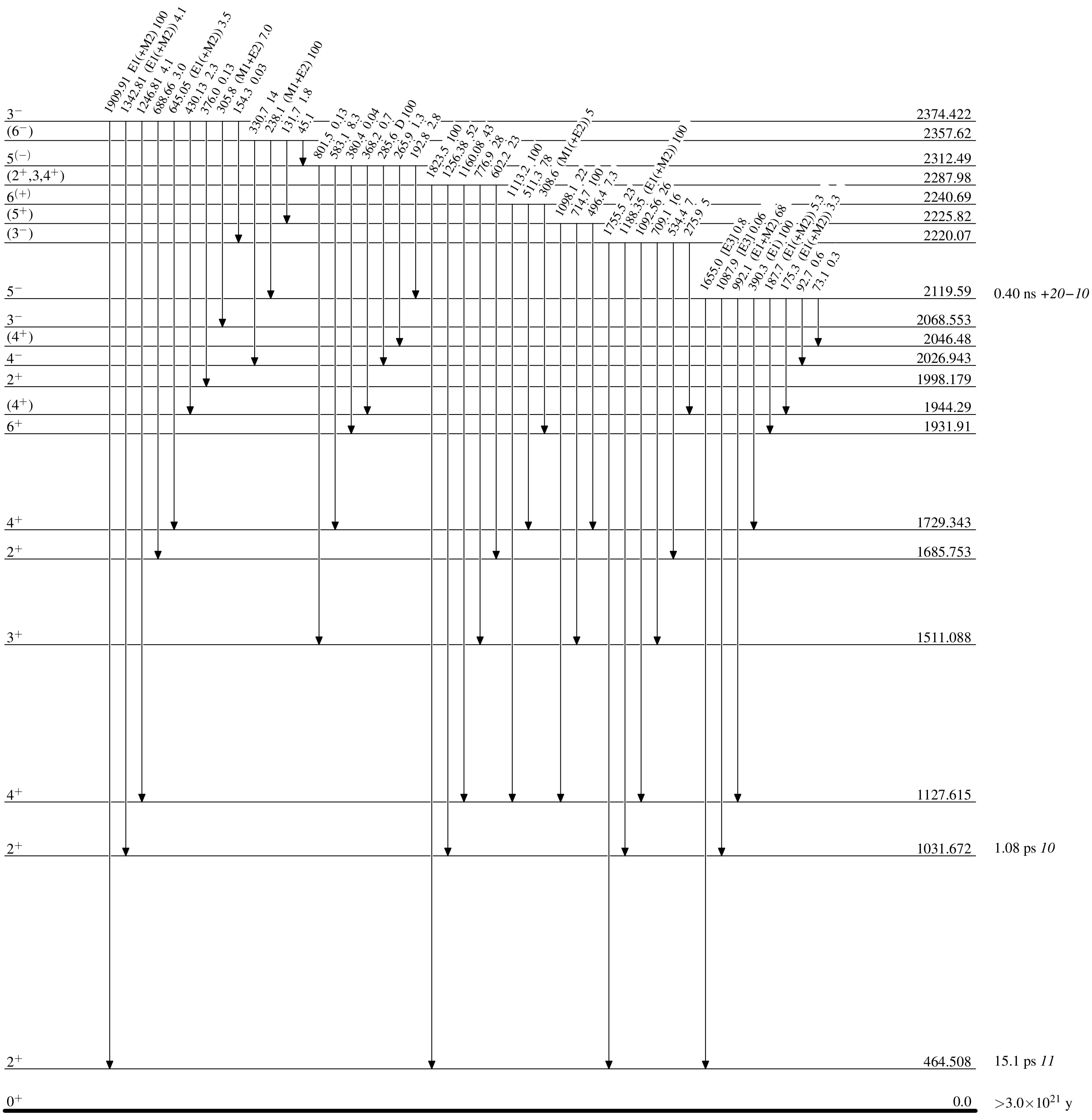


$^{132}_{56}Ba_{76}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

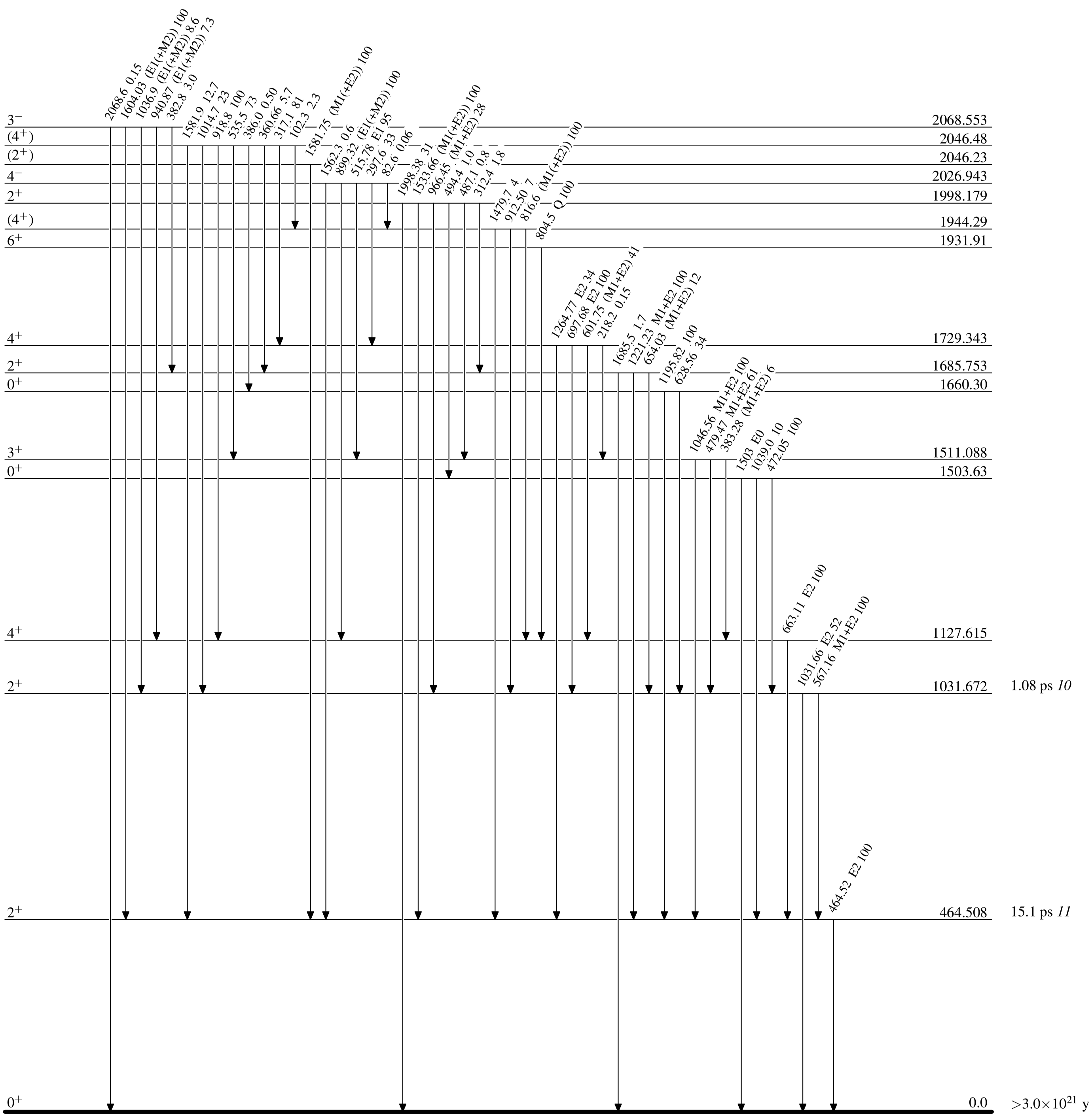


$^{132}_{56}Ba_{76}$

Adopted Levels, Gammas

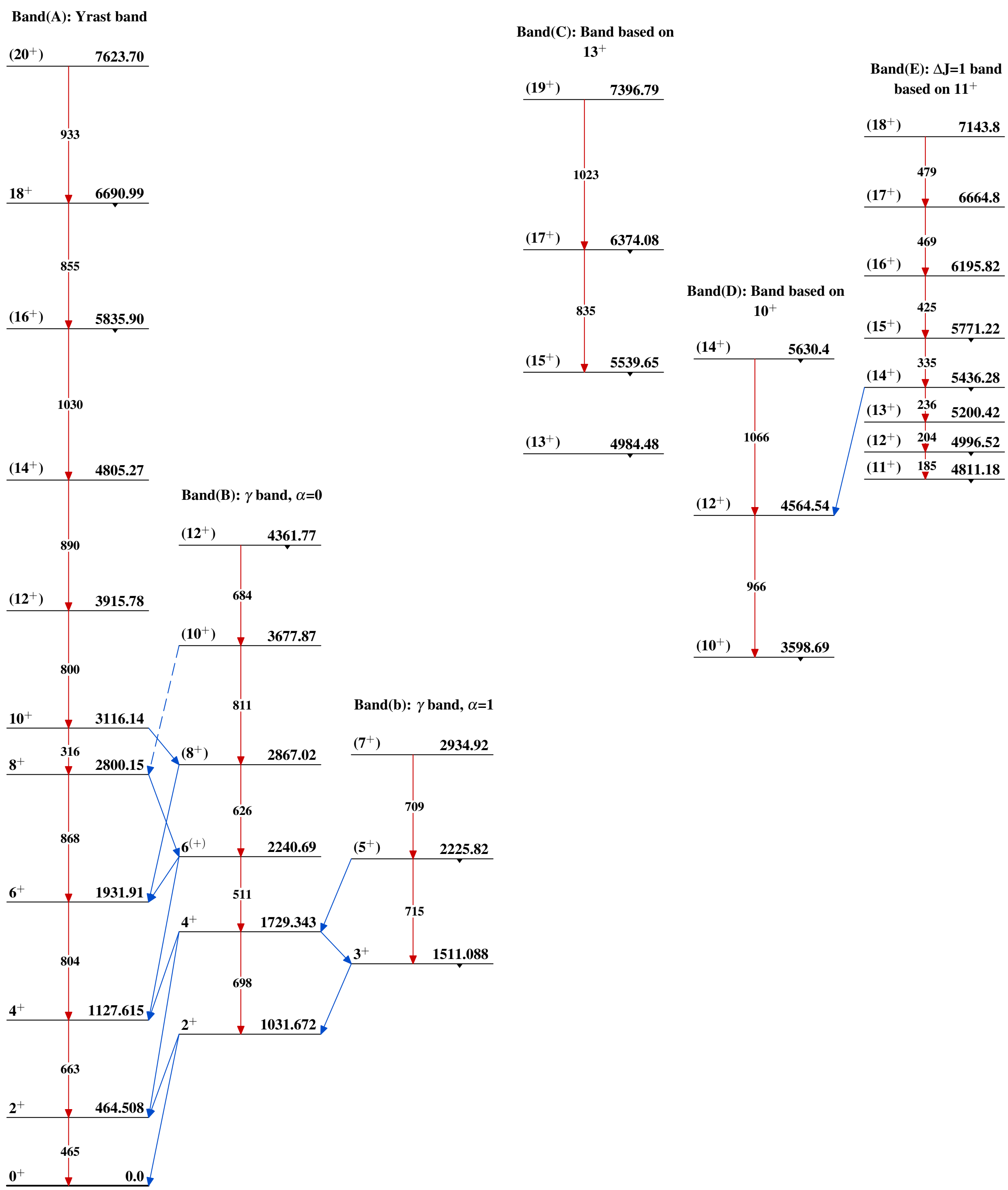
Level Scheme (continued)

Intensities: Relative photon branching from each level



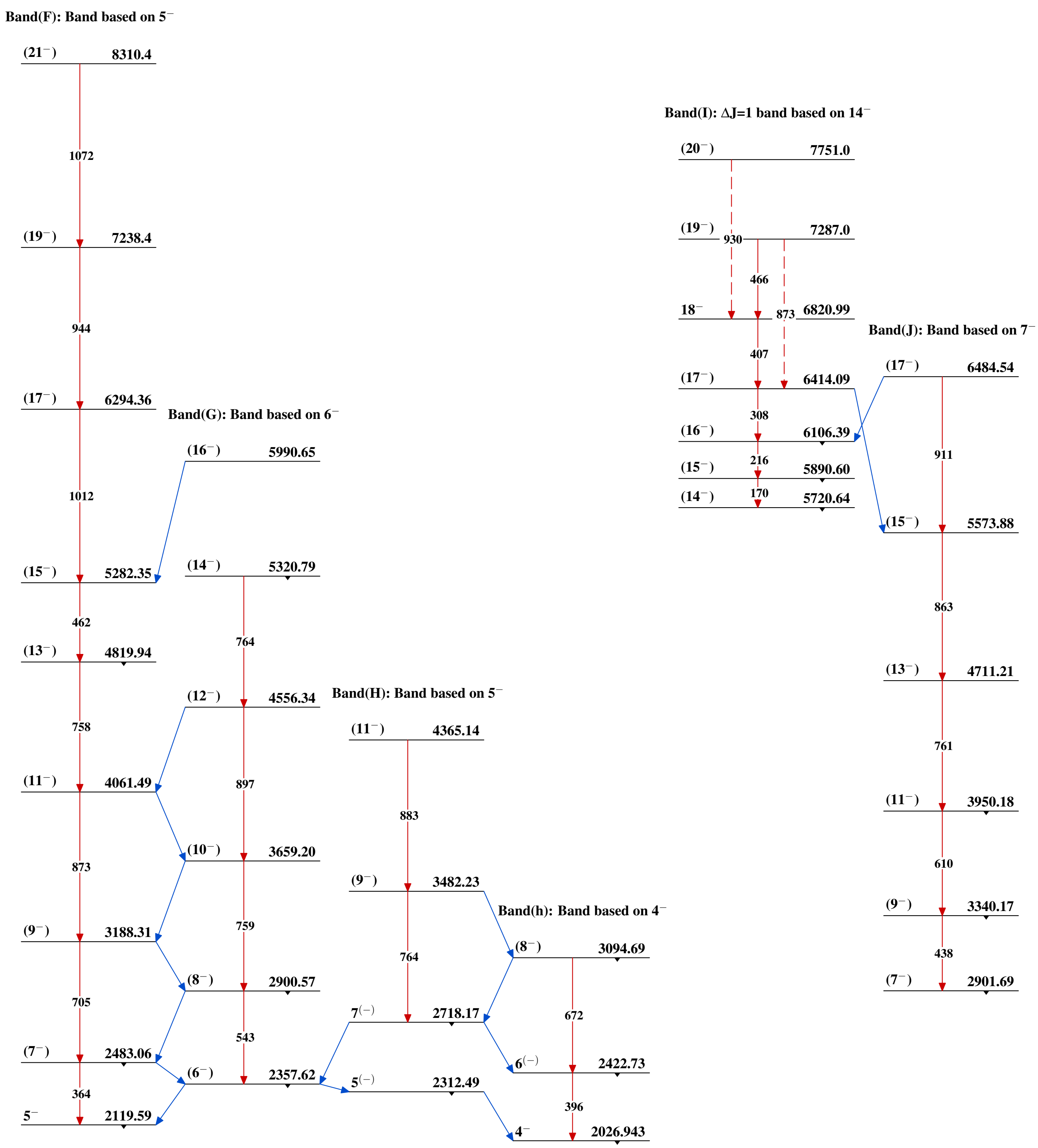
$^{132}_{56}Ba_{76}$

Adopted Levels, Gammas



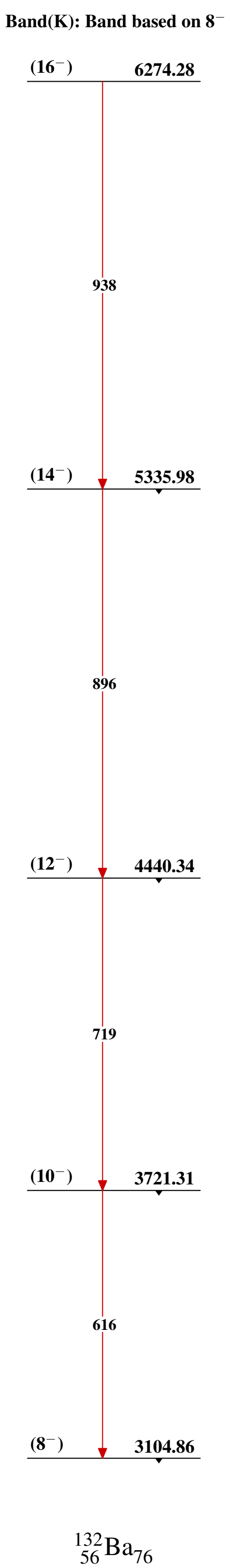
$^{132}_{56}Ba_{76}$

Adopted Levels, Gammas (continued)



$^{132}_{56}Ba_{76}$

Adopted Levels, Gammas (continued)



Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	A. A. Sonzogni	NDS 103,1 (2004)	31-Jul-2004

Q(β^-)=−3731 *20*; S(n)=9467.8 *11*; S(p)=8168.1 *3*; Q(α)=−1494.5 *3* 2012Wa38
Note: Current evaluation has used the following Q record −3731 209467.7 *118167.9* *4* −1493.1 *9* 2003Au03.

^{134}Ba Levels

Cross Reference (XREF) Flags

A	^{134}Cs β^- decay (2.0652 y)	F	Coulomb excitation
B	^{134}Ba IT decay (2.63 μs)	G	^{136}Ba(p,t)
C	^{134}La ε decay (6.45 min)	H	(HI,xnγ)
D	^{134}Ba(n,n′γ)	I	^{134}Ba(γ,γ')
E	^{134}Ba(α,α')		

E(level)	J^π	$T_{1/2}$[†]	XREF	Comments
0.0[a]	0+	stable	ABCDEFGHI	
604.7223[a] *19*	2+	5.12 ps *9*	ABCDEFGH	μ=+0.84 *10* (1989Ra17) Q=−0.26 *8* or +0.15 *8* (1989Ra17). J^π: L(p,t)=2. $T_{1/2}$: from B(E2)=0.679 *11* (Coul. ex.). μ, Q: from Coul. ex.
1167.968 *3*	2+	2.7 ps *8*	A CD FGH	J^π: L(p,t)=2. $T_{1/2}$: from B(E2) in Coul. ex.
1400.590[a] *4*	4+	0.83 ps *9*	ABCD FGH	J^π: L(p,t)=4. $T_{1/2}$: from B(E2) in Coul. ex., $T_{1/2}$=8.7 ps *17* from ^{134}Cs β^- decay.
1643.336 *4*	3+	78 ps *21*	A CD H	J^π: M1+E2 γ to 2+; $\gamma\gamma(\theta)$. $T_{1/2}$: from $\beta\gamma$(t) (^{134}Cs β^- decay).
1760.555 *22*	0+		CD G	J^π: E0 transition to g.s.
1969.921 *4*	4+		A DE H	J^π: M1+E2 γ to 4+; $\gamma\gamma(\theta)$.
1986.35 *21*	5−	52 ns *6*	D GH	J^π: L(p,t)=5. $T_{1/2}$: from (HI,xnγ).
2029.242 *18*	2+	0.159 ps *16*	CD	J^π: E2 γ to 0+ g.s.
2088.288 *17*	2+	0.059 ps *5*	CD F	J^π: E2 γ to 0+ g.s.
2118.195 *9*	(4+)		D	J^π: γ's to 4+,2+ levels; no γ's to 0+,3+ levels.
2159.683 *21*	(0)+	0.104 ps *+28−21*	CD G	J^π: L(p,t)=0, E2 γ to 2+.
2164.620 *12*	(4+)		D	J^π: $\gamma(\theta)$ and excitation function in (n,n′γ).
2211.3[a] *3*	(6+)		B D H	J^π: excitation function in (n,n′γ).
2244.99 *5*			D	
2254.95 *14*	3−		CDEF	J^π: $\sigma(\theta)$ in Coul. ex., (α,α') data.
2271.57 *24*	7−		D GH	J^π: L(p,t)=7.
2279.87 *3*	(2,3)		D	J^π: $\gamma(\theta)$ in (n,n′γ); decay pattern.
2285.34 *4*	(5)+		D	J^π: E2 γ to 3+.
2299.7 *3*	(6+)		D H	J^π: γ to 4+; excitation function in (n,n′γ).
2311	(1)[@]		I	
2334.76 *6*	1,2+	0.21 ps *+10−6*	CD	J^π: γ to 0+.
2336.82 *3*	0+	0.097 ps *+28−21*	CD G	J^π: E0 transition to g.s.
2371.02 *7*	2+	0.46 ps *+21−12*	D	J^π: $\gamma(\theta)$ in (n,n′γ); RUL.
2377.1 *4*	(6)		D H	J^π: $\gamma(\theta)$ and excitation function in (n,n′γ).
2379.112 *18*	0+		CD G	J^π: E0 transition to g.s.
2464.28 *6*	(2+)		D	J^π: $\gamma(\theta)$ in (n,n′γ).
2469.58 *6*	(5)+		D	J^π: E2 γ to 3+.
2479 *10*	4+		G	J^π: L(p,t)=4.

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Adopted Levels, Gammas (continued)

^{134}Ba Levels (continued)

E(level)	J$^{\pi}$	T$_{1/2}$[†]	XREF	Comments
2480.34 *5*	(2,3)[&]		D	J$^{\pi}$: $\gamma(\theta)$ in (n,n′γ).
2488.434 *21*	0$^+$	0.13 ps *+9−4*	CD G	J$^{\pi}$: E0 transition to g.s.
2506.26 *4*	(4$^+$)	0.15 ps *+23−7*	D	J$^{\pi}$: $\gamma(\theta)$, excitation function in (n,n′γ).
2531.31 *22*	(5$^-$ to 7$^-$)		D	J$^{\pi}$: γ′s to 7$^-$ and 5$^-$ levels.
2536.91 *5*	0 to 2	0.15 ps *+19−6*	CD	J$^{\pi}$: log *ft*=7.5 from 1$^+$ parent.
2564.712 *19*	1$^+$,2$^+$[‡]	0.06 ps *+12−4*	CD	
2570.87 *3*	1$^{(+)}$[@]		CD I	
2574.31 *10*	(2$^+$)		D	J$^{\pi}$: $\gamma(\theta)$ in (n,n′γ).
2599.88 *4*	2$^+$		CD	J$^{\pi}$: M1+E2 γ to 2$^+$; $\gamma(\theta)$ in (n,n′γ).
2656.23 *8*	(2$^+$)		CD	J$^{\pi}$: γ to 0$^+$ g.s., possible γ to 4$^+$.
2661.88 *5*	3 to 5		D	γ to 3$^+$.
2677.76 *8*	3,4		D	J$^{\pi}$: γ′s to 2$^+$ levels.
2696.58 *5*	1,2		CD	J$^{\pi}$: γ′s to 0$^+$ and 2$^+$ levels.
2729.23 *4*	1,2$^+$		CD G	J$^{\pi}$: γ′s to 0$^+$, 2$^+$ levels.
2747.965 *24*	2$^+$		CD G	J$^{\pi}$: γ′s to 0$^+$, 4$^+$. M1+E2 γ to π=+.
2758.9? *3*	1,2$^+$		C	J$^{\pi}$: γ′s to 0$^+$, 2$^+$ levels.
2760.74 *12*	1,2[&]		CD	
2773.73 *10*	3,4		D	J$^{\pi}$: γ to 2$^+$, 4$^+$ levels.
2779.9 *10*			H	
2806	(1)[@]		I	
2823.72 *11*	1$^-$[@]		D G I	
2828.50 *4*	1$^+$,2$^+$[‡]		C G	J$^{\pi}$: M1,E2 γ to 2$^+$, γ to 0$^+$.
2835.9[a] *4*	(8$^+$)		B D H	
2851.26 *6*	2$^+$		CD G	J$^{\pi}$: E2 γ to 0$^+$ g.s.
2874 *8*	0$^+$[#]		G	
2876.89 *10*	3 to 5		D	J$^{\pi}$: γ to 3$^+$.
2887.04 *4*	1,2		C	J$^{\pi}$: γ′s to 2$^+$, 3$^+$ levels, log *ft*=6.8 from decay of 1$^+$ level.
2913.1 *4*			H	
2917.61 *6*	2		CD	J$^{\pi}$: γ′s to 4$^+$, 2$^+$ levels, log *ft*=7.3 in decay of 1$^+$ level.
2925.99 *15*	3 to 5		D	J$^{\pi}$: γ to 3$^+$.
2938.93 *20*	1$^+$[@]		CD I	
2943.90 *14*	2 to 4		D	J$^{\pi}$: γ to 2$^+$.
2950.56 *24*	3,4		D	J$^{\pi}$: γ′s to 2$^+$ and 3$^+$ levels.
2957.2 *5*	(10$^+$)	2.63 μs *14*	B H	%IT=100 μ=−2.0 *1* J$^{\pi}$: (E2) γ to (8$^+$); systematics, configuration=(ν h$_{11/2}$)$^{-2}$. T$_{1/2}$: from (HI,xnγ). μ: DPAD (1989Ra17).
2996 *8*	(0)$^+$[#]		G	
3004.41 *15*	1,2$^+$		C	J$^{\pi}$: γ′s to 0$^+$, 2$^+$ levels.
3011	(1)[@]		I	
3011.7 *11*			H	
3027.38 *6*	(1$^+$)[@]		CD I	
3061.29 *6*	2$^{(+)}$		CD	J$^{\pi}$: γ′s to 0$^+$, 2$^+$ and 4$^+$.
3068.85? *13*	1,2$^+$		C	J$^{\pi}$: γ′s tp 0$^+$, 2$^+$ levels.
3074.72? *13*	(2)		C	J$^{\pi}$: γ′s to 3$^+$, 4$^+$ levels, log *ft*=7.4 from decay of 1$^+$ level.
3079 *10*	4$^+$		G	J$^{\pi}$: L(p,t)=4.
3086.65 *10*	1$^+$,2$^+$		CD	J$^{\pi}$: γ′s to 0$^+$, 2$^+$ and 3$^+$.
3160.07 *19*	1,2$^+$		CD	J$^{\pi}$: γ′s to 0$^+$, 2$^+$.
3181 *8*	(0)$^+$[#]		G	
3216.3? *6*	1,2$^+$		C	J$^{\pi}$: γ′s to 0$^+$, 2$^+$ levels.
3240.5 *4*	(9$^-$)		H	J$^{\pi}$: stretched (E2) γ to 7$^-$.

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Adopted Levels, Gammas (continued)

^{134}Ba Levels (continued)

E(level)	J^{π}	XREF	Comments
3242.3 *8*		GH	
3245.88 *19*	(1^{+})@	CD G I	
3262.0 *3*	2 to 4	D	J^{π}: γ to 2^{+}.
3272.10 *5*	$1^{-},2^{-}$	C	J^{π}: γ's to 2^{+}, 3^{-} levels, log *ft*=6.8 from decay of 1^{+} level.
3311.3 *8*		H	
3314.56 *18*	2,3	D	J^{π}: γ's to 2^{+}, 4^{+}.
3327.25 *13*	(1^{+})@	CD I	
3328.3 *11*		H	
3343	(1)@	I	
3368.97 *6*	1,2	CD	J^{π}: γ's to 0^{+}, 2^{+} and 3^{-} levels.
3371.79 *20*	2 to 4	D	J^{π}: γ to 2^{+}.
3408.72 *17*	1,2	CD G	J^{π}: γ's to 0^{+}, 2^{+} and 3^{+} levels.
3432.15? *10*	$1,2^{+}$	C	J^{π}: γ's to 0^{+}, 2^{+}.
3443.39 *20*	2 to 4	D	J^{π}: γ to 2^{+}.
3450.27 *8*	(1^{+})@	C I	
3451.0 *4*	$1,2^{+}$	D	J^{π}: γ's to 0^{+}, 2^{+}.
3459.3 *12*		H	
3471.1? *3*	2^{+}	C	J^{π}: γ's to 0^{+}, 2^{+}.
3499.68 *14*	(1,2)	C	J^{π}: γ's to 2^{+}, log *ft*=7.3 from decay of 1^{+} level.
3501 *8*	$(0)^{+}$#	G	
3504.2 *11*		H	
3548.5 *4*	$1,2^{+}$	C	J^{π}: γ to 0^{+}, 2^{+}.
3560	1@	I	
3589	1@	I	
3599.3 *13*		H	
3617	(1)@	I	
3618 *8*	$(0)^{+}$#	G	
3635.9 *11*		H	
3652.1? *5*	$1,2^{+}$	C	J^{π}: γ's to 0^{+}, 2^{+}.
3684.2 *4*	2^{+}	D	J^{π}: E2 γ to 0^{+}.
3705	1@	I	
3754 *10*		G	
3783	(1)@	I	
3836	1@	I	
3853.8 *4*	2^{+}	D	J^{π}: E2 γ to 0^{+}.
3899.1 *11*		H	
3954.3 *12*		H	
3980	(1)@	I	
3992	(1)@	I	
4001.4 *5*		H	
4019 *10*		G	
4083.5 *11*		H	
4517.4 *12*		H	
4549.9 *15*		H	
4635.2 *15*		H	
5001.4 *15*		H	
5015.4 *15*		H	
5230.9 *18*		H	

† From (n,n′γ), except as noted.

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{134}Ba Levels (continued)

‡ γ to 0^+ g.s., transition multipolarities.
# L=0 in ^{136}Ba(p,t).
@ From (γ,γ').
& $\gamma(\theta)$ in (n,n$'\gamma$).
[a] Band(A): g.s. band.

γ(^{134}Ba)

E$_i$(level)	J$^\pi_i$	E$_\gamma$	I$_\gamma$	E$_f$	J$^\pi_f$	Mult.	δ	α[‡]	Comments
604.7223	2^+	604.721 2	100	0.0	0^+	E2		0.00599	α(K)=0.00503 16; α(L)=0.00072 2; B(E2)(W.u.)=33.6 6
1167.968	2^+	563.246 5	100.00 17	604.7223	2^+	M1+E2	−7.4 9	0.00727 2	α(K)=0.00609 1; α(L)=0.00089; B(E2)(W.u.)=73 22; B(M1)(W.u.)=0.0007 3
		1167.968 5	21.47 6	0.0	0^+	E2		0.00131	α(K)=0.00112 4; α(L)=0.00014 1; B(E2)(W.u.)=0.42 13
1400.590	4^+	232.6[@]	<0.0013	1167.968	2^+	[E2]		0.104	α(K)=0.0825 25; α(L)=0.0171 6; α(M)=0.00361 11; B(E2)(W.u.)=0.16 16
		795.864 4	100	604.7223	2^+	E2		0.00305	α(K)=0.00258 8; α(L)=0.00035 1; B(E2)(W.u.)=52 6
1643.336	3^+	242.738 8	1.88 16	1400.590	4^+	(M1+E2)		0.088 2	α(K)=0.0728 9; α(L)=0.0121 25; α(M)=0.0025 6
		475.365 2	100.0 3	1167.968	2^+	M1+E2	−10 3	0.0114	α(K)=0.0096; α(L)=0.00146; α(M)=0.00030; B(E2)(W.u.)=4.3 12; B(M1)(W.u.)=1.5×10^{-5} 10
		1038.610 7	66.98 19	604.7223	2^+	M1+E2	+0.83 11	0.00207 5	α(K)=0.00177 4; α(L)=0.00022 1; B(E2)(W.u.)=0.024 8; B(M1)(W.u.)=5.9×10^{-5} 17
1760.555	0^+	592.58 3	94 6	1167.968	2^+				
		1155.83 3	100 5	604.7223	2^+	E2		0.00134	α(K)=0.00115 4; α(L)=0.00015 1
		1759.9 7		0.0	0^+	E0			
1969.921	4^+	326.589 13	0.105 7	1643.336	3^+	[M1+E2]		0.037 2	α(K)=0.031 3; α(L)=0.0047 3; α(M)=0.00097 8
		569.331 3	100.00 11	1400.590	4^+	M1+E2	+0.26 1	0.0096	α(K)=0.00816 1; α(L)=0.00105
		801.953 4	56.5 1	1167.968	2^+	E2		0.00300	α(K)=0.00254 8; α(L)=0.00034 1
		1365.185 7	19.63 5	604.7223	2^+	E2		0.00096	α(K)=0.00082 3; α(L)=0.00010
1986.35	5^-	16		1969.921	4^+				
		585.5 3	100 12	1400.590	4^+	E1		0.00230	α(K)=0.00197 6; α(L)=0.00024 1; B(E1)(W.u.)=2.2×10^{-8} 5
		1382.0 3	12 4	604.7223	2^+	[E3]		0.00175	α(K)=0.00148 5; α(L)=0.00020 1; B(E3)(W.u.)=0.24 9
2029.242	2^+	861.29 5	1.8 5	1167.968	2^+				
		1424.511 24	100.0 16	604.7223	2^+	M1+E2	−0.31 5	0.00112 1	α(K)=0.00096 1; α(L)=0.00012; B(E2)(W.u.)=1.1 4; B(M1)(W.u.)=0.036 4
		2029.19 4	20.9 4	0.0	0^+	E2			B(E2)(W.u.)=0.43 5
2088.288	2^+	920.352 23	13.1 4	1167.968	2^+	M1+E2		0.0026 5	α(K)=0.0023 4; α(L)=0.00029 5 δ: +0.01 12 or +2.2 +12−7. B(M1)(W.u.)=0.041 4, B(E2)(W.u.)<0.08 if δ=+0.01 12; B(M1)(W.u.)=0.007 7, B(E2)(W.u.)=25 6 if δ=+2.2 +12−7.
		1483.52 3	100.0 21	604.7223	2^+	M1+E2	+0.02 5	0.00105	α(K)=0.00090; α(L)=0.00011; B(E2)(W.u.)=0.01 +5−10; B(M1)(W.u.)=0.075 7
		2088.26 4	39.9 10	0.0	0^+	E2			B(E2)(W.u.)=1.55 14
2118.195	(4^+)	717.604 8	100.0 7	1400.590	4^+				
		950.21 3	19.6 7	1167.968	2^+				
2159.683	$(0)^+$	991.73 4	1.8 4	1167.968	2^+	[E2]		0.00186	α(K)=0.00158 5; α(L)=0.00021 1; B(E2)(W.u.)=2.5 +8−9
		1554.946 24	100.0 18	604.7223	2^+	E2			B(E2)(W.u.)=14 +3−14
		2159.5[#@] 5	≤0.11	0.0	0^+				
2164.620	(4^+)	764.02 3	57.7 14	1400.590	4^+				
		996.649 12	100.0 14	1167.968	2^+				

From ENSDF

Adopted Levels, Gammas (continued)

γ(^{134}Ba) (continued)

E_i(level)	J^π_i	E_γ	I_γ	E_f	J^π_f	Mult.	δ	α‡	Comments
2211.3	(6$^+$)	810.7 3	100	1400.590	4$^+$	(E2)		0.00292	α(K)=0.00248 8; α(L)=0.00033 1
2244.99		601.65 5	100	1643.336	3$^+$				
2254.95	3$^-$	854.1@ 3	<48	1400.590	4$^+$				
		1087.8 3	19.5 8	1167.968	2$^+$	E1(+M2)	−0.08 7	0.00068 7	α(K)=0.00059 6
		1649.97 23	100.0 6	604.7223	2$^+$	E1(+M2)	−0.01 3		
2271.57	7$^-$	285.1 3	100	1986.35	5$^-$	[E2]		0.0534	α(K)=0.0433 13; α(L)=0.00805 25; α(M)=0.00169 5
2279.87	(2,3)	879.30 3	59.1 16	1400.590	4$^+$				
		1111.70 10	39.3 16	1167.968	2$^+$				
		1675.10 12	100.0 16	604.7223	2$^+$				
2285.34	(5)$^+$	315.54 12	18.0 18	1969.921	4$^+$				
		642.01 5	100 4	1643.336	3$^+$	E2		0.00514	α(K)=0.00433 13; α(L)=0.00061 2
		884.72 6	39.8 20	1400.590	4$^+$				
2299.7	(6$^+$)	899.1 3	100	1400.590	4$^+$				
2311	(1)	2311		0.0	0$^+$				
2334.76	1,2$^+$	1730.05 7	100 7	604.7223	2$^+$				
		2334.71 9	12.5 14	0.0	0$^+$				
2336.82	0$^+$	1168.63 8	8.4 11	1167.968	2$^+$	E2		0.00131	α(K)=0.00112 4; α(L)=0.00014 1; B(E2)(W.u.)=5.1 +13−17
		1732.12 3	100 2	604.7223	2$^+$	E2			B(E2)(W.u.)=8.5 +19−25
		2335 3		0.0	0$^+$	E0			
2371.02	2$^+$	728.2 5	7.8 6	1643.336	3$^+$				
		1766.28 7	100.0 11	604.7223	2$^+$	M1+E2			δ: −0.80 +10−16 or −5.5 +9−14. B(M1)(W.u.)=0.0044 21, B(E2)(W.u.)=0.6 3 if δ=−0.80 +10−16; B(M1)(W.u.)=0.00023 13, B(E2)(W.u.)=1.4 4 if δ=−5.5 +9−14.
		2371.0 5	12.9 9	0.0	0$^+$	E2			B(E2)(W.u.)=0.043 +12−20
2377.1	(6)	390.7 3	100	1986.35	5$^-$				
2379.112	0$^+$	1211.154 22	100 2	1167.968	2$^+$	E2		0.00122	α(K)=0.00104 4; α(L)=0.00013
		1774.35 3	40.5 13	604.7223	2$^+$	E2			
		2379.6 15		0.0	0$^+$	E0			
2464.28	(2$^+$)	1859.58 6	100.2 9	604.7223	2$^+$	(M1+E2)			δ: +0.18 +11−7 or +1.5 3.
		2464.15 10	16.2 9	0.0	0$^+$	(E2)			
2469.58	(5)$^+$	826.28 6	100 5	1643.336	3$^+$	E2		0.00279	α(K)=0.00237 8; α(L)=0.00032 1
		1068.76 16	33.8 23	1400.590	4$^+$				
2480.34	(2,3)	1875.60 5	100	604.7223	2$^+$				
2488.434	0$^+$	843.91 5	100 10	1643.336	3$^+$				E_γ: seen only in (n,n′γ).
		1320.707 23	69 3	1167.968	2$^+$	E2		0.00102	α(K)=0.00087 3; α(L)=0.00011; B(E2)(W.u.)=11 +4−11
		1883.74 12	2.8 2	604.7223	2$^+$				
		2487.0 15		0.0	0$^+$	E0			
2506.26	(4$^+$)	1105.68 4	100 3	1400.590	4$^+$	(M1+E2)		0.0017 3	α(K)=0.00149 24; α(L)=0.00019 3; δ: −0.21 11 or +1.5 5.
		1901.2 2	54 3	604.7223	2$^+$				

From ENSDF

$^{134}_{56}$Ba$_{78}$-6

$\gamma(^{134}\mathrm{Ba})$ (continued)

E_i(level)	J_i^π	E_γ	I_γ	E_f	J_f^π	Mult.	δ	α[‡]	Comments
2531.31	(5^- to 7^-)	259.70 12	48 7	2271.57	7^-				
		544.97 7	100 5	1986.35	5^-				
2536.91	0 to 2	1368.96 7	79 6	1167.968	2^+				
		1932.16 6	100 8	604.7223	2^+				
2564.712	$1^+,2^+$	1396.730 22	37.4 11	1167.968	2^+	M1,E2		0.00105 14	α(K)=0.00090 12; α(L)=0.00011 2
		1959.95 4	100 2	604.7223	2^+	M1,E2			
		2564.84 7	5.6 4	0.0	0^+				
2570.87	$1^{(+)}$	1402.89 4	58.2 23	1167.968	2^+				
		1966.09 11	20 3	604.7223	2^+				
		2570.85 5	100 3	0.0	0^+				
2574.31	(2^+)	544.7 3	49 6	2029.242	2^+				
		1406.4 5	67 6	1167.968	2^+				
		1969.65 11	85 6	604.7223	2^+				
		2573.7 5	100 9	0.0	0^+	(E2)			
2599.88	2^+	1431.35[#@] 13	2.5 5	1167.968	2^+				
		1995.14 4	100 2	604.7223	2^+	M1+E2			δ: −0.17 +9−7 or +4.1 +16−10.
		2599.84 6	3.4 5	0.0	0^+				
2656.23	(2^+)	1255.1[@] 3	23 3	1400.590	4^+				
		1488.3 3	60 15	1167.968	2^+				
		2051.51 9	100 9	604.7223	2^+	(M1+E2)	−0.4 3		
		2656.11 18	7.4 10	0.0	0^+				
2661.88	3 to 5	1018.54 5	100	1643.336	3^+				
2677.76	3,4	648.4 3	12 2	2029.242	2^+				
		2073.02 8	100 2	604.7223	2^+				
2696.58	1,2	1528.54 7	26.9 21	1167.968	2^+				
		2091.98 9	100 4	604.7223	2^+				
		2696.52 7	31.1 16	0.0	0^+				
2729.23	$1,2^+$	1561.4 4	4.1 5	1167.968	2^+				
		2124.49 4	100 2	604.7223	2^+				
		2729[@]	<10	0.0	0^+				
2747.965	2^+	659.85 9	16.2 16	2088.288	2^+				
		718.71 3	76 5	2029.242	2^+				
		1104.5 5	17 4	1643.336	3^+				
		1347.34 5	31.8 20	1400.590	4^+				
		1579.92 15	38 4	1167.968	2^+				
		2143.24 5	100 3	604.7223	2^+	M1+E2			δ: +0.4 +14−2 or +1.1 +5−9.
		2748.1 5	0.105 22	0.0	0^+				
2758.9?	$1,2^+$	1591.1[@] 11	100 30	1167.968	2^+				
		2758.9 3	46 3	0.0	0^+				
2760.74	1,2	2156.00 12	100	604.7223	2^+				

$^{134}_{56}\mathrm{Ba}_{78}$-7

$\gamma(^{134}Ba)$ (continued)

E_i(level)	J^π_i	E_γ	I_γ	E_f	J^π_f	Mult.	α[‡]	Comments
2773.73	3,4	744.73 15	61 5	2029.242	2^+			
		1373.2 10	20 5	1400.590	4^+			
		2168.99 10	100	604.7223	2^+			
2779.9		810	100	1969.921	4^+			
2806	(1)	2806		0.0	0^+			
2823.72	1^-	2823.69 11		0.0	0^+	E1		
2828.50	$1^+,2^+$	1184.92 12	9.8 12	1643.336	3^+			
		1660.57[#] 7	16.2 14	1167.968	2^+			
		2223.77 4	100 3	604.7223	2^+	M1,E2		
		2828.1 3	0.20 6	0.0	0^+			
2835.9	(8^+)	536		2299.7	(6^+)			
		565		2271.57	7^-			
		624.5 3		2211.3	(6^+)	(E2)	0.00552	α(K)=0.00464 14; α(L)=0.00066 2
2851.26	2^+	1683.33 7	100 7	1167.968	2^+			
		2246.7 4	18 4	604.7223	2^+			E_γ: Not seen in (n,n′γ).
		2851.05 12	35.5 17	0.0	0^+	E2		
2876.89	3 to 5	1233.55 10	100	1643.336	3^+			
2887.04	1,2	1243.84[#] 21	26 5	1643.336	3^+			
		1719.05 6	77 5	1167.968	2^+			
		2282.30 5	100 4	604.7223	2^+			
2913.1		641.5 3	100	2271.57	7^-			
2917.61	2	1517.09 15	79 22	1400.590	4^+			
		1749.41 13	64 8	1167.968	2^+			
		2312.91 7	100 6	604.7223	2^+			
2925.99	3 to 5	1282.65 15	100	1643.336	3^+			
2938.93	1^+	1771	33[†] 7	1167.968	2^+			
		2334.7[@] 4	26[†] 5	604.7223	2^+			E_γ: Seen only in ε decay.
		2938.9 2	100[†]	0.0	0^+	M1		
2943.90	2 to 4	2339.16 14	100	604.7223	2^+			
2950.56	3,4	1307.6 4	52 8	1643.336	3^+			
		2345.6 3	100 8	604.7223	2^+			
2957.2	(10^+)	121.3 3	100	2835.9	(8^+)	E2	0.98	α(K)=0.673 21; α(L)=0.243 8; α(M)=0.0524 16; B(E2)(W.u.)=0.102 6
3004.41	$1,2^+$	1243.84[#@] 21	<130	1760.555	0^+			
		1836.43 15	100	1167.968	2^+			
3011	(1)	3011		0.0	0^+			
3011.7		712	100	2299.7	(6^+)			
3027.38	(1^+)	1859.43[@] 6		1167.968	2^+			E_γ: γ not observed in (γ,γ') experiment.
		2422.4 6	46 6	604.7223	2^+			
		3027.11 18	100 7	0.0	0^+			
3061.29	$2^{(+)}$	1660.57[#@] 7	<120	1400.590	4^+			

$\gamma(^{134}Ba)$ (continued)

E_i(level)	J^π_i	E_γ	I_γ	E_f	J^π_f	Mult.	α[‡]	Comments
3061.29	$2^{(+)}$	1893.35 *9*	100 *7*	1167.968	2^+			
		2456.2 *5*	6.2 *21*	604.7223	2^+			
		3061.23 *8*	22.7 *21*	0.0	0^+			
3068.85?	$1,2^+$	1307.0 *7*	100 *50*	1760.555	0^+			
		2464.15 *13*	83 *15*	604.7223	2^+			
3074.72?	(2)	1431.35[#] *13*	100 *20*	1643.336	3^+			
		1674.6 *5*	27 *11*	1400.590	4^+			
3086.65	$1^+,2^+$	1443.1 *2*	100 *8*	1643.336	3^+			
		1917.8 *4*	86 *10*	1167.968	2^+			
		2482.24 *17*	62 *19*	604.7223	2^+			
		3086.59 *15*	36 *6*	0.0	0^+			
3160.07	$1,2^+$	1992.1 *2*	100 *8*	1167.968	2^+			
		3159.9 *6*	34 *5*	0.0	0^+			
3216.3?	$1,2^+$	2612.3 *9*	13 *6*	604.7223	2^+			
		3215.7 *8*	100 *40*	0.0	0^+			
3240.5	(9^-)	328[@]		2913.1				
		968.9 *3*	100	2271.57	7^-	(E2)	0.00195	α(K)=0.00166 *5*; α(L)=0.00022 *1*
3242.3		865		2377.1	(6)			
		971		2271.57	7^-			
3245.88	(1^+)	3245.84 *19*	100	0.0	0^+			
3262.0	2 to 4	2657.2 *3*	100	604.7223	2^+			
3272.10	$1^-,2^-$	1017.3 *2*	17 *8*	2254.95	3^-			
		2104.09 *6*	100 *7*	1167.968	2^+			
		2667.37 *9*	34.9 *23*	604.7223	2^+			
3311.3		934		2377.1	(6)			
		1040		2271.57	7^-			
3314.56	2,3	1913.8 *2*		1400.590	4^+			
		2710.4 *4*	100	604.7223	2^+			
3327.25	(1^+)	2159.5[#] *5*	≤90	1167.968	2^+			
		2722.5 *3*	77 *9*	604.7223	2^+			
		3327.18 *15*	100 *20*	0.0	0^+			
3328.3		1117	100	2211.3	(6^+)			
3343	(1)	3343		0.0	0^+			
3368.97	1,2	1114.3 *6*	100 *23*	2254.95	3^-			
		2764.22 *6*	60.0 *25*	604.7223	2^+			
		3368.8 *6*	1.5 *5*	0.0	0^+			
3371.79	2 to 4	2203.8 *2*	100	1167.968	2^+			
3408.72	1,2	1765.71 *22*	100 *17*	1643.336	3^+			
		2240.4 *6*	24 *8*	1167.968	2^+			
		2803.5 *3*	12.9 *15*	604.7223	2^+			
		3408.1 *8*	14 *7*	0.0	0^+			

Adopted Levels, Gammas (continued)

γ(^{134}Ba) (continued)

E_i(level)	J_i^π	E_γ	I_γ	E_f	J_f^π	Mult.
3432.15?	1,2$^+$	2827.4 *1*	100 *25*	604.7223	2$^+$	
		3432.1 *7*	10.0 *25*	0.0	0$^+$	
3443.39	2 to 4	2275.4 *2*	100	1167.968	2$^+$	
3450.27	(1$^+$)	2845.6 *5*	19 *10*	604.7223	2$^+$	
		3450.22 *8*	100 *15*	0.0	0$^+$	
3451.0	1,2$^+$	2283.0 *4*	100 *10*	1167.968	2$^+$	
		3451.4 *11*	52 *10*	0.0	0$^+$	
3459.3		217	100	3242.3		
3471.1?	2$^+$	2866.4 *3*	100 *14*	604.7223	2$^+$	
		3471.0 *5*	4.4 *23*	0.0	0$^+$	
3499.68	(1,2)	2894.92 *14*	100	604.7223	2$^+$	
3504.2		547	100	2957.2	(10$^+$)	
3548.5	1,2$^+$	2943.3 *8*	100 *22*	604.7223	2$^+$	
		3548.5 *4*	43 *8*	0.0	0$^+$	
3560	1	3560		0.0	0$^+$	D
3589	1	3589		0.0	0$^+$	D
3599.3		357	100	3242.3		
3617	(1)	3617		0.0	0$^+$	
3635.9		800	100	2835.9	(8$^+$)	
3652.1?	1,2$^+$	3047.4 *5*	100 *50*	604.7223	2$^+$	
3652.1?	1,2$^+$	3652.0 *10*	13 *10*	0.0	0$^+$	
3684.2	2$^+$	3684.1 *4*	100	0.0	0$^+$	E2
3705	1	3705		0.0	0$^+$	D
3783	(1)	3783		0.0	0$^+$	
3836	1	3836		0.0	0$^+$	D
3853.8	2$^+$	3853.7 *4*	100	0.0	0$^+$	E2
3899.1		986	100	2913.1		
3954.3		495		3459.3		
		712		3242.3		
3980	(1)	3980		0.0	0$^+$	
3992	(1)	3992		0.0	0$^+$	
4001.4		760.9 *3*	100	3240.5	(9$^-$)	
4083.5		843	100	3240.5	(9$^-$)	
4517.4		516	100	4001.4		
4549.9		914	100	3635.9		
4635.2		1131	100	3504.2		
5001.4		484	100	4517.4		
5015.4		498	100	4517.4		
5230.9		681	100	4549.9		

† From ^{134}Ba(γ,γ').

‡ Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.

Multiply placed.

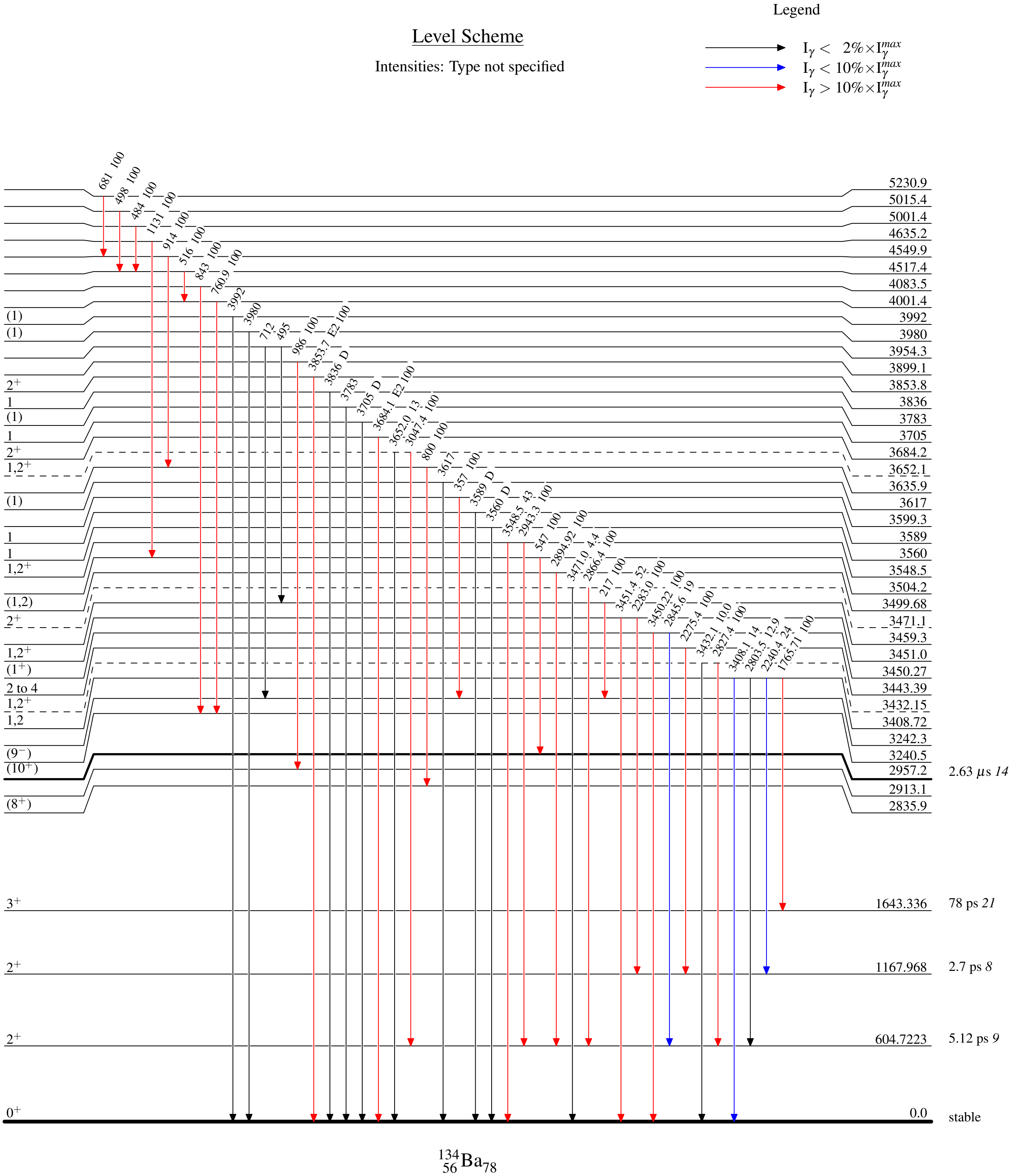
@ Placement of transition in the level scheme is uncertain.

$^{134}_{56}Ba_{78}$-10

Adopted Levels, Gammas

Level Scheme

Intensities: Type not specified



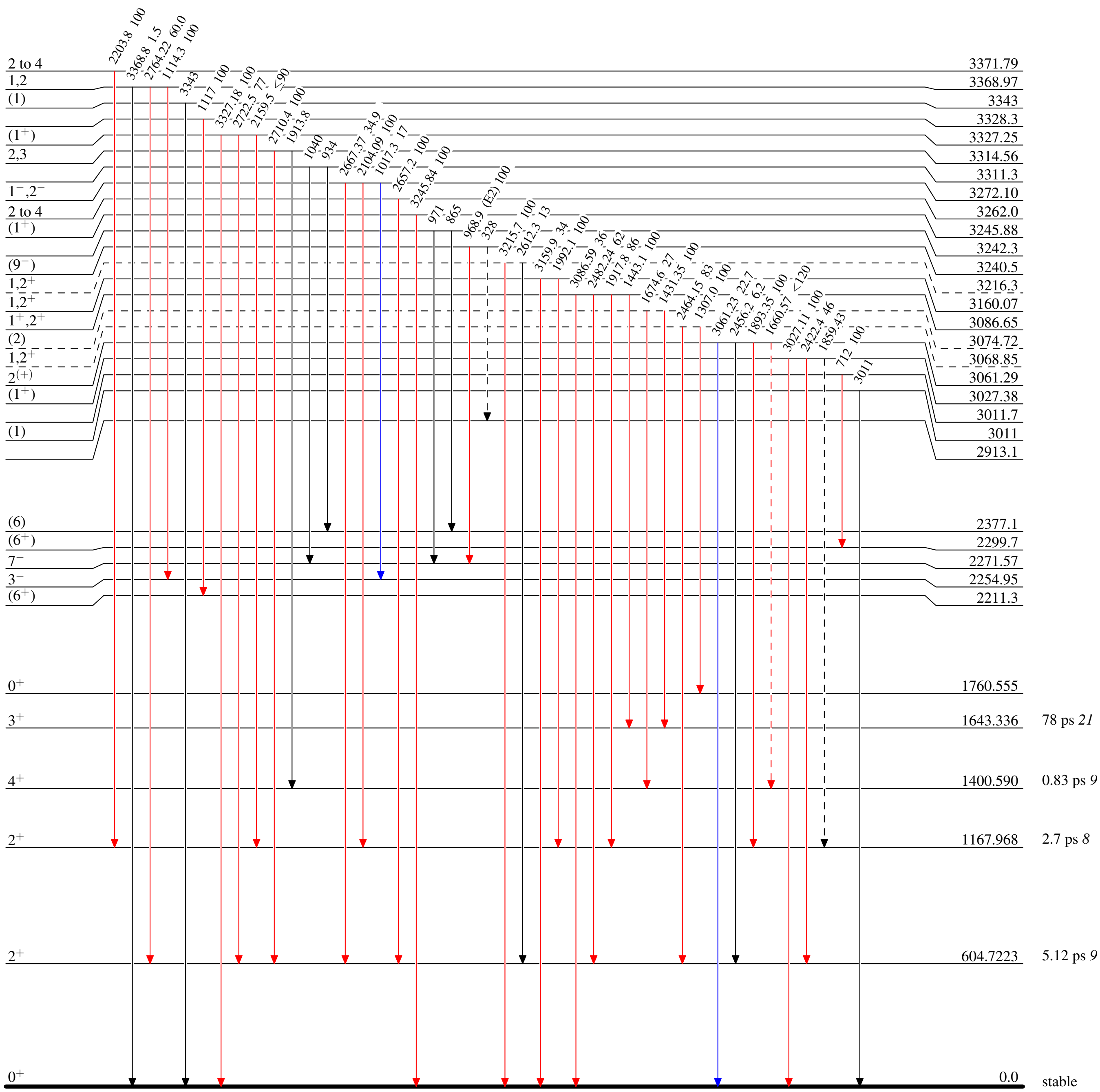
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Type not specified

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)

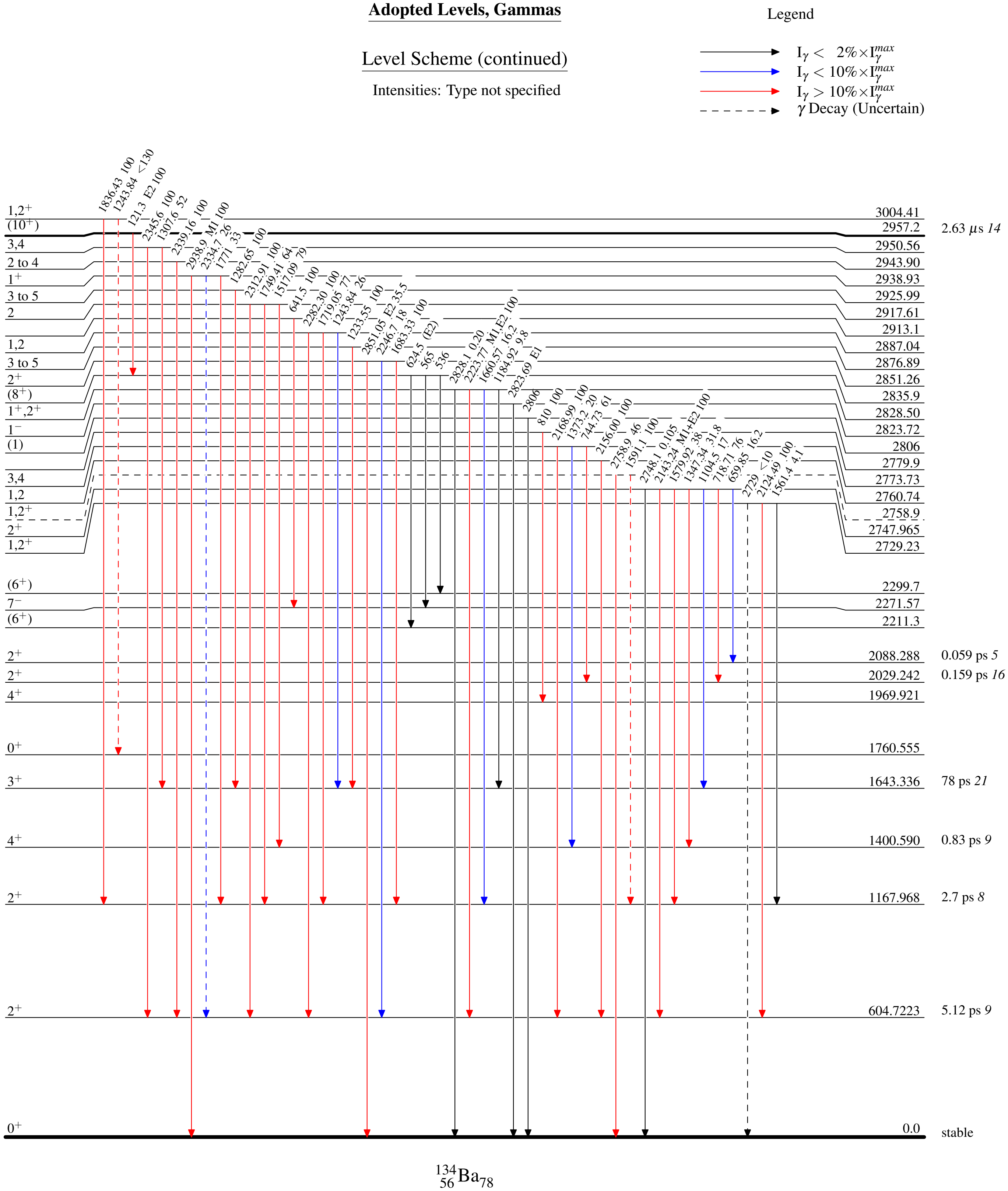


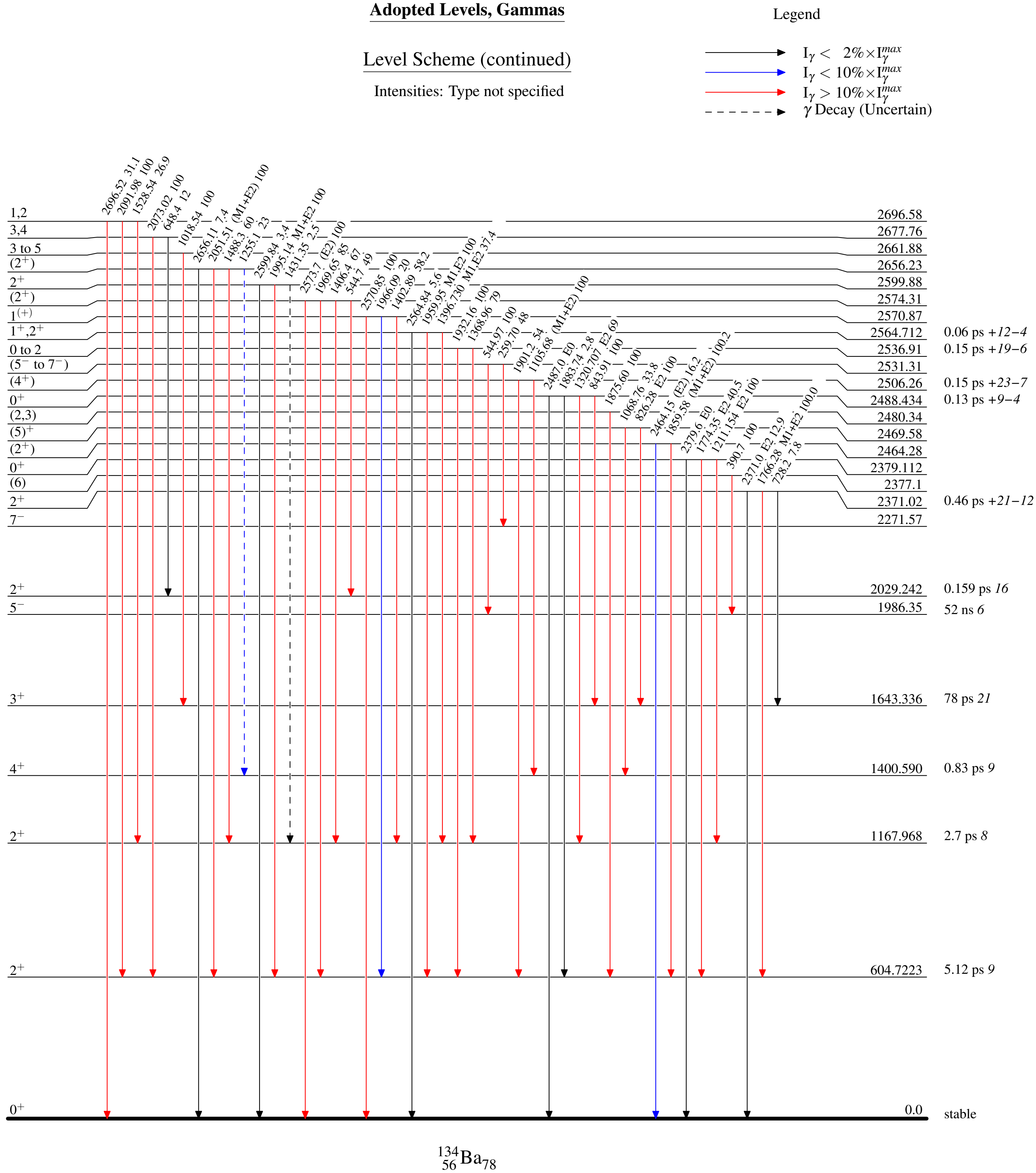
$^{134}_{56}Ba_{78}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Type not specified

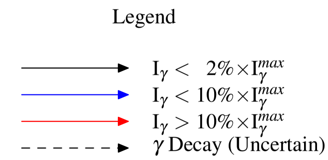


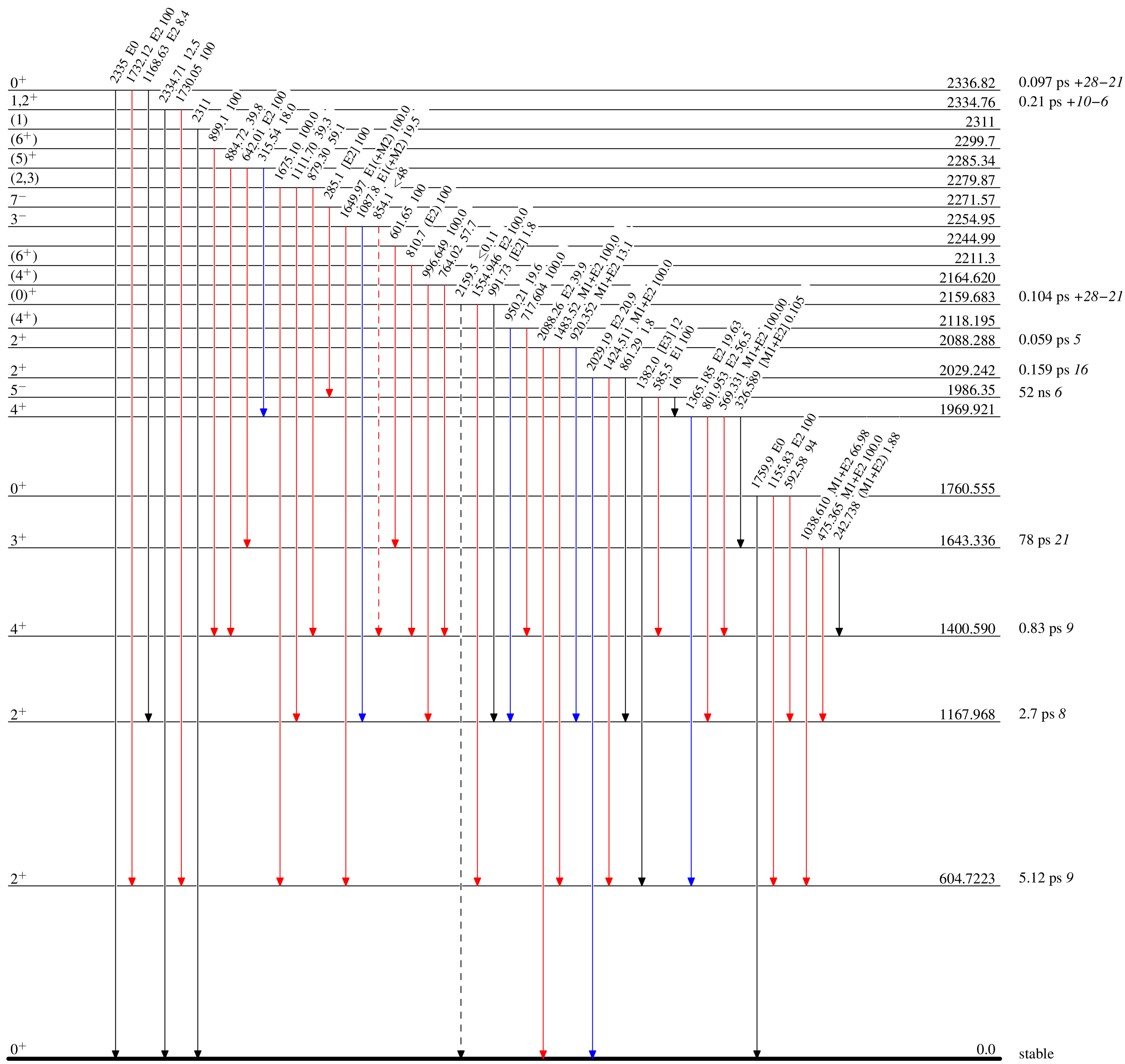

Adopted Levels, Gammas
Level Scheme (continued)
Intensities: Type not specified
Legend
$I_\gamma < 2\% \times I_\gamma^{max}$
$I_\gamma < 10\% \times I_\gamma^{max}$
$I_\gamma > 10\% \times I_\gamma^{max}$
γ Decay (Uncertain)
1,2 2696.58
3,4 2677.76
3 to 5 2661.88
(2+) 2656.23
2+ 2599.88
(2+) 2574.31
1(+) 2570.87
1+,2+ 2564.712 0.06 ps +12−4
0 to 2 2536.91 0.15 ps +19−6
(5− to 7−) 2531.31
(4+) 2506.26 0.15 ps +23−7
0+ 2488.434 0.13 ps +9−4
(2,3) 2480.34
(5)+ 2469.58
(2+) 2464.28
0+ 2379.112
(6) 2377.1
2+ 2371.02 0.46 ps +21−12
7− 2271.57
2+ 2029.242 0.159 ps 16
5− 1986.35 52 ns 6
3+ 1643.336 78 ps 21
4+ 1400.590 0.83 ps 9
2+ 1167.968 2.7 ps 8
2+ 604.7223 5.12 ps 9
0+ 0.0 stable
2696.52 31.1
2091.98 100
1528.54 26.9
2073.02 100
648.4 12
1018.54 100
2656.11 7.4
2051.51 (M1+E2) 100
1488.3 60
1255.1 23
2599.84 3.4
1995.14 M1+E2 100
1431.35 2.5
2573.7 (E2) 100
1969.65 85
1406.4 67
544.7 49
2570.85 100
1966.09 20
1402.89 58.2
2564.84 5.6
1959.95 M1,E2 100
1396.730 M1,E2 37.4
1932.16 100
1368.96 79
544.97 100
259.70 48
1901.2 54
1105.68 (M1+E2) 100
2487.0 E0
1883.74 2.8
1320.707 E2 69
843.91 100
1875.60 100
1068.76 33.8
826.28 E2 100
2464.15 (E2) 16.2
1859.58 (M1+E2) 100.2
2379.6 E0
1774.35 E2 40.5
1211.154 E2 100
390.7 100
2371.0 E2 12.9
1766.28 M1+E2 100.0
728.2 7.8
$^{134}_{56}Ba_{78}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Type not specified



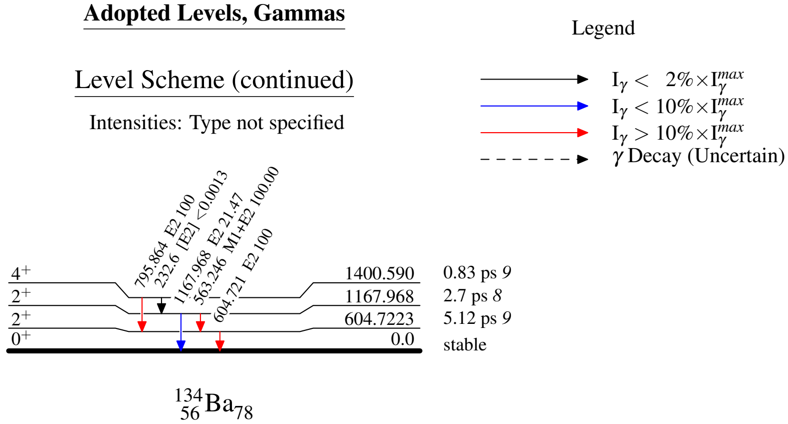


$^{134}_{56}Ba_{78}$

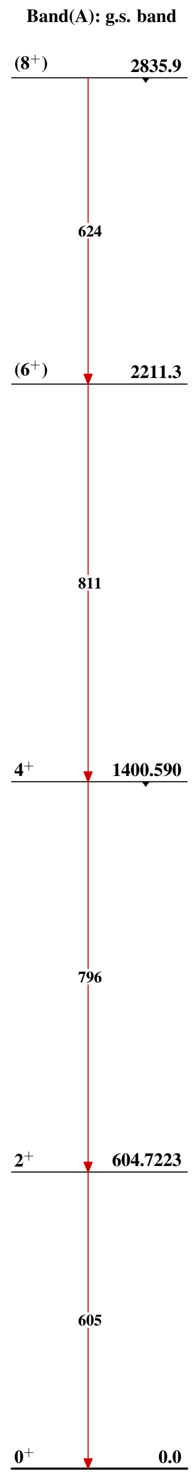
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Type not specified



Adopted Levels, Gammas



$^{134}_{56}Ba_{78}$

Adopted Levels, Gammas

	History		
Type	Author	Citation	Literature Cutoff Date
Full Evaluation	E. A. Mccutchan	NDS 152, 331 (2018)	1-Apr-2018

Q(β^-)=−2.85×10^3 *5*; S(n)=9107.74 *4*; S(p)=8594.3 *10*; Q(α)=−2032.9 *3* 2017Wa10
S(2n)=16079.70 *11*, S(2p)=15339.0 *3* (2017Wa10).
α: Additional information 1.

^{136}Ba Levels

Cross Reference (XREF) Flags

A	^{136}Cs β^- decay (13.01 d)	G	^{136}Ba(n,n′γ)	M	^{198}Pt(^{136}Xe,Xγ)
B	^{136}La ε decay (9.87 min)	H	^{136}Ba(d,d′),(α,α′)	N	^{135}Ba(d,p)
C	^{136}Ba IT decay	I	Coulomb excitation	O	^{140}Ce(d,^{6}Li)
D	^{135}Ba(n,γ) E=thermal	J	^{136}Ba(γ,γ′),(pol γ,γ′)	P	^{208}Pb(^{136}Xe,Xγ)
E	^{135}Ba(n,γ) E=24.4-463.4 eV res	K	^{138}Ba(p,t),(pol p,t)		
F	^{135}Ba(n,γ) E=2,24 keV: av res	L	^{139}La(^{82}Se,Xγ)		

E(level)[†]	J$^\pi$	T$_{1/2}$[‡]	XREF	Comments
0.0[&]	0$^+$	stable	ABCDEFGHIJKLM OP	Δ<r^2>(^{138}Ba,^{136}Ba)=−0.039 *7* (1988We07), other: −0.034 *4* (1999GaZX).
818.522[&] *10*	2$^+$	1.89 ps *3*	ABCDEFGHIJKLMNOP	μ=0.68 *10* (1980Br01); B(E2)↑=0.407 *7* J$^\pi$: E2 818γ to 0$^+$. T$_{1/2}$: deduced by evaluator from B(E2) value and Adopted Gamma properties. B(E2)↑: from Coulomb Excitation. μ: from dynamic field technique (1980Br01). Q: −0.19 *6* (+0.07 *7*) (1986BaZJ,1986Ro15), +0.01 *5* (+0.25 *5*) (1984Be20), or −0.19 *17* (+0.02 *18*) (1972Ke16). Values outside parentheses correspond to constructive interference from 2nd 2$^+$ while those in parentheses correspond to destructive interference.
1550.987 *13*	2$^+$	0.89 ps *29*	ABCDEFGHIJK N	B(E2)↑=0.016 *4* (1985Bu01) T$_{1/2}$: weighted average of 1.08 ps *29* from B(E2) in Coulomb Excitation 0.88 ps *39* from resonance fluorescence in (γ,γ′), 0.77 ps *+24−19* from DSAM in ^{136}Ba(n,n′γ). J$^\pi$: E2 1551γ to 0$^+$. B(E2)↑: from Coulomb Excitation.
1578.969 *22*	0$^+$	>735 fs	B DEFGH N	J$^\pi$: E0 transition to 0$^+$.
1866.611[&] *18*	4$^+$		A CD FGH KLM P	J$^\pi$: E2 1048γ to 2$^+$; band assignment.
2030.535 *18*	7$^-$	0.3084 s *19*	A CD G KLM P	%IT=100 J$^\pi$: E3 164γ to 4$^+$; L(p,t)=7. T$_{1/2}$: from γ(t) in ^{135}Ba(n,γ), E=thermal. Other: 0.37 s *5* (γ(t) in 1965Ru05).
2053.892 *18*	4$^+$	0.87 ps *+84−29*	A D GH LM	J$^\pi$: E2 1235γ to 2$^+$, M1+E2 187γ to 4$^+$.
2080.13 *3*	2$^+$	1.0 ps *+11−4*	B DEFG J N	J$^\pi$: E2 2080γ to 0$^+$. T$_{1/2}$: other: >0.6 ps in (γ,γ′).
2128.869 *14*	2$^+$	50 fs *4*	B DEFGHIJ N	J$^\pi$: E2 2129γ to 0$^+$. T$_{1/2}$: weighted average of 48.5 fs *69* from DSAM in ^{136}Ba(n,n′γ) and 51 fs *4* from (γ,γ′).
2140.237 *18*	5$^-$	1.6 ns *1*	A D G KLM	μ=−1.9 *2* (1979Oh03); Configuration=((ν s$_{1/2}$)$^{-1}$(ν h$_{11/2}$)$^{-1}$) (1987Dr13) J$^\pi$: L(p,t)=5. T$_{1/2}$: from $\gamma\gamma$(t) in ^{136}Cs β^- decay.

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{136}Ba Levels (continued)

E(level)[†]	J^π	$T_{1/2}$[‡]	XREF	Comments
				μ: from IPAC method (1979Oh03).
2141.38 *3*	0^+	0.26 ps *+13−7*	B D FGh	J^π: E2 1322.85γ to 2^+; J=0 from isotropic γ(θ) in (n,n′γ).
2153.55 *8*	$(1,2^+)$		D h	J^π: 2153.5γ to 0^+.
2207.147[&] *18*	6^+	3.1 ns *1*	A D G LMN	XREF: N(2182). J^π: E1+M2 177γ to 7^-, E2 340.5γ to 4^+. $T_{1/2}$: from βγ(t) in ^{136}Cs β^- decay.
2222.709 *19*	$(2,1)^+$	0.63 ps *+44−19*	DEFG J N	J^π: M1+E2 1404γ to 2^+, tentative 2223γ to 0^+.
2298.69 *4*	(6^-)		D G	J^π: D+Q 158γ to 5^-, 268γ to 7^-.
2315.26 *7*	0^+	>0.85 ps	B D FGH	J^π: γ(θ) is isotropic for 1497γ in ^{136}Ba(n,n′γ).
2349.5? *5*			E	
2356.497 *22*	4^+	0.51 ps *+52−18*	A D G	J^π: M1(+E2) 302γ to 4^+, E2 1538γ to 2^+.
2373.761 *18*	5^+		A D FG	J^π: M1(+E2) 167γ to 6^+, M1+E2 320γ to 4^+.
2390.817 *22*	3^-	0.21 ps *+8−5*	D G	J^π: E1(+M2) 337γ to 4^+, E1+M2 1572γ to 2^+.
2392.1 *6*	$(1^+,2^+)$		F n	J^π: from analysis of average resonance capture data.
2399.94 *3*	$(1)^+$	118 fs *+28−21*	DEFG n	J^π: $(1^+,2^+)$ from analysis of average resonance capture data, excitation function in ^{136}Ba(n,n′γ) favors J=1, M1+E2 1581γ to 2^+ gives π=+.
2430.936 *22*	3^+	0.20 ps *+7−4*	D FG	J^π: average resonance capture data gives J=0 or 3; M1+E2 1612γ to 2^+.
2485.13 *5*	2^+	146 fs *+35−28*	B D FG J	J^π: E2 2485γ to 0^+. $T_{1/2}$: other: >18 fs in (γ,γ′).
2532.653 *23*	3^-	76 fs *7*	B DEFGHI	B(E2)↑=0.155 *18* J^π: $0^-,3^-$ from average resonance capture, E1+M2 1714γ to 2^+. B(E2)↑: from Coulomb Excitation.
2544.481 *24*	4^+	0.44 ps *+56−17*	G	J^π: E2 993γ to 2^+.
2562? *10*			K	
2587.08 *3*	$(5)^+$	>0.83 ps	G	J^π: M1+E2 720γ to 4^+, J=5 is favored from excitation function in ^{136}Ba(n,n′γ).
2640.80 *4*	(1^+)	55 fs *7*	B DEFG K	XREF: E(?). J^π: D+Q 1822γ to 2^+, analysis of average resonance capture gives $(1^+,2^+)$, excitation function in ^{136}Ba(n,n′γ) suggests $J^\pi=1^+$.
2659.65 *5*	$(3,4,5)^+$		G n	J^π: M1+E2 793γ to 4^+.
2661.48 *5*	$1,2^+$	73 fs *14*	DEFG n	J^π: D+Q 1843γ to 2^+, 2662γ to 0^+.
2693.89 *5*	1	120 ps *20*	DEFG J	J^π: D 2694γ to 0^+. $T_{1/2}$: weighted average of 104 fs *+35−28* from DSAM in ^{136}Ba(n,n′γ) and 127 ps *20* from (γ,γ′).
2694.43? *4*	5^+		D G	J^π: M1+E2 641γ to 4^+, D+Q 487γ to 6^+.
2773.66 *4*	2^+	180 fs *+60−40*	B DEFG J	J^π: E2 2774γ to 0^+.
2779.99 *5*	2^+	0.28 ps *+37−11*	FG J	J^π: E2 2779.5γ to 0^+.
2784.44? *13*	0^+	42 fs *+21−14*	E Gh	J^π: isotropic γ(θ) for 1966γ in ^{136}Ba(n,n′γ) gives J=0, π=+ from RUL of 1966γ.
2812.02 *7*	(3^+)	0.15 ps *+22−7*	DEFGh	XREF: E(?). J^π: D+Q 1993γ to 2^+, γ(θ) in ^{136}Ba(n,n′γ).
2820.18 *10*	$(2,3,4^+)$		G	J^π: 287.4γ to 3^-, 389.5γ to 3^+, 740.1γ to 2^+.
2840.74 *10*	(4^+)		G K	J^π: (M1+E2) 974γ to 4^+, Q 2022γ to 2^+.
2905.0? *5*			EF	
2935.1? *9*	$(1,2^+)$		E G	J^π: 2935γ to 0^+.
2946.0? *5*	$0^{(+)},1,2,3^+$[c]		E	
2977.67 *18*		0.11 ps *+16−6*	EFG J	
2985.01 *6*	$(2^+,3^+,4^+)$	0.11 ps *+19−6*	G	J^π: 1118γ to 4^+, 2166γ to 2^+.
2994.19[&] *14*	$8^{(+)}$		LM	J^π: Q 787γ to 6^+, band assignment.
2995.34 *5*			DE	

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{136}Ba Levels (continued)

E(level)[†]	J^π	$T_{1/2}$[‡]	XREF	Comments
3022.10 *8*	(1,2$^+$)	0.14 ps *+6−4*	DEFG K	XREF: F(3014). J^π: 3022γ to 0$^+$, L(p,t)=4 is discrepant.
3044.54 *5*	1$^{(-)}$[@]	20 fs *3*	DEFG J	J^π: J=1 from γ(126°)/γ(90°) in (γ,γ'). Linear polarization in (pol γ,γ') slightly favors π=−.
3077.35 *7*	3$^+$	0.11 ps *+8−4*	G	J^π: M1+E2 2259γ to 2$^+$, D+Q 1211γ to 4$^+$.
3109.59 *9*	2$^+$	0.27 ps *+13−7*	FGH J	J^π: E2 3109γ to 0$^+$.
3116.08 *6*	2$^+$	101 fs *22*	DE G J	J^π: E2 3116γ to 0$^+$. $T_{1/2}$: weighted average of 83 fs *+21−14* from DSAM in ^{136}Ba(n,n$'\gamma$) and 122 fs *22* from (γ,γ').
3178.9 *7*	0$^{(+)}$,1,2,3$^{(+)}$[c]		E	
3212.0? *5*	0$^{(+)}$,1,2,3$^+$[c]		E	
3241.89 *17*		42 fs *+21−14*	G K	XREF: K(3262).
3335.6 *3*			G	
3347.6 *7*	0$^{(+)}$,1,2,3$^+$[c]		E	
3354.5 *3*			G	
3357.19[&] *25*	10$^{(+)}$	91 ns *2*	LM	$T_{1/2}$: weighted average of 94 ns *10* from $\gamma\gamma$(t) in ^{139}La(^{82}Se,Xγ) and 91 ns *2* from $\gamma\gamma$(t) in ^{198}Pt(^{136}Xe,Xγ). J^π: E2 363γ to 8$^{(+)}$; band assignment.
3370.07 *21*	1	18 fs *4*	DE G J	XREF: E(3366.5). J^π: D 3370γ to 0$^+$. $T_{1/2}$: deduced by evaluator from $\Gamma^2_{\gamma0}/\Gamma$ in (γ,γ') assuming $\Gamma_{\gamma0}$=1.
3378.0? *5*			E	
3435.0 *1*	1$^-$	6.0 fs *13*	DE G J	J^π: E1 3435γ to 0$^+$. $T_{1/2}$: deduced by evaluator from $\Gamma^2_{\gamma0}/\Gamma$ in (γ,γ') assuming $\Gamma_{\gamma0}$=1.
3505.5 *9*	0$^{(+)}$,1,2,3$^+$[c]		DE h	
3508.7 *3*	(4$^+$)		Gh K	J^π: L(p,t)=(4).
3526.7 *4*	2$^+$		G J	J^π: Q 3526γ to 0$^+$, population in (γ,γ') suggests positive parity.
3542.5 *7*	(0$^+$),1,2,3,4$^{(+)}$[c]		E	
3550.70? *20*			G	
3559.0? *5*	0$^{(+)}$,1,2,3$^{(+)}$[c]		E	
3579.5 *7*	0$^+$,1,2,3,4$^+$[c]		E	
3650.0 *5*	(0$^+$),1,2,3,4$^{(+)}$[c]		E H	
3691.92 *13*	1 to 3		DE	J^π: 2873γ to 2$^+$, primary γ from 1$^{(+)}$.
3698.5 *7*	(0$^+$),1,2,3,4$^{(+)}$[c]		E	
3706.1 *6*	(1,2$^+$)		G K	J^π: 3706γ to 0$^+$.
3706.4 *3*			LM	
3760.3? *11*			F	
3768.9 *3*	1$^{(-)}$,2,3$^+$		DE	J^π: 1235γ to 3$^-$; primary γ from 1$^+$ res.
3795.34 *15*	(1,2$^+$)		DE G	J^π: 3795γ to 0$^+$.
3848.5 *5*	0$^{(+)}$,1,2,3$^+$[c]		E	
3850.4?			M	
3852.7? *6*	(1,2$^+$)		fG	J^π: 3853γ to 0$^+$.
3863.47 *23*	(1,2$^+$)		DEf	J^π: 3863γ to 0$^+$.
3881.17? *10*	(1,2$^+$)		G J	J^π: 3881γ to 0$^+$.
3925.6 *3*			DE	
3962.9 *8*			G	
3965.51 *6*	(1,2$^+$)		DE	J^π: 3965.5γ to 0$^+$.
3979.76 *20*	(1)	21 fs *4*	DE G J	$T_{1/2}$: deduced by evaluator from $\Gamma^2_{\gamma0}/\Gamma$ in (γ,γ') assuming $\Gamma_{\gamma0}$=1.
3992.56 *19*	0$^{(+)}$,1,2,3$^+$[c]		DE	

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{136}Ba Levels (continued)

E(level)†	J^π	XREF	Comments
4008.6 3	1,2$^+$	DE	J^π: 2429.6γ to 0^+.
4075? 10		K	
4137.07 10	1	D J	J^π: D 4137γ to 0^+.
4214.9		LM	
4231.17 20	1#	J	
4366.78 20	1#	J	
4413.28 10	(1)#	J	
4475.18 10	(1)#	J	
4536.4 3	1#	J	
4601.08 20	(1)#	J	
4623.7 3	1^-@	J	
4639.7 10	1^-@	J	
4697.79 10	1^-@	J	
4767.69 10	1^-@	J	
4814.09 10	1#	J	
4833.3 5		J	
4897.8 16	1#	J	
4985.0 6	1^-@	J	
5040 3	1^-@	J	
5060.80 20	1^-@	J	
5065		M	
5076.9 8	1^-@	J	
5094.5 7	1^-@	J	
5135.2 3	1^-@	J	
5216.31 20	(1)#	J	
5268.4 7	(1)#	J	
5294.31 10	1#	J	
5337.81 20	1#	J	
5380		M	
5393		M	
5396.5 7	(1)#	J	
5418.4 5	(1)#	J	
5431.5 10	1#	J	
5444.42 10	(1)#	J	
5497.6 7	1^-@	J	
5561.1 3	1^-@	J	
5585.6 7	1^-@	J	
5601.22 10	1^-@	J	
5610.0 6	1^-@	J	
5647.9 13	1^-@	J	
5652.2 10	1^-@	J	
5718 3	(1)#	J	
5735.0 7		J	
5768.0 4	1#	J	
5781.7 9	1#	J	
5805.13 10	1#	J	
5924.2 6	1#	J	

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Adopted Levels, Gammas (continued)

^{136}Ba Levels (continued)

E(level)†	J$^{\pi}$	XREF
5965.8 *4*	1^{-}@	J
5979.24 *20*	1^{-}@	J
6005.04 *10*	1^{-}@	J
6035.74 *10*	1^{-}@	J
6052.94 *20*	1^{-}@	J
6061.44 *10*	1^{-}@	J
6082.55 *10*	1^{-}@	J
6113.35 *20*	1^{-}@	J
6161.25 *20*	1^{-}@	J
6182.35 *20*	1^{-}@	J
6192.8 *8*	(1)#	J
6215.7 *5*	(1)#	J
6231.6 *4*	(1)#	J
6244.2 *8*	(1)#	J
6264.75 *20*	(1)#	J
6289.2 *7*	(1)#	J
6331.9 *4*	1^{-}@	J
6344.4 *7*	1^{-}@	J
6358.2 *7*	1^{-}@	J
6373.6 *8*	1^{-}@	J
6391.3 *16*	1^{-}@	J
6409.9 *19*	1^{-}@	J
6430.6 *11*	1^{-}@	J
6449.46 *20*	1^{-}@	J
6478.17 *10*	1^{-}@	J
6488.67 *10*	1^{-}@	J
6528.8 *11*	1^{-}@	J
6554.3 *8*	1^{-}@	J
6591.8 *3*	1^{-}@	J
6625.27 *10*	1^{-}@	J
6677.3 *3*	1#	J
6693.38 *10*	1#	J
6716.8 *3*	1#	J
6741.9 *3*	1^{-}@	J
6756.58 *20*	1^{-}@	J
6767.78 *10*	1^{-}@	J
6776.78 *10*	1^{-}@	J
6788.38 *20*	1^{-}@	J
6830.8 *7*	1^{-}@	J
6840.3 *8*	1^{-}@	J
6847.5 *11*	1^{-}@	J
6859.2 *8*	1^{-}@	J
6870.4 *10*	1^{-}@	J
6880.5 *5*	1^{-}@	J
6895.79 *20*	1^{-}@	J
6952.0 *11*	1^{-}@	J
6982.29 *20*	1^{-}@	J
6998.5 *7*	1^{-}@	J
7006.6 *14*	1^{-}@	J
7018.89 *10*	1^{-}@	J
7150.60 *10*	(1)#	J
7251.1 *3*	1^{-}@	J
7271.6 *5*	1^{-}@	J
7281.5 *15*	1^{-}@	J
7298.81 *10*	1^{-}@	J
7314.81 *20*	1^{-}@	J
7350.2 *14*	1^{-}@	J
7364.1 *3*	1^{-}@	J
7382.1 *4*	1^{-}@	J
7394.4 *9*	1^{-}@	J
7402.5 *3*	1^{-}@	J
7414.9 *13*	1^{-}@	J
7444.4 *3*	1^{-}@	J
7472.52 *10*	1^{-}@	J
7487.5 *4*	1^{-}@	J
7502.8 *3*	1^{-}@	J
7519.2 *10*	1^{-}@	J
7541.0 *6*	1^{-}@	J
7558.1 *7*	1^{-}@	J
7572.13 *10*	1^{-}@	J
7583.5 *8*	1^{-}@	J
7594.8 *5*	1^{-}@	J
7604.2 *8*	1#	J
7625.7 *4*	1#	J
7662.33 *20*	1#	J
7675.63 *20*	1#	J
7699.0 *3*	1#	J
7747.6 *5*	1#	J
7769.84 *10*	1#	J
7788.1 *5*	(1)#	J
7819.8 *8*	1^{-}@	J
7848.9 *3*	1^{-}@	J
7857.9 *12*	1^{-}@	J
7875.0 *11*	1^{-}@	J
7895.25 *20*	1^{-}@	J
7911.3 *4*	1^{-}@	J
7972.4 *10*	1^{-}@	J
8006.6 *5*	1^{-}@	J
8083.5 *3*	1^{-}@	J
8124.66 *20*	1^{-}@	J

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Adopted Levels, Gammas (continued)

^{136}Ba Levels (continued)

E(level)[†]	J^{π}	XREF	Comments
8144.3 *7*	1^{-}[@]	J	
8171.2 *10*	1^{-}[@]	J	
8184.3 *3*	1^{-}[@]	J	
8227.9 *5*	1^{-}[@]	J	
8250.8 *7*	1^{-}[@]	J	
8280.4 *10*	1^{-}[@]	J	
8315.4 *9*	1^{-}[@]	J	
8339.2 *14*	1^{-}[@]	J	
8359.5 *5*	1^{-}[@]	J	
8389.7 *7*	1^{-}[@]	J	
8404.1 *13*	1^{-}[@]	J	
8611.1 *21*	1^{-}[@]	J	
8825.1 *10*	1^{-}[@]	J	
9049.5 *7*	1^{-}[@]	J	
9077.8 *7*	1^{-}[@]	J	
9107.12 *80*	1^{+}[b]	E	
9107.18 *80*	$2^{(+)}$[b]	E	
9107.20 *80*	$1^{(+)}$,2	E	J^{π}: J from evaluation of 1981MuZQ. π from assumption that strong primary γ's to the 0^{+} levels are M1.
9107.32 *80*	$2^{(+)}$[b]	E	
9107.38 *80*	$2^{(+)}$[b]	E	
9107.42 *80*	$2^{(+)}$[b]	E	
9107.48 *80*	$1^{(+)}$[a]	E	
9107.51 *80*	$2^{(+)}$[b]	E	
9107.56 *80*	2[b]	DE	
9107.89 *80*	$2^{(+)}$[b]	E	

[†] From a least-squares fit to Eγ, by evaluator.
[‡] From DSAM in ^{136}Ba(n,n$'\gamma$), except where noted.
[#] From $\gamma(\theta)$ in (γ,γ').
[@] From $\gamma(\theta)$ and γ(lin pol) in (γ,γ').
[&] Band(A): g.s. band.
[a] J from evaluation of 1981MuZQ. π from assumption that strong primary γ's to the 0^{+} levels are M1.
[b] J from evaluation of 1981MuZQ. π from assumption that γ to 2532, 3^{-}, is E1.
[c] From γ decay of resonance above neutron separation energy with J=1 to 2.

Adopted Levels, Gammas (continued)

$\gamma(^{136}\mathrm{Ba})$

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[‡]	δ[‡]	α	$I_{(\gamma+ce)}$	Comments
818.522	2^+	818.514[#] *12*	100	0.0	0^+	E2[@]		0.00283		α(K)=0.00242 *4*; α(L)=0.000327 *5*; α(M)=6.75×10^{-5} *10*; α(N)=1.449×10^{-5} *21*; α(O)=2.19×10^{-6} *3* α(P)=1.495×10^{-7} *21* B(E2)(W.u.)=19.6 *4*
1550.987	2^+	732.41 *2*	92 *5*	818.522	2^+	M1+E2	−1.00 *4*	0.00444		α(K)=0.00381 *6*; α(L)=0.000500 *8*; α(M)=0.0001030 *16*; α(N)=2.22×10^{-5} *4*; α(O)=3.38×10^{-6} *6* α(P)=2.41×10^{-7} *4* B(E2)(W.u.)=17 *6*; B(M1)(W.u.)=0.015 *5*
		1550.99 *2*	100 *5*	0.0	0^+	E2		8.37×10^{-4}		α(K)=0.000640 *9*; α(L)=8.03×10^{-5} *12*; α(M)=1.645×10^{-5} *23*; α(N)=3.55×10^{-6} *5*; α(O)=5.43×10^{-7} *8* α(P)=3.98×10^{-8} *6* B(E2)(W.u.)=0.89 *25*
1578.969	0^+	760.45 *2*	100	818.522	2^+	E2		0.00337		α(K)=0.00287 *4*; α(L)=0.000393 *6*; α(M)=8.12×10^{-5} *12*; α(N)=1.742×10^{-5} *25*; α(O)=2.63×10^{-6} *4* α(P)=1.769×10^{-7} *25* B(E2)(W.u.)<73 Mult.: Q from $\gamma(\theta)$ in ^{136}Ba(n,n′γ); $\Delta\pi$=no from level scheme.
		1579.819[e]		0.0	0^+	E0			0.0028 *CA*	ce(K)/(γ+ce)=0.89; ce(L)/(γ+ce)=0.11 $I_{(\gamma+ce)}$: from ^{135}Ba(n,γ), E=thermal. Mult.: from ^{135}Ba(n,γ), E=thermal; ce(K) observed but not γ. B(E0)/B(E2 to 2^+, 818 level)=0.173 *15* (1987PaZS). B(E2 to 2^+, 1551 level)/B(E2 to 2^+, 818 level)≈0 (1987PaZS).
1866.611	4^+	315.5[#g] *5*	0.025[#] *23*	1550.987	2^+	[E2]		0.0385		α(K)=0.0315 *5*; α(L)=0.00559 *9*; α(M)=0.001177 *18*; α(N)=0.000249 *4*; α(O)=3.60×10^{-5} *6* α(P)=1.80×10^{-6} *3* B(E2)(W.u.)=1.4 *+6−5*
		1048.073[#] *20*	100[#] *4*	818.522	2^+	E2		1.64×10^{-3}		α(K)=0.001406 *20*; α(L)=0.000183 *3*; α(M)=3.77×10^{-5} *6*; α(N)=8.11×10^{-6} *12* α(O)=1.234×10^{-6} *18*; α(P)=8.73×10^{-8} *13* B(E2)(W.u.)=14 *6*
2030.535	7^-	163.920[#] *2*	100	1866.611	4^+	E3[@]		2.23		α(K)=1.104 *16*; α(L)=0.881 *13*; α(M)=0.198

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$\gamma(^{136}Ba)$ (continued)

E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f	Mult.‡	δ‡	α	Comments
									3; α(N)=0.0411 *6*; α(O)=0.00537 *8* α(P)=5.35×10^{-5} *8* B(E3)(W.u.)=0.349 *4*
2053.892	4^+	187.285# *6*	2.7# *3*	1866.611	4^+	M1+E2@	0.8@ *4*	0.188 *12*	α(K)=0.154 *6*; α(L)=0.027 *6*; α(M)=0.0058 *12*; α(N)=0.00122 *24*; α(O)=0.00018 *3* α(P)=9.2×10^{-6} *3* B(E2)(W.u.)=7.E+2 *+5−7*; B(M1)(W.u.)=0.06 *5* δ: other: 0.8 *6* from $\gamma(\theta)$ in ^{136}Ba(n,n′γ). B(E2) value of 700 W.u. exceeds RUL.
		1235.362# *23*	100# *3*	818.522	2^+	E2@		1.17×10^{-3}	α(K)=0.001001 *14*; α(L)=0.0001281 *18*; α(M)=2.63×10^{-5} *4*; α(N)=5.66×10^{-6} *8* α(O)=8.65×10^{-7} *13*; α(P)=6.22×10^{-8} *9* B(E2)(W.u.)=5 *3*
2080.13	2^+	528.96 *8*	10.6 *6*	1550.987	2^+	M1+E2c		0.0099 *15*	α(K)=0.0085 *14*; α(L)=0.00116 *11*; α(M)=0.000240 *21*; α(N)=5.2×10^{-5} *5*; α(O)=7.8×10^{-6} *9* α(P)=5.3×10^{-7} *11*
		1261.65 *4*	100 *4*	818.522	2^+	M1+E2	−1.00 *5*	1.31×10^{-3} *2*	α(K)=0.001115 *18*; α(L)=0.0001406 *22*; α(M)=2.88×10^{-5} *5*; α(N)=6.22×10^{-6} *10* α(O)=9.54×10^{-7} *15*; α(P)=7.04×10^{-8} *12* B(E2)(W.u.)=1.2 *+5−12*; B(M1)(W.u.)=0.0032 *+13−32*
		2080.11 *7*	60.6 *21*	0.0	0^+	E2		7.61×10^{-4}	α(K)=0.000370 *6*; α(L)=4.56×10^{-5} *7*; α(M)=9.33×10^{-6} *13*; α(N)=2.01×10^{-6} *3*; α(O)=3.09×10^{-7} *5* α(P)=2.30×10^{-8} *4* B(E2)(W.u.)=0.12 *+8−6* Mult.: Q from $\gamma(\theta)$ in ^{136}Ba(n,n′γ), M2 excluded by comparison to RUL.
2128.869	2^+	1310.34 *1*	100 *4*	818.522	2^+	M1(+E2)	+0.005 *9*	1.37×10^{-3}	α(K)=0.001167 *17*; α(L)=0.0001456 *21*; α(M)=2.98×10^{-5} *5*; α(N)=6.44×10^{-6} *9* α(O)=9.92×10^{-7} *14*; α(P)=7.44×10^{-8} *11* B(E2)(W.u.)=0.00117 *11*; B(M1)(W.u.)=0.130 *12*
		2128.88 *5*	50.0 *16*	0.0	0^+	E2		7.67×10^{-4}	α(K)=0.000355 *5*; α(L)=4.37×10^{-5} *7*; α(M)=8.94×10^{-6} *13*; α(N)=1.93×10^{-6} *3*; α(O)=2.96×10^{-7} *5* α(P)=2.21×10^{-8} *3* B(E2)(W.u.)=2.07 *19* Mult.: Q from $\gamma(\theta)$ in ^{136}Ba(n,n′γ), M2 excluded by comparison to RUL.
2140.237	5^-	86.36# *3*	46# *6*	2053.892	4^+	E1@		0.341	α(K)=0.291 *4*; α(L)=0.0401 *6*; α(M)=0.00823 *12*; α(N)=0.001743 *25*; α(O)=0.000254 *4* α(P)=1.482×10^{-5} *21* B(E1)(W.u.)=6.7×10^{-5} *11*
		109.681# *7*	3.23# *16*	2030.535	7^-	E2@		1.388	α(K)=0.914 *13*; α(L)=0.373 *6*; α(M)=0.0814 *12*; α(N)=0.01691 *24*; α(O)=0.00225 *4* α(P)=4.29×10^{-5} *6*

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Adopted Levels, Gammas (continued)

$\gamma(^{136}Ba)$ (continued)

E_i(level)	J^{π}_i	E_{γ}[†]	I_{γ}[†]	E_f	J^{π}_f	Mult.[‡]	δ[‡]	α	Comments
									B(E2)(W.u.)=10.1 *10* δ: δ(M3/E2)<0.05 from β^- decay; however, from RUL one expects $\delta \leq 9\times10^{-5}$.
2140.237	5^-	273.646[#] *8*	100[#] *2*	1866.611	4^+	E1+M2[@]	0.07[@] *5*	0.016 *3*	α(K)=0.0136 *21*; α(L)=0.0018 *4*; α(M)=0.00037 *8*; α(N)=7.8×10^{-5} *16*; α(O)=1.18×10^{-5} *24* α(P)=8.1×10^{-7} *16* B(E1)(W.u.)=4.5×10^{-6} *4* δ: other: 0.00 *2* from $\gamma(\theta)$ in ^{136}Ba(n,n′γ).
		1321.6[#g] *4*	0.39[#] *16*	818.522	2^+	[E3]		0.00198	α(K)=0.001679 *24*; α(L)=0.000230 *4*; α(M)=4.76×10^{-5} *7*; α(N)=1.023×10^{-5} *15* α(O)=1.552×10^{-6} *22*; α(P)=1.072×10^{-7} *15* B(E3)(W.u.)=0.22 *10*
2141.38	0^+	1322.85 *3*	100	818.522	2^+	E2		1.04×10^{-3}	α(K)=0.000872 *13*; α(L)=0.0001109 *16*; α(M)=2.28×10^{-5} *4*; α(N)=4.90×10^{-6} *7* α(O)=7.49×10^{-7} *11*; α(P)=5.43×10^{-8} *8* B(E2)(W.u.)=13 *+5−4*
		2141.5		0.0	0^+	[E0]			E_{γ}: from ^{136}La ε decay only. B(E0)/B(E2 to 2^+, 818 level)=0.125 *15* (1987PaZS). B(E2 to 2^+, 1551 level)/B(E2 to 2^+, 818 level)≈0 (1987PaZS).
2153.55	$(1,2^+)$	2153.53 *8*	100	0.0	0^+				
2207.147	6^+	66.881[#] *17*	10.2[#] *4*	2140.237	5^-	E1(+M2)[@]	≤0.008	0.689	α(K)=0.584 *9*; α(L)=0.0836 *12*; α(M)=0.01715 *25*; α(N)=0.00362 *6*; α(O)=0.000521 *8* α(P)=2.88×10^{-5} *5* B(E1)(W.u.)=1.05×10^{-5} *5* δ: from comparison to RUL. δ: other: 0.09 *3* from α(L)exp in β^- decay.
		153.246[#] *4*	16.4[#] *11*	2053.892	4^+	E2[@]		0.430	α(K)=0.316 *5*; α(L)=0.0896 *13*; α(M)=0.0193 *3*; α(N)=0.00404 *6*; α(O)=0.000552 *8* α(P)=1.589×10^{-5} *23* B(E2)(W.u.)=4.9 *4*
		176.602[#] *4*	29.2[#] *6*	2030.535	7^-	E1+M2[@]	0.07[@] *5*	0.053 *12*	α(K)=0.045 *10*; α(L)=0.0062 *17*; α(M)=0.00127 *36*; α(N)=2.71×10^{-4} *77*; α(O)=4.1×10^{-5} *12* α(P)=2.65×10^{-6} *77* B(E1)(W.u.)=2.5×10^{-6} *11* δ: other: −0.01 *2* from $\gamma(\theta)$ in ^{136}Ba(n,n′γ).
		340.547[#] *8*	100[#] *1*	1866.611	4^+	E2		0.0304	α(K)=0.0250 *4*; α(L)=0.00429 *6*; α(M)=0.000901

$\gamma(^{136}Ba)$ (continued)

E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f	Mult.‡	δ‡	α	Comments
									13; α(N)=0.000191 3; α(O)=2.77×10^{-5} 4 α(P)=1.441×10^{-6} 21 B(E2)(W.u.)=0.550 20
2222.709	$(2,1)^+$	671.65 3	100 5	1550.987	2^+	M1(+E2)	+0.001 14	0.00639	α(K)=0.00551 8; α(L)=0.000701 10; α(M)=0.0001440 21; α(N)=3.11×10^{-5} 5; α(O)=4.78×10^{-6} 7 α(P)=3.55×10^{-7} 5 B(M1)(W.u.)=0.055 20
		1404.21 2	99 4	818.522	2^+	M1+E2	+1.92 10	1.00×10^{-3} 2	α(K)=0.000823 13; α(L)=0.0001037 16; α(M)=2.13×10^{-5} 4; α(N)=4.58×10^{-6} 7 α(O)=7.03×10^{-7} 11; α(P)=5.16×10^{-8} 8 B(E2)(W.u.)=1.5 +11−6
		2223[g]	≈9	0.0	0^+				
2298.69	(6^-)	158.45 4	100 5	2140.237	5^-	D+Q	+0.11 2		
		268.3 3	1.7 6	2030.535	7^-				
2315.26	0^+	1496.73 7	100	818.522	2^+	E2		8.71×10^{-4}	α(K)=0.000685 10; α(L)=8.62×10^{-5} 12; α(M)=1.766×10^{-5} 25; α(N)=3.81×10^{-6} 6; α(O)=5.83×10^{-7} 9 α(P)=4.26×10^{-8} 6 B(E2)(W.u.)<2.1 Mult.: Q from γ(θ) in ^{136}Ba(n,n′γ).
2356.497	4^+	302.37 8	31.8 16	2053.892	4^+	M1(+E2)	+0.3 +5−3	0.0472 13	α(K)=0.0404 16; α(L)=0.0054 4; α(M)=0.00112 9; α(N)=0.000241 17; α(O)=3.68×10^{-5} 18 α(P)=2.61×10^{-6} 20 B(M1)(W.u.)=0.18 +18−7
		489.93 5	59 3	1866.611	4^+	M1+E2[c]		0.0121 18	α(K)=0.0103 16; α(L)=0.00143 11; α(M)=0.000296 20; α(N)=6.4×10^{-5} 5; α(O)=9.6×10^{-6} 9 α(P)=6.5×10^{-7} 13
		805.54 3	45 3	1550.987	2^+	E2		0.00294	α(K)=0.00251 4; α(L)=0.000340 5; α(M)=7.02×10^{-5} 10; α(N)=1.508×10^{-5} 22; α(O)=2.28×10^{-6} 4 α(P)=1.550×10^{-7} 22 B(E2)(W.u.)=15 8 I_γ: from relative branchings for transitions from the 2356.5 level in (n,n′γ) from 2008Mu19. Mult.: Q from γ(θ) in ^{136}Ba(n,n′γ); M2 excluded by comparison to RUL.
		1537.95 3	100 5	818.522	2^+	E2		8.45×10^{-4}	α(K)=0.000650 10; α(L)=8.17×10^{-5} 12; α(M)=1.673×10^{-5} 24; α(N)=3.61×10^{-6} 5; α(O)=5.52×10^{-7} 8 α(P)=4.05×10^{-8} 6 B(E2)(W.u.)=1.3 7

$^{136}_{56}Ba_{80}$-10

Adopted Levels, Gammas (continued)

$\gamma(^{136}Ba)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[‡]	δ[‡]	α	Comments
2373.761	5^+	166.576[#] *6*	63[#] *3*	2207.147	6^+	M1(+E2)[@]	0.3[@] *3*	0.243 *16*	α(K)=0.205 *8*; α(L)=0.030 *7*; α(M)=0.0062 *15*; α(N)=0.0013 *3*; α(O)=0.00020 *4* α(P)=1.32×10^{-5} *3*
		233.5[#] *4*	8[#] *1*	2140.237	5^-	[E1]		0.0221	α(K)=0.0190 *3*; α(L)=0.00245 *4*; α(M)=0.000503 *8*; α(N)=0.0001076 *16*; α(O)=1.618×10^{-5} *24* α(P)=1.085×10^{-6} *16* E_γ: other: 234.1 *3* in (n,n′γ).
		319.911[#] *8*	50[#] *7*	2053.892	4^+	M1+E2	0.30 *1*	0.0407	α(K)=0.0348 *5*; α(L)=0.00466 *7*; α(M)=0.000961 *14*; α(N)=0.000207 *3*; α(O)=3.16×10^{-5} *5* α(P)=2.25×10^{-6} *4*
		507.188[#] *10*	100[#] *3*	1866.611	4^+	M1+E2[c]	0.70 *1*	0.01164	α(K)=0.00996 *14*; α(L)=0.001337 *19*; α(M)=0.000276 *4*; α(N)=5.93×10^{-5} *9*; α(O)=9.02×10^{-6} *13* α(P)=6.33×10^{-7} *9* E_γ: other: 506.91 *3* in (n,n′γ).
2390.817	3^-	336.75 *12*	18.2 *11*	2053.892	4^+	E1(+M2)	+0.01 *5*	0.0085 *5*	α(K)=0.0073 *5*; α(L)=0.00093 *7*; α(M)=0.000191 *14*; α(N)=4.1×10^{-5} *3*; α(O)=6.2×10^{-6} *5* α(P)=4.3×10^{-7} *3* B(E1)(W.u.)=0.0047 *19*
		839.82 *11*	4.5 *5*	1550.987	2^+				
		1572.29 *2*	100 *4*	818.522	2^+	E1+M2	−0.050 *10*	6.19×10^{-4}	α(K)=0.000300 *5*; α(L)=3.63×10^{-5} *6*; α(M)=7.41×10^{-6} *12*; α(N)=1.599×10^{-6} *24*; α(O)=2.46×10^{-7} *4* α(P)=1.83×10^{-8} *3* B(E1)(W.u.)=0.00025 *10*
2399.94	$(1)^+$	1581.41 *3*	100	818.522	2^+	M1+E2		0.00091 *9*	α(K)=0.00069 *8*; α(L)=8.6×10^{-5} *10*; α(M)=1.77×10^{-5} *19*; α(N)=3.8×10^{-6} *5*; α(O)=5.9×10^{-7} *7* α(P)=4.4×10^{-8} *6*
2430.936	3^+	879.94 *2*	100 *6*	1550.987	2^+	M1+E2	−1.9 *4*	0.00261 *10*	α(K)=0.00224 *9*; α(L)=0.000294 *10*; α(M)=6.06×10^{-5} *19*; α(N)=1.30×10^{-5} *5*; α(O)=1.98×10^{-6} *7* α(P)=1.40×10^{-7} *6* B(E2)(W.u.)=55 *21*
		1612.46 *5*	85 *5*	818.522	2^+	M1+E2	−4.0 *4*	8.18×10^{-4}	α(K)=0.000603 *9*; α(L)=7.54×10^{-5} *11*; α(M)=1.543×10^{-5} *22*; α(N)=3.33×10^{-6} *5*; α(O)=5.10×10^{-7} *8* α(P)=3.76×10^{-8} *6* B(E2)(W.u.)=2.7 *10*
2485.13	2^+	906.8[fg] *2*	≤11[f]	1578.969	0^+	[E2]		0.00224	α(K)=0.00192 *3*; α(L)=0.000256 *4*;

$^{136}_{56}Ba_{80}$-11

$\gamma(^{136}Ba)$ (continued)

E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f	Mult.‡	δ‡	α	Comments
									α(M)=5.27×10^{-5} *8*; α(N)=1.132×10^{-5} *16*; α(O)=1.717×10^{-6} *24* α(P)=1.191×10^{-7} *17* B(E2)(W.u.)=9.8 *+23−19*
2485.13	2^+	935[f] *1*	18[f] *16*	1550.987	2^+				
		1666.57 *5*	100 *5*	818.522	2^+	M1+E2	+0.24 *4*	9.30×10^{-4} *14*	α(K)=0.000680 *10*; α(L)=8.44×10^{-5} *13*; α(M)=1.727×10^{-5} *25*; α(N)=3.73×10^{-6} *6*; α(O)=5.75×10^{-7} *9* α(P)=4.32×10^{-8} *7* B(E2)(W.u.)=0.24 *10*; B(M1)(W.u.)=0.019 *5*
		2485.02 *14*	42 *3*	0.0	0^+	E2		8.38×10^{-4}	α(K)=0.000269 *4*; α(L)=3.29×10^{-5} *5*; α(M)=6.73×10^{-6} *10*; α(N)=1.453×10^{-6} *21*; α(O)=2.24×10^{-7} *4* α(P)=1.674×10^{-8} *24* B(E2)(W.u.)=0.24 *+6−5* Mult.: Q from $\gamma(\theta)$ in ^{136}Ba(n,n′γ), M2 excluded by comparison to RUL.
2532.653	3^-	981.65 *2*	64 *3*	1550.987	2^+	E1+M2	+0.11 *2*	0.00086 *3*	α(K)=0.00074 *3*; α(L)=9.2×10^{-5} *4*; α(M)=1.88×10^{-5} *7*; α(N)=4.04×10^{-6} *15*; α(O)=6.20×10^{-7} *23* α(P)=4.56×10^{-8} *17* B(E1)(W.u.)=0.0014 *2*
		1714.20 *6*	100 *6*	818.522	2^+	E1+M2	+0.010 *8*	6.77×10^{-4}	α(K)=0.000257 *4*; α(L)=3.11×10^{-5} *5*; α(M)=6.34×10^{-6} *9*; α(N)=1.367×10^{-6} *20*; α(O)=2.10×10^{-7} *3* α(P)=1.572×10^{-8} *22* B(E1)(W.u.)=4.0×10^{-4} *5*; B(M2)(W.u.)=0.064 *7*
2544.481	4^+	993.49 *2*	100	1550.987	2^+	E2		0.00184	α(K)=0.001576 *22*; α(L)=0.000207 *3*; α(M)=4.26×10^{-5} *6*; α(N)=9.15×10^{-6} *13* α(O)=1.391×10^{-6} *20*; α(P)=9.77×10^{-8} *14* B(E2)(W.u.)=32 *+20−18* Mult.: Q from $\gamma(\theta)$ in ^{136}Ba(n,n′γ), M2 excluded by comparison to RUL.
2587.08	$(5)^+$	720.47 *2*	100	1866.611	4^+	M1+E2	−0.14 *2*	0.00537	α(K)=0.00463 *7*; α(L)=0.000589 *9*; α(M)=0.0001208 *17*; α(N)=2.61×10^{-5} *4*; α(O)=4.01×10^{-6} *6* α(P)=2.98×10^{-7} *5* B(E2)(W.u.)<2; B(M1)(W.u.)<0.07
2640.80	(1^+)	1822.26 *4*	100	818.522	2^+	D+Q	0.1 *+50−1*		
2659.65	$(3,4,5)^+$	793.04 *5*	100	1866.611	4^+	M1+E2	−0.08 *2*	0.00429	α(K)=0.00370 *6*; α(L)=0.000469 *7*; α(M)=9.61×10^{-5} *14*; α(N)=2.08×10^{-5} *3*; α(O)=3.19×10^{-6} *5* α(P)=2.38×10^{-7} *4*
2661.48	$1,2^+$	1110.50 *5*		1550.987	2^+				

$^{136}_{56}Ba_{80}$-12

$\gamma(^{136}$Ba) (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[‡]	δ[‡]	α	Comments
2661.48	1,2$^+$	1842.89 *10*	100 *5*	818.522	2$^+$	D+Q	+0.7 *3*		
		2661.7 *6*	5.1 *8*	0.0	0$^+$				
2693.89	1	1875.29 *7*	18 *8*	818.522	2$^+$	D+Q	−0.8 *+34−7*		
		2693.92 *7*	100 *8*	0.0	0$^+$	D			
2694.43?	5$^+$	487.17 *8*	72 *5*	2207.147	6$^+$	M1+E2[c]		0.0123 *18*	α(K)=0.0105 *16*; α(L)=0.00145 *11*; α(M)=0.000300 *20*; α(N)=6.5×10^{-5} *5*; α(O)=9.7×10^{-6} *9* α(P)=6.6×10^{-7} *13* I_γ: from relative photon branchings for transitions from the 2694.4 level in (n,n′γ) from 2008Mu19.
		640.57 *4*	100 *5*	2053.892	4$^+$	M1+E2	−0.33 *2*	0.00696	α(K)=0.00599 *9*; α(L)=0.000771 *11*; α(M)=0.0001583 *23*; α(N)=3.42×10^{-5} *5*; α(O)=5.24×10^{-6} *8* α(P)=3.85×10^{-7} *6*
2773.66	2$^+$	1222.2 *6*	28 *3*	1550.987	2$^+$				
		1955.03 *8*	100 *5*	818.522	2$^+$	M1+E2[c]	+0.65 *25*	8.17×10^{-4} *19*	α(K)=0.000466 *14*; α(L)=5.76×10^{-5} *17*; α(M)=1.18×10^{-5} *4*; α(N)=2.54×10^{-6} *8*; α(O)=3.92×10^{-7} *12* α(P)=2.94×10^{-8} *10* B(E2)(W.u.)=0.5 *3*; B(M1)(W.u.)=0.0066 *+22−28*
		2773.66 *4*	45 *3*	0.0	0$^+$	E2		9.16×10^{-4}	α(K)=0.000222 *4*; α(L)=2.71×10^{-5} *4*; α(M)=5.53×10^{-6} *8*; α(N)=1.194×10^{-6} *17*; α(O)=1.84×10^{-7} *3* α(P)=1.381×10^{-8} *20* B(E2)(W.u.)=0.12 *+3−3* Mult.: Q from γ(θ) in ^{136}Ba(n,n′γ); M2 excluded by comparison to RUL. I_γ: from 1994Al17 in (n,n′γ). In 2008Mu19, also (n,n′γ) the branching ratio Iγ(2773γ):Iγ(1955γ) is given as 78 *10*: 22 *10*, and no observation of 1222γ is reported.
2779.99	2$^+$	1229.14 *10*	59 *4*	1550.987	2$^+$	M1+E2[c]		0.00138 *20*	α(K)=0.00118 *17*; α(L)=0.000149 *20*; α(M)=3.1×10^{-5} *4*; α(N)=6.6×10^{-6} *9*; α(O)=1.01×10^{-6} *14* α(P)=7.4×10^{-8} *12*
		1961.40 *6*	100 *4*	818.522	2$^+$	M1+E2[c]		0.00080 *5*	α(K)=0.00045 *4*; α(L)=5.5×10^{-5} *5*; α(M)=1.13×10^{-5} *10*; α(N)=2.45×10^{-6} *20*; α(O)=3.8×10^{-7} *4* α(P)=2.8×10^{-8} *3*
		2779.5 *7*	21 *3*	0.0	0$^+$	E2		9.18×10^{-4}	α(K)=0.000221 *4*; α(L)=2.70×10^{-5} *4*; α(M)=5.51×10^{-6} *8*; α(N)=1.189×10^{-6} *17*; α(O)=1.83×10^{-7} *3* α(P)=1.376×10^{-8} *20* B(E2)(W.u.)=0.034 *+22−19* Mult.: Q from γ(θ) in ^{136}Ba(n,n′γ); M2 excluded by comparison to RUL.
2784.44?	0$^+$	1965.88 *6*	100	818.522	2$^+$	E2		7.53×10^{-4}	α(K)=0.000410 *6*; α(L)=5.07×10^{-5} *8*; α(M)=1.038×10^{-5} *15*; α(N)=2.24×10^{-6} *4*; α(O)=3.44×10^{-7} *5*

$^{136}_{56}Ba_{80}$-13

$\gamma(^{136}Ba)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[‡]	α	Comments
								α(P)=2.55×10^{-8} *4* B(E2)(W.u.)=11 *+6−4* Mult.: Q from $\gamma(\theta)$ in ^{136}Ba(n,n′γ); M2 excluded by comparison to RUL.
2812.02	(3$^+$)	1993.48 *7*	100	818.522	2$^+$	(M1+E2)	0.00080 *5*	α(K)=0.00043 *4*; α(L)=5.4×10^{-5} *5*; α(M)=1.10×10^{-5} *9*; α(N)=2.37×10^{-6} *19*; α(O)=3.6×10^{-7} *3* α(P)=2.73×10^{-8} *25* Mult.: D+Q from $\gamma(\theta)$ in ^{136}Ba(n,n′γ); nonzero value of δ excludes E1+M2. δ: −2.0 *2* or −0.26 *4* (1994Al17); 2 *1* or 0.3 *1* (2008Mu19), both from $\gamma(\theta)$ in ^{136}Ba(n,n′γ).
2820.18	(2,3,4$^+$)	287.42 *12*	100 *6*	2532.653	3$^-$			
		389.5 *2*	25 *4*	2430.936	3$^+$			
		740.1 *3*	19 *3*	2080.13	2$^+$			
2840.74	(4$^+$)	974.10 *15*	69 *5*	1866.611	4$^+$	(M1+E2)	0.0023 *4*	α(K)=0.0020 *4*; α(L)=0.00025 *4*; α(M)=5.2×10^{-5} *8*; α(N)=1.12×10^{-5} *16*; α(O)=1.7×10^{-6} *3* α(P)=1.24×10^{-7} *23* I_γ: from branching ratio measurements in (n,n′γ) (2008Mu19).
		2022.22 *14*	100 *5*	818.522	2$^+$	(E2)	7.56×10^{-4}	α(K)=0.000390 *6*; α(L)=4.81×10^{-5} *7*; α(M)=9.84×10^{-6} *14*; α(N)=2.12×10^{-6} *3*; α(O)=3.26×10^{-7} *5* α(P)=2.42×10^{-8} *4* Mult.: Q from $\gamma(\theta)$ in ^{136}Ba(n,n′γ); $\Delta\pi$=no from level scheme.
2935.1?	(1,2$^+$)	2935.1[g] *9*	100	0.0	0$^+$			
2977.67		2159.13 *18*		818.522	2$^+$			
		2976.7 *6*		0.0	0$^+$			E_γ: from (γ,γ′),(pol γ,γ′).
2985.01	(2$^+$,3$^+$,4$^+$)	1118.40 *6*	100 *4*	1866.611	4$^+$			
		2166.3 *3*	62 *5*	818.522	2$^+$			
2994.19	8$^{(+)}$	787.1[&] *2*	100[&] *4*	2207.147	6$^+$	Q[b]		
		963.6[&] *2*	24[&] *3*	2030.535	7$^-$			I_γ: other: 9.4 *12* in ^{139}La(^{82}Se,Xγ).
3022.10	(1,2$^+$)	1441.9[e] *10*	100[e] *6*	1578.969	0$^+$			
		1469.0[e] *10*		1550.987	2$^+$			
		2203.60 *8*	100 *6*	818.522	2$^+$			E_γ: other: 2201.4 *4* in (n,γ) E=thermal.
		3021.9 *9*	10 *2*	0.0	0$^+$			
3044.54	1$^{(-)}$	1494.1 *6*	29 *4*	1550.987	2$^+$			
		2224.8[eg] *20*		818.522	2$^+$			E_γ: tentative placement as transition only observed in ^{135}Ba(n,γ), E=thermal.
		3044.48 *5*	100 *6*	0.0	0$^+$	D[a]		
3077.35	3$^+$	948.62 *14*	31 *6*	2128.869	2$^+$	M1+E2[c]	0.0024 *4*	α(K)=0.0021 *4*; α(L)=0.00027 *4*; α(M)=5.5×10^{-5} *8*; α(N)=1.19×10^{-5} *17*; α(O)=1.8×10^{-6} *3* α(P)=1.32×10^{-7} *25* I_γ: from branching ratio measurements in (n,n′γ) (2008Mu19). δ: 0.3 *+5−3* or 6.9 *+10−50* from $\gamma(\theta)$ in ^{136}Ba(n,n′γ).

$^{136}_{56}Ba_{80}$-14

γ(^{136}Ba) (continued)

E_i(level)	J_i^π	E_γ†	I_γ†	E_f	J_f^π	Mult.‡	δ‡	α	Comments
3077.35	3+	1210.70 *6*	77 *8*	1866.611	4+	M1+E2[c]		0.00142 *21*	α(K)=0.00122 *18*; α(L)=0.000154 *21*; α(M)=3.2×10^{-5} *5*; α(N)=6.8×10^{-6} *9*; α(O)=1.04×10^{-6} *15* α(P)=7.7×10^{-8} *13* I_γ: from branching ratio measurements in (n,n′γ) (2008Mu19). δ: 0.2 *2* or 12 *+1−8* from $\gamma(\theta)$ in ^{136}Ba(n,n′γ).
		2258.76 *9*	100 *11*	818.522	2+	M1+E2	−4.5 *+16−10*	7.91×10^{-4} *12*	α(K)=0.000321 *6*; α(L)=3.94×10^{-5} *7*; α(M)=8.06×10^{-6} *13*; α(N)=1.74×10^{-6} *3*; α(O)=2.68×10^{-7} *5* α(P)=2.00×10^{-8} *4* B(E2)(W.u.)=1.0 *5* I_γ: from branching ratio measurements in (n,n′γ) (2008Mu19). Mult.: D+Q from $\gamma(\theta)$ in ^{136}Ba(n,n′γ), large, non-zero value of delta and RUL exclude E1+M2.
3109.59	2+	2291.13 *12*	22 *6*	818.522	2+	M1+E2[c]		0.00082 *4*	α(K)=0.000330 *20*; α(L)=4.06×10^{-5} *25*; α(M)=8.3×10^{-6} *5*; α(N)=1.79×10^{-6} *11*; α(O)=2.76×10^{-7} *18* α(P)=2.07×10^{-8} *15* I_γ: from branching ratio measurements in (n,n′γ) (2008Mu19). δ: +4 *+4−1* or −0.13 *14* (1994Al17); 3 *+6−1* or 0.04 *+25−20* (2008Mu19), both from $\gamma(\theta)$ in ^{136}Ba(n,n′γ).
		3109.43 *14*	100 *16*	0.0	0+	E2		1.02×10^{-3}	α(K)=0.000183 *3*; α(L)=2.22×10^{-5} *4*; α(M)=4.52×10^{-6} *7*; α(N)=9.77×10^{-7} *14*; α(O)=1.505×10^{-7} *21* α(P)=1.134×10^{-8} *16* B(E2)(W.u.)=0.14 *+5−5* I_γ: from branching ratio measurements in (n,n′γ) (2008Mu19). Mult.: Q from $\gamma(\theta)$ in ^{136}Ba(n,n′γ); M2 excluded by comparison to RUL.
3116.08	2+	2297.4 *4*	2.0 *16*	818.522	2+				
		3116.04 *6*	100 *7*	0.0	0+	E2		1.02×10^{-3}	α(K)=0.000182 *3*; α(L)=2.21×10^{-5} *3*; α(M)=4.51×10^{-6} *7*; α(N)=9.73×10^{-7} *14*; α(O)=1.499×10^{-7} *21* α(P)=1.130×10^{-8} *16* B(E2)(W.u.)=0.45 *11* Mult.: Q from $\gamma(\theta)$ in ^{136}Ba(n,n′γ); M2 excluded by comparison to RUL.
3241.89		1690.6[g] *3*	69 *5*	1550.987	2+				
		2423.34 *13*	100 *8*	818.522	2+				
3335.6		2517.1 *3*	100	818.522	2+				
3354.5		2536.0 *3*	100	818.522	2+				

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Adopted Levels, Gammas (continued)

$\gamma(^{136}Ba)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[‡]	α	Comments
3357.19	$10^{(+)}$	363.0[&] *2*	100	2994.19	$8^{(+)}$	E2	0.0250	α(K)=0.0206 *3*; α(L)=0.00345 *5*; α(M)=0.000724 *11*; α(N)=0.0001539 *22*; α(O)=2.24×10^{-5} *4* α(P)=1.199×10^{-6} *17* B(E2)(W.u.)=0.0232 *6* Mult.: Q from R(DCO) in ^{139}La(^{82}Se,Xγ), M2 excluded by comparison to RUL.
3370.07	1	3370.03 *21*	100	0.0	0^+	D[a]		
3435.0	1^-	3435.0 *1*	100	0.0	0^+	E1[a]	1.52×10^{-3}	α(K)=9.00×10^{-5} *13*; α(L)=1.073×10^{-5} *15*; α(M)=2.19×10^{-6} *3*; α(N)=4.72×10^{-7} *7*; α(O)=7.27×10^{-8} *11* α(P)=5.50×10^{-9} *8* B(E1)(W.u.)=0.00105 *20* E_γ: from (γ,γ'),(pol γ,γ').
3505.5	$0^{(+)},1,2,3^+$	1955.19 *17*	100	1550.987	2^+			E_γ: from ^{135}Ba(n,γ) E=thermal.
3508.7	(4^+)	1428.7 *4*	64 *10*	2080.13	2^+			
		2690.1 *4*	100 *9*	818.522	2^+			
3526.7	2^+	2709.0 *8*	68 *10*	818.522	2^+			
		3526.4 *4*	100 *11*	0.0	0^+	Q		
3550.70?		1999.7[g] *2*	100	1550.987	2^+			E_γ: multiply placed in ^{136}Ba(n,n$'\gamma$) as from the 3551-keV level or a 3866-keV level.
3691.92	1 to 3	2873.36[e] *13*	100	818.522	2^+			
3706.1	$(1,2^+)$	3706.0 *6*	100	0.0	0^+			
3706.4		349.2 *2*	100	3357.19	$10^{(+)}$			E_γ: from ^{139}La(^{82}Se,Xγ).
3768.9	$1^{(-)},2,3^+$	747.3[e] *3*	85[e] *30*	3022.10	$(1,2^+)$			
		1234.9[e]	≤100[e]	2532.653	3^-			
3795.34	$(1,2^+)$	2244.8 *4*	25 *8*	1550.987	2^+			
		2976.5 *4*	100 *11*	818.522	2^+			
		3795.24[e] *18*	3[e] *1*	0.0	0^+			E_γ: not observed in ^{136}Ba(n,n$'\gamma$).
3850.4?		144[&g]	100[&]	3706.4				
3852.7?	$(1,2^+)$	3852.6[g] *6*	100	0.0	0^+			
3863.47	$(1,2^+)$	3863.41[e] *23*	100	0.0	0^+			
3881.17?	$(1,2^+)$	3064.3 *4*		818.522	2^+			
		3881.0[d] *1*		0.0	0^+			
3925.6		157.8[eg] *5*	100[e] *19*	3768.9	$1^{(-)},2,3^+$			
		880.3[e] *3*	22[e] *8*	3044.54	$1^{(-)}$			
		1798.4[e] *7*	44[e] *19*	2128.869	2^+			
3962.9		3144.3 *8*	100	818.522	2^+			
3965.51	$(1,2^+)$	3965.28[e] *6*	100	0.0	0^+			
3979.76	(1)	3979.7[d] *2*	100	0.0	0^+	(D)[a]		
3992.56	$0^{(+)},1,2,3^+$	2441.55[e] *19*	100	1550.987	2^+			
4008.6	$1,2^+$	2429.6[e] *3*	100	1578.969	0^+			
4137.07	1	4137.0[d] *1*	100	0.0	0^+	D[a]		

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$\gamma(^{136}Ba)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[‡]	α	Comments
4214.9		508.9 *1*	100	3706.4				E_γ: from $^{139}La(^{82}Se,X\gamma)$.
4231.17	1	4231.1[d] *2*	100	0.0	0^+	D[a]		
4366.78	1	4366.7[d] *2*	100	0.0	0^+	D[a]		
4413.28	(1)	4413.2[d] *1*	100	0.0	0^+	(D)[a]		
4475.18	(1)	4475.1[d] *1*	100	0.0	0^+	(D)[a]		
4536.4	1	4536.3[d] *3*	100	0.0	0^+	D[a]		
4601.08	(1)	4601.0[d] *2*	100	0.0	0^+	(D)[a]		
4623.7	1^-	4623.6[d] *3*	100	0.0	0^+	E1[a]	0.00195	α(K)=6.00×10^{-5} *9*; α(L)=7.13×10^{-6} *10*; α(M)=1.451×10^{-6} *21*; α(N)=3.13×10^{-7} *5*; α(O)=4.83×10^{-8} *7* α(P)=3.66×10^{-9} *6*
4639.7	1^-	4639.6[d] *10*	100	0.0	0^+	E1[a]	0.00196	α(K)=5.97×10^{-5} *9*; α(L)=7.10×10^{-6} *10*; α(M)=1.445×10^{-6} *21*; α(N)=3.12×10^{-7} *5*; α(O)=4.81×10^{-8} *7* α(P)=3.64×10^{-9} *6*
4697.79	1^-	4697.7[d] *1*	100	0.0	0^+	E1[a]	0.00198	α(K)=5.87×10^{-5} *9*; α(L)=6.98×10^{-6} *10*; α(M)=1.421×10^{-6} *20*; α(N)=3.07×10^{-7} *5*; α(O)=4.73×10^{-8} *7* α(P)=3.58×10^{-9} *5*
4767.69	1^-	4767.6[d] *1*	100	0.0	0^+	E1[a]	0.00200	α(K)=5.76×10^{-5} *8*; α(L)=6.84×10^{-6} *10*; α(M)=1.393×10^{-6} *20*; α(N)=3.01×10^{-7} *5*; α(O)=4.64×10^{-8} *7* α(P)=3.51×10^{-9} *5*
4814.09	1	4814.0[d] *1*	100	0.0	0^+	D[a]		
4833.3		4833.2[d] *5*	100	0.0	0^+			
4897.8	1	4897.7[d] *16*	100	0.0	0^+	D[a]		
4985.0	1^-	4984.9[d] *6*	100	0.0	0^+	E1[a]	0.00206	α(K)=5.43×10^{-5} *8*; α(L)=6.45×10^{-6} *9*; α(M)=1.313×10^{-6} *19*; α(N)=2.83×10^{-7} *4*; α(O)=4.37×10^{-8} *7* α(P)=3.31×10^{-9} *5*
5040	1^-	5039.5[d] *29*	100	0.0	0^+	E1[a]	0.00208	α(K)=5.35×10^{-5} *8*; α(L)=6.36×10^{-6} *9*; α(M)=1.294×10^{-6} *19*; α(N)=2.79×10^{-7} *4*; α(O)=4.31×10^{-8} *6* α(P)=3.27×10^{-9} *5*
5060.80	1^-	5060.7[d] *2*	100	0.0	0^+	E1[a]	0.00208	α(K)=5.32×10^{-5} *8*; α(L)=6.32×10^{-6} *9*; α(M)=1.287×10^{-6} *18*; α(N)=2.78×10^{-7} *4*; α(O)=4.28×10^{-8} *6* α(P)=3.25×10^{-9} *5*
5065		849[&]	100[&] *5*	4214.9				
		1215[&]	75[&] *7*	3850.4?				
5076.9	1^-	5076.8[d] *8*	100	0.0	0^+	E1[a]	0.00209	α(K)=5.30×10^{-5} *8*; α(L)=6.30×10^{-6} *9*; α(M)=1.282×10^{-6} *18*; α(N)=2.77×10^{-7} *4*; α(O)=4.27×10^{-8} *6* α(P)=3.23×10^{-9} *5*
5094.5	1^-	5094.4[d] *7*	100	0.0	0^+	E1[a]	0.00209	α(K)=5.28×10^{-5} *8*; α(L)=6.27×10^{-6} *9*; α(M)=1.276×10^{-6} *18*; α(N)=2.75×10^{-7} *4*;

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γ(^{136}Ba) (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[‡]	α	Comments
								α(O)=4.25×10^{-8} *6* α(P)=3.22×10^{-9} *5*
5135.2	1$^-$	5135.1[d] *3*	100	0.0	0$^+$	E1[a]	0.00211	α(K)=5.22×10^{-5} *8*; α(L)=6.20×10^{-6} *9*; α(M)=1.262×10^{-6} *18*; α(N)=2.73×10^{-7} *4*; α(O)=4.20×10^{-8} *6* α(P)=3.19×10^{-9} *5*
5216.31	(1)	5216.2[d] *2*	100	0.0	0$^+$	(D)[a]		
5268.4	(1)	5268.3[d] *7*	100	0.0	0$^+$	(D)[a]		
5294.31	1	5294.2[d] *1*	100	0.0	0$^+$	D[a]		
5337.81	1	5337.7[d] *2*	100	0.0	0$^+$	D[a]		
5380		1164[&]	100[&]	4214.9				
5393		328[&]	100[&]	5065				
5396.5	(1)	5396.4[d] *7*	100	0.0	0$^+$	(D)[a]		
5418.4	(1)	5418.3[d] *5*	100	0.0	0$^+$	(D)[a]		
5431.5	1	5431.4[d] *10*	100	0.0	0$^+$	D[a]		
5444.42	(1)	5444.3[d] *1*	100	0.0	0$^+$	(D)[a]		
5497.6	1$^-$	5497.5[d] *7*	100	0.0	0$^+$	E1[a]	0.00221	α(K)=4.78×10^{-5} *7*; α(L)=5.67×10^{-6} *8*; α(M)=1.155×10^{-6} *17*; α(N)=2.49×10^{-7} *4*; α(O)=3.84×10^{-8} *6* α(P)=2.92×10^{-9} *4*
5561.1	1$^-$	5561.0[d] *3*	100	0.0	0$^+$	E1[a]	0.00223	α(K)=4.71×10^{-5} *7*; α(L)=5.59×10^{-6} *8*; α(M)=1.138×10^{-6} *16*; α(N)=2.46×10^{-7} *4*; α(O)=3.79×10^{-8} *6* α(P)=2.87×10^{-9} *4*
5585.6	1$^-$	5585.5[d] *7*	100	0.0	0$^+$	E1[a]	0.00224	α(K)=4.68×10^{-5} *7*; α(L)=5.56×10^{-6} *8*; α(M)=1.131×10^{-6} *16*; α(N)=2.44×10^{-7} *4*; α(O)=3.76×10^{-8} *6* α(P)=2.86×10^{-9} *4*
5601.22	1$^-$	5601.1[d] *1*	100	0.0	0$^+$	E1[a]	0.00224	α(K)=4.67×10^{-5} *7*; α(L)=5.54×10^{-6} *8*; α(M)=1.127×10^{-6} *16*; α(N)=2.43×10^{-7} *4*; α(O)=3.75×10^{-8} *6* α(P)=2.85×10^{-9} *4*
5610.0	1$^-$	5609.9[d] *6*	100	0.0	0$^+$	E1[a]	0.00224	α(K)=4.66×10^{-5} *7*; α(L)=5.53×10^{-6} *8*; α(M)=1.125×10^{-6} *16*; α(N)=2.43×10^{-7} *4*; α(O)=3.74×10^{-8} *6* α(P)=2.84×10^{-9} *4*
5647.9	1$^-$	5647.8[d] *13*	100	0.0	0$^+$	E1[a]	0.00225	α(K)=4.62×10^{-5} *7*; α(L)=5.48×10^{-6} *8*; α(M)=1.115×10^{-6} *16*; α(N)=2.41×10^{-7} *4*; α(O)=3.71×10^{-8} *6* α(P)=2.82×10^{-9} *4*
5652.2	1$^-$	5652.1[d] *10*	100	0.0	0$^+$	E1[a]	0.00225	α(K)=4.61×10^{-5} *7*; α(L)=5.47×10^{-6} *8*; α(M)=1.114×10^{-6} *16*; α(N)=2.40×10^{-7} *4*; α(O)=3.71×10^{-8} *6* α(P)=2.81×10^{-9} *4*
5718	(1)	5718[d] *3*	100	0.0	0$^+$	(D)[a]		

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$\gamma(^{136}Ba)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[‡]	α	Comments
5735.0		5734.9[d] *7*	100	0.0	0^+			
5768.0	1	5767.9[d] *4*	100	0.0	0^+			
5781.7	1	5781.6[d] *9*	100	0.0	0^+	D[a]		
5805.13	1	5805.0[d] *1*	100	0.0	0^+	D[a]		
5924.2	1	5924.1[d] *6*	100	0.0	0^+	D[a]		
5965.8	1^-	5965.7[d] *4*	100	0.0	0^+	E1[a]	0.00234	α(K)=4.31×10^{-5} *6*; α(L)=5.10×10^{-6} *8*; α(M)=1.039×10^{-6} *15*; α(N)=2.24×10^{-7} *4*; α(O)=3.46×10^{-8} *5* α(P)=2.62×10^{-9} *4*
5979.24	1^-	5979.1[d] *2*	100	0.0	0^+	E1[a]	0.00234	α(K)=4.29×10^{-5} *6*; α(L)=5.09×10^{-6} *8*; α(M)=1.036×10^{-6} *15*; α(N)=2.24×10^{-7} *4*; α(O)=3.45×10^{-8} *5* α(P)=2.62×10^{-9} *4*
6005.04	1^-	6004.9[d] *1*	100	0.0	0^+	E1[a]		
6035.74	1^-	6035.6[d] *1*	100	0.0	0^+	E1[a]		
6052.94	1^-	6052.8[d] *2*	100	0.0	0^+	E1[a]		
6061.44	1^-	6061.3[d] *1*	100	0.0	0^+	E1[a]		
6082.55	1^-	6082.4[d] *1*	100	0.0	0^+	E1[a]		
6113.35	1^-	6113.2[d] *2*	100	0.0	0^+	E1[a]		
6161.25	1^-	6161.1[d] *2*	100	0.0	0^+	E1[a]		
6182.35	1^-	6182.2[d] *2*	100	0.0	0^+	E1[a]		
6192.8	(1)	6192.6[d] *8*	100	0.0	0^+	(D)[a]		
6215.7	(1)	6215.5[d] *5*	100	0.0	0^+	(D)[a]		
6231.6	(1)	6231.4[d] *4*	100	0.0	0^+	(D)[a]		
6244.2	(1)	6244.0[d] *8*	100	0.0	0^+	(D)[a]		
6264.75	(1)	6264.6[d] *2*	100	0.0	0^+	(D)[a]		
6289.2	(1)	6289.0[d] *7*	100	0.0	0^+	(D)[a]		
6331.9	1^-	6331.7[d] *4*	100	0.0	0^+	E1[a]		
6344.4	1^-	6344.2[d] *7*	100	0.0	0^+	E1[a]		
6358.2	1^-	6358.0[d] *7*	100	0.0	0^+	E1[a]		
6373.6	1^-	6373.4[d] *8*	100	0.0	0^+	E1[a]		
6391.3	1^-	6391.1[d] *16*	100	0.0	0^+	E1[a]		
6409.9	1^-	6409.7[d] *19*	100	0.0	0^+	E1[a]		
6430.6	1^-	6430.4[d] *11*	100	0.0	0^+	E1[a]		
6449.46	1^-	6449.3[d] *2*	100	0.0	0^+	E1[a]		
6478.17	1^-	6478.0[d] *1*	100	0.0	0^+	E1[a]		
6488.67	1^-	6488.5[d] *1*	100	0.0	0^+	E1[a]		

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$\gamma(^{136}Ba)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[‡]
6528.8	1^-	6528.6[d] 11	100	0.0	0^+	E1[a]
6554.3	1^-	6554.1[d] 8	100	0.0	0^+	E1[a]
6591.8	1^-	6591.6[d] 3	100	0.0	0^+	E1[a]
6625.27	1^-	6625.1[d] 1	100	0.0	0^+	E1[a]
6677.3	1	6677.1[d] 3	100	0.0	0^+	D[a]
6693.38	1	6693.2[d] 1	100	0.0	0^+	D[a]
6716.8	1	6716.6[d] 3	100	0.0	0^+	D[a]
6741.9	1^-	6741.7[d] 3	100	0.0	0^+	E1[a]
6756.58	1^-	6756.4[d] 2	100	0.0	0^+	E1[a]
6767.78	1^-	6767.6[d] 1	100	0.0	0^+	E1[a]
6776.78	1^-	6776.6[d] 1	100	0.0	0^+	E1[a]
6788.38	1^-	6788.2[d] 2	100	0.0	0^+	E1[a]
6830.8	1^-	6830.6[d] 7	100	0.0	0^+	E1[a]
6840.3	1^-	6840.1[d] 8	100	0.0	0^+	E1[a]
6847.5	1^-	6847.3[d] 11	100	0.0	0^+	E1[a]
6859.2	1^-	6859.0[d] 8	100	0.0	0^+	E1[a]
6870.4	1^-	6870.2[d] 10	100	0.0	0^+	E1[a]
6880.5	1^-	6880.3[d] 5	100	0.0	0^+	E1[a]
6895.79	1^-	6895.6[d] 2	100	0.0	0^+	E1[a]
6952.0	1^-	6951.8[d] 11	100	0.0	0^+	E1[a]
6982.29	1^-	6982.1[d] 2	100	0.0	0^+	E1[a]
6998.5	1^-	6998.3[d] 7	100	0.0	0^+	E1[a]
7006.6	1^-	7006.4[d] 14	100	0.0	0^+	E1[a]
7018.89	1^-	7018.7[d] 1	100	0.0	0^+	E1[a]
7150.60	(1)	7150.4[d] 1	100	0.0	0^+	(D)[a]
7251.1	1^-	7250.9[d] 3	100	0.0	0^+	E1[a]
7271.6	1^-	7271.4[d] 5	100	0.0	0^+	E1[a]
7281.5	1^-	7281.3[d] 15	100	0.0	0^+	E1[a]
7298.81	1^-	7298.6[d] 1	100	0.0	0^+	E1[a]
7314.81	1^-	7314.6[d] 2	100	0.0	0^+	E1[a]
7350.2	1^-	7350.0[d] 14	100	0.0	0^+	E1[a]
7364.1	1^-	7363.9[d] 3	100	0.0	0^+	E1[a]
7382.1	1^-	7381.9[d] 4	100	0.0	0^+	E1[a]
7394.4	1^-	7394.2[d] 9	100	0.0	0^+	E1[a]
7402.5	1^-	7402.3[d] 3	100	0.0	0^+	E1[a]
7414.9	1^-	7414.7[d] 13	100	0.0	0^+	E1[a]
7444.4	1^-	7444.2[d] 3	100	0.0	0^+	E1[a]
7472.52	1^-	7472.3[d] 1	100	0.0	0^+	E1[a]
7487.5	1^-	7487.3[d] 4	100	0.0	0^+	E1[a]
7502.8	1^-	7502.6[d] 3	100	0.0	0^+	E1[a]
7519.2	1^-	7519.0[d] 10	100	0.0	0^+	E1[a]
7541.0	1^-	7540.8[d] 6	100	0.0	0^+	E1[a]
7558.1	1^-	7557.9[d] 7	100	0.0	0^+	E1[a]
7572.13	1^-	7571.9[d] 1	100	0.0	0^+	E1[a]
7583.5	1^-	7583.3[d] 8	100	0.0	0^+	E1[a]
7594.8	1^-	7594.6[d] 5	100	0.0	0^+	E1[a]
7604.2	1	7604.0[d] 8	100	0.0	0^+	D[a]
7625.7	1	7625.5[d] 4	100	0.0	0^+	D[a]
7662.33	1	7662.1[d] 2	100	0.0	0^+	D[a]
7675.63	1	7675.4[d] 2	100	0.0	0^+	D[a]
7699.0	1	7698.8[d] 3	100	0.0	0^+	D[a]
7747.6	1	7747.4[d] 5	100	0.0	0^+	D[a]
7769.84	1	7769.6[d] 1	100	0.0	0^+	D[a]
7788.1	(1)	7787.9[d] 5	100	0.0	0^+	(D)[a]
7819.8	1^-	7819.6[d] 8	100	0.0	0^+	E1[a]
7848.9	1^-	7848.7[d] 3	100	0.0	0^+	E1[a]
7857.9	1^-	7857.7[d] 12	100	0.0	0^+	E1[a]
7875.0	1^-	7874.8[d] 11	100	0.0	0^+	E1[a]
7895.25	1^-	7895.0[d] 2	100	0.0	0^+	E1[a]
7911.3	1^-	7911.1[d] 4	100	0.0	0^+	E1[a]
7972.4	1^-	7972.1[d] 10	100	0.0	0^+	E1[a]
8006.6	1^-	8006.3[d] 5	100	0.0	0^+	E1[a]
8083.5	1^-	8083.2[d] 3	100	0.0	0^+	E1[a]
8124.66	1^-	8124.4[d] 2	100	0.0	0^+	E1[a]
8144.3	1^-	8144.0[d] 7	100	0.0	0^+	E1[a]
8171.2	1^-	8170.9[d] 10	100	0.0	0^+	E1[a]
8184.3	1^-	8184.0[d] 3	100	0.0	0^+	E1[a]
8227.9	1^-	8227.6[d] 5	100	0.0	0^+	E1[a]
8250.8	1^-	8250.5[d] 7	100	0.0	0^+	E1[a]
8280.4	1^-	8280.1[d] 10	100	0.0	0^+	E1[a]

γ(^{136}Ba) (continued)

E$_i$(level)	J$^\pi_i$	E$_\gamma$[†]	I$_\gamma$[†]	E$_f$	J$^\pi_f$	Mult.[‡]
8315.4	1$^-$	8315.1[d] *9*	100	0.0	0$^+$	E1[a]
8339.2	1$^-$	8338.9[d] *14*	100	0.0	0$^+$	E1[a]
8359.5	1$^-$	8359.2[d] *5*	100	0.0	0$^+$	E1[a]
8389.7	1$^-$	8389.4[d] *7*	100	0.0	0$^+$	E1[a]
8404.1	1$^-$	8403.8[d] *13*	100	0.0	0$^+$	E1[a]
8611.1	1$^-$	8610.8[d] *21*	100	0.0	0$^+$	E1[a]
8825.1	1$^-$	8824.8[d] *10*	100	0.0	0$^+$	E1[a]
9049.5	1$^-$	9049.2[d] *7*	100	0.0	0$^+$	E1[a]
9077.8	1$^-$	9077.5[d] *7*	100	0.0	0$^+$	E1[a]

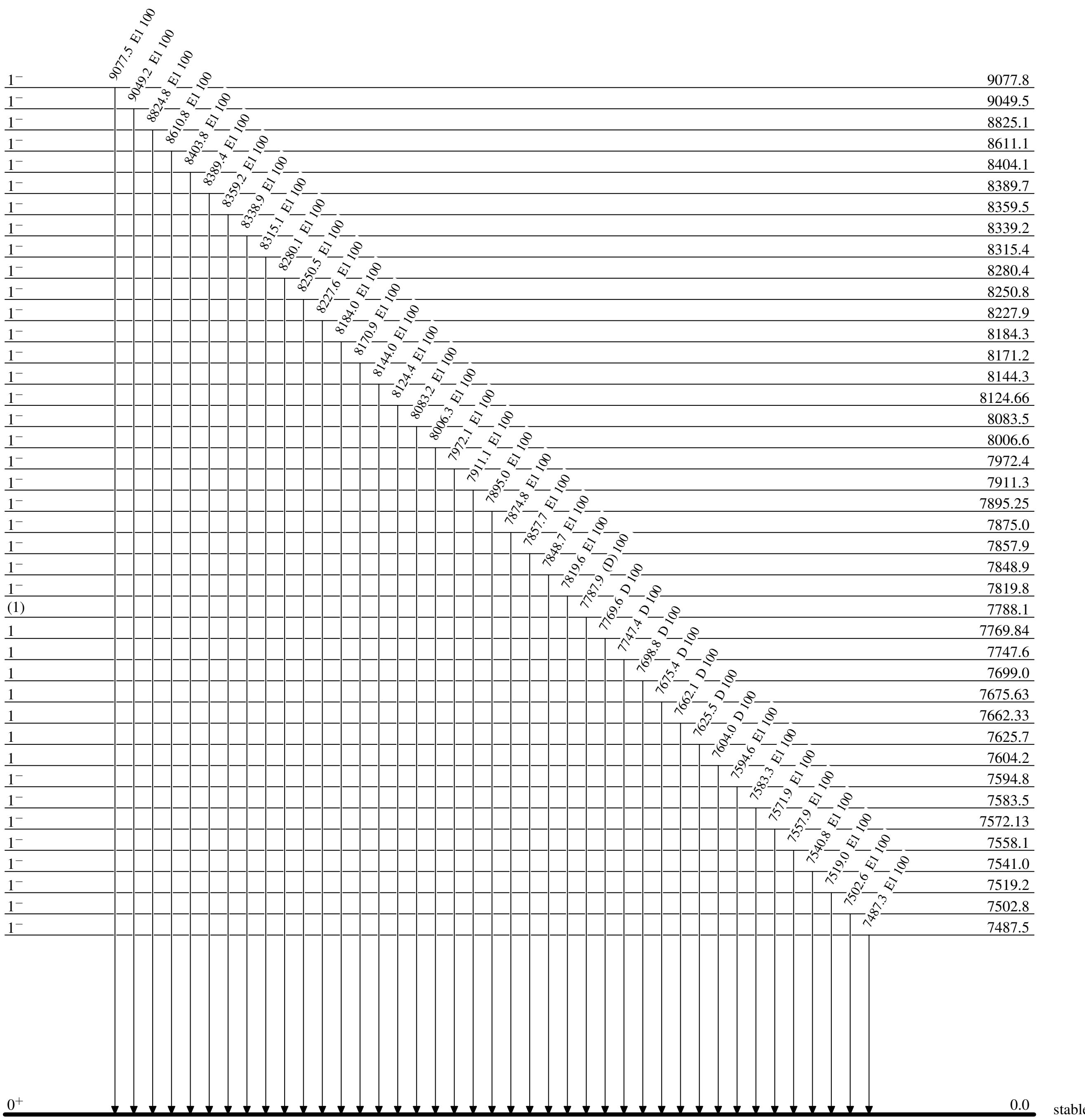
† From ^{136}Ba(n,n′γ), except where noted.
‡ From $\gamma(\theta)$ and γ(lin pol) in (n,n′γ), except as noted.
# From ^{136}Cs β^- decay (13.16 d).
@ From α(K)exp and K/L ratios in ^{136}Cs β^- decay (13.16 d).
& From ^{198}Pt(^{136}Xe,Xγ).
a From $\gamma(\theta)$ and γ(lin pol) in (γ,γ').
b From R(DCO) in ^{139}La(^{82}Se,Xγ).
c D+Q from $\gamma(\theta)$ in (n,n′γ); $\Delta\pi$=no from level scheme.
d From (γ,γ').
e From ^{135}Ba(n,γ), E=thermal.
f From ^{136}La ε decay (9.87 min).
g Placement of transition in the level scheme is uncertain.

$^{136}_{56}$Ba$_{80}$-21

Adopted Levels, Gammas

Level Scheme

Intensities: Relative photon branching from each level

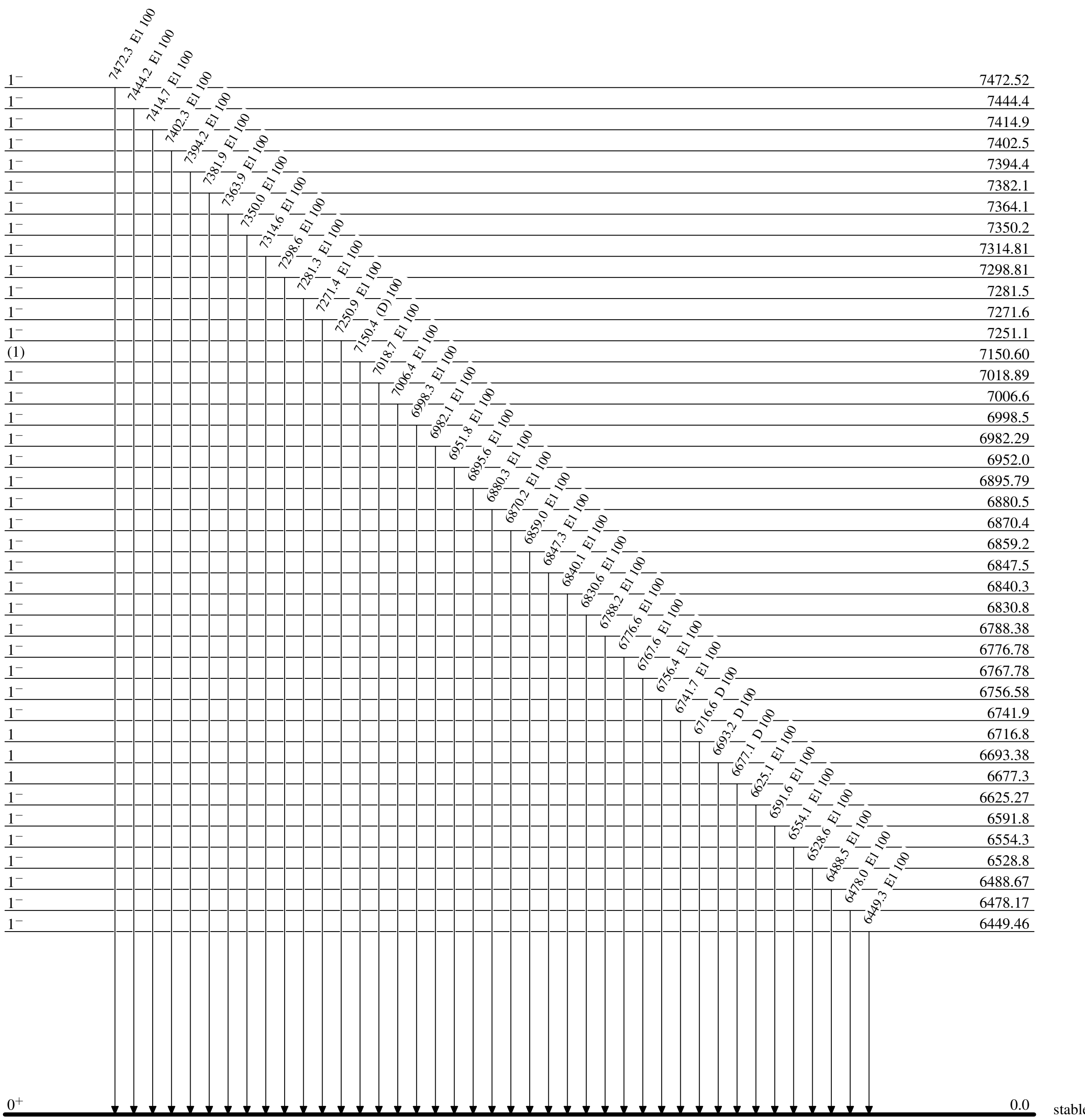


$^{136}_{56}Ba_{80}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

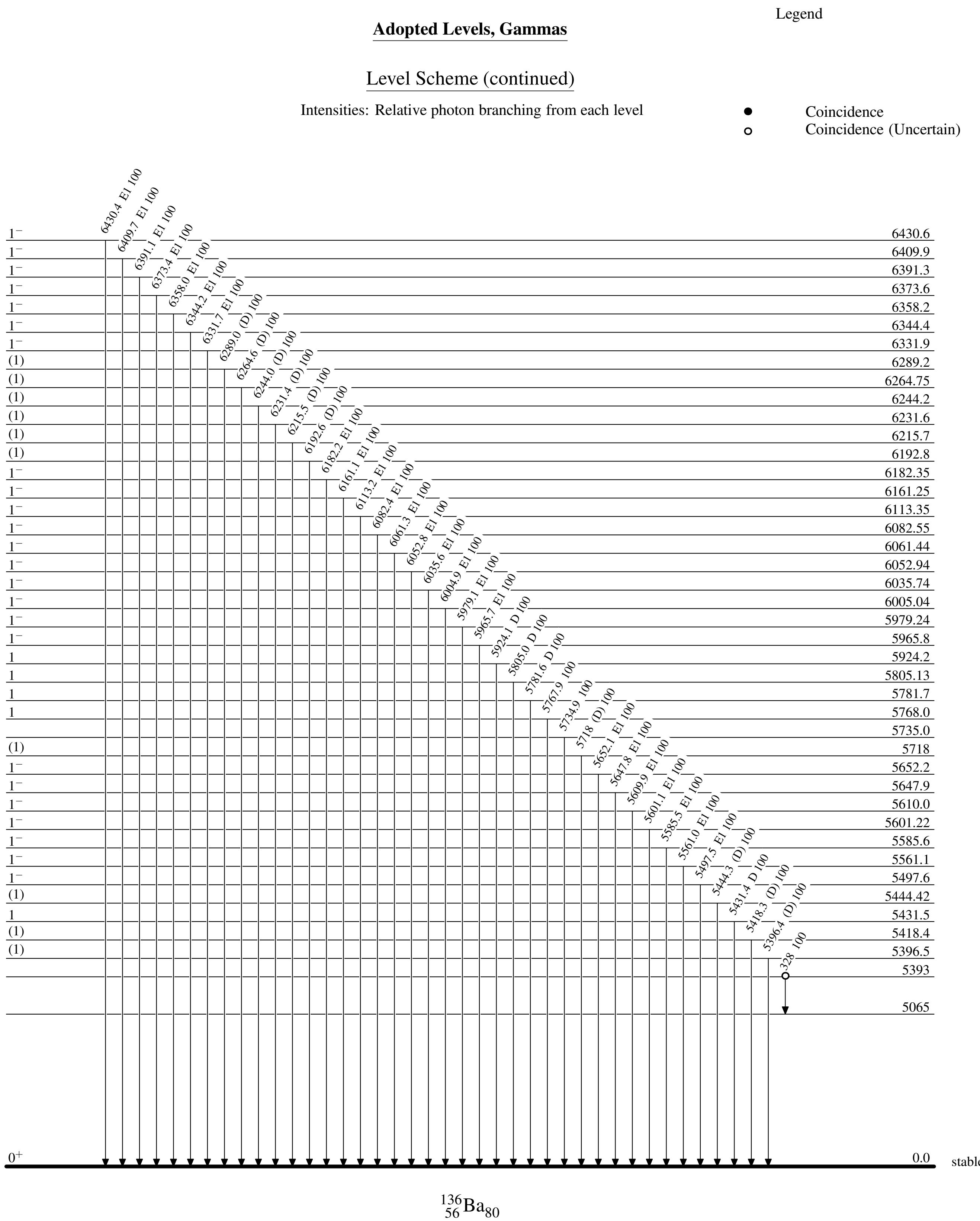


$^{136}_{56}Ba_{80}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



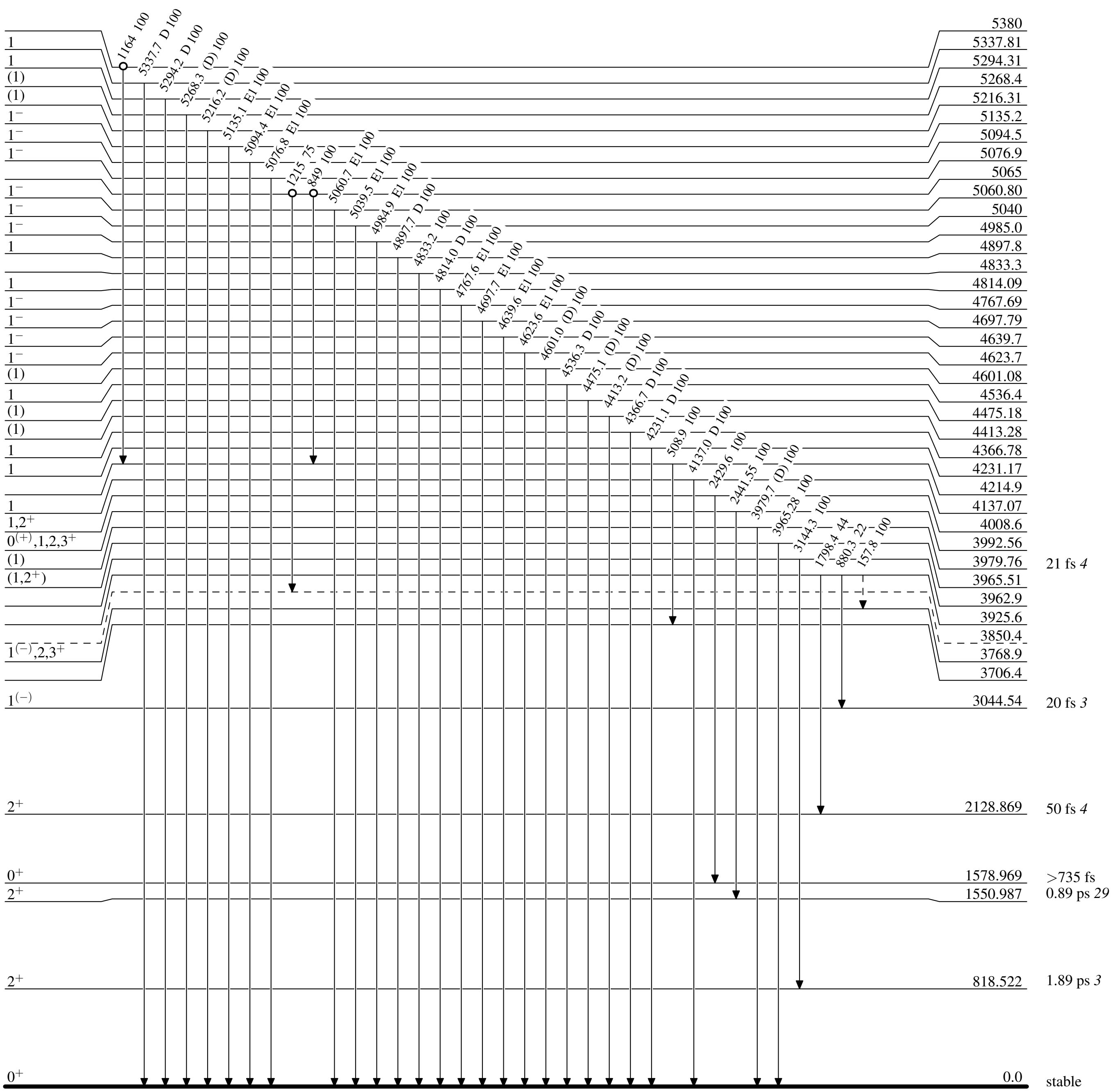
Legend

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

γ Decay (Uncertain)
Coincidence
Coincidence (Uncertain)



$^{136}_{56}Ba_{80}$

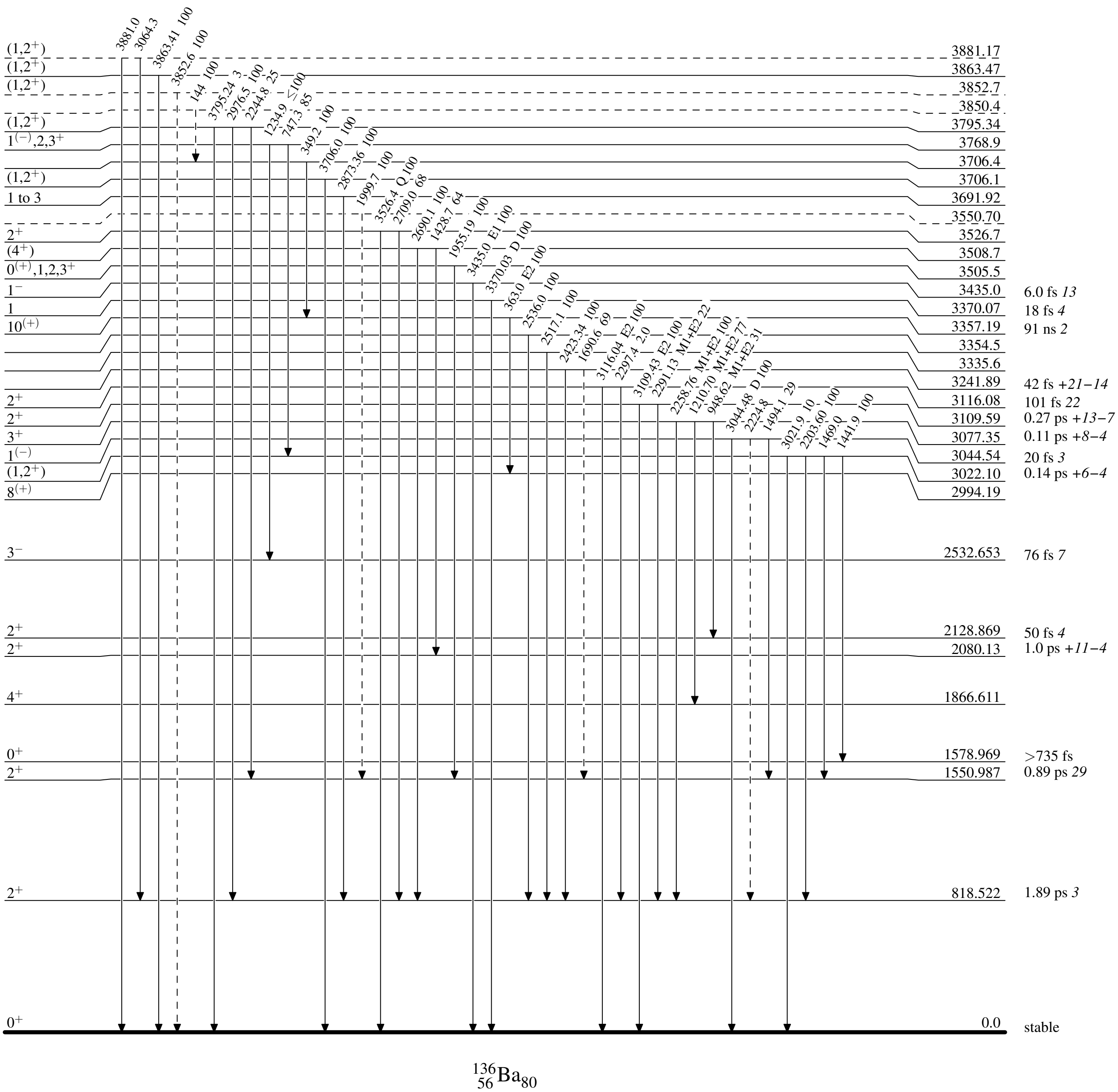
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

Legend

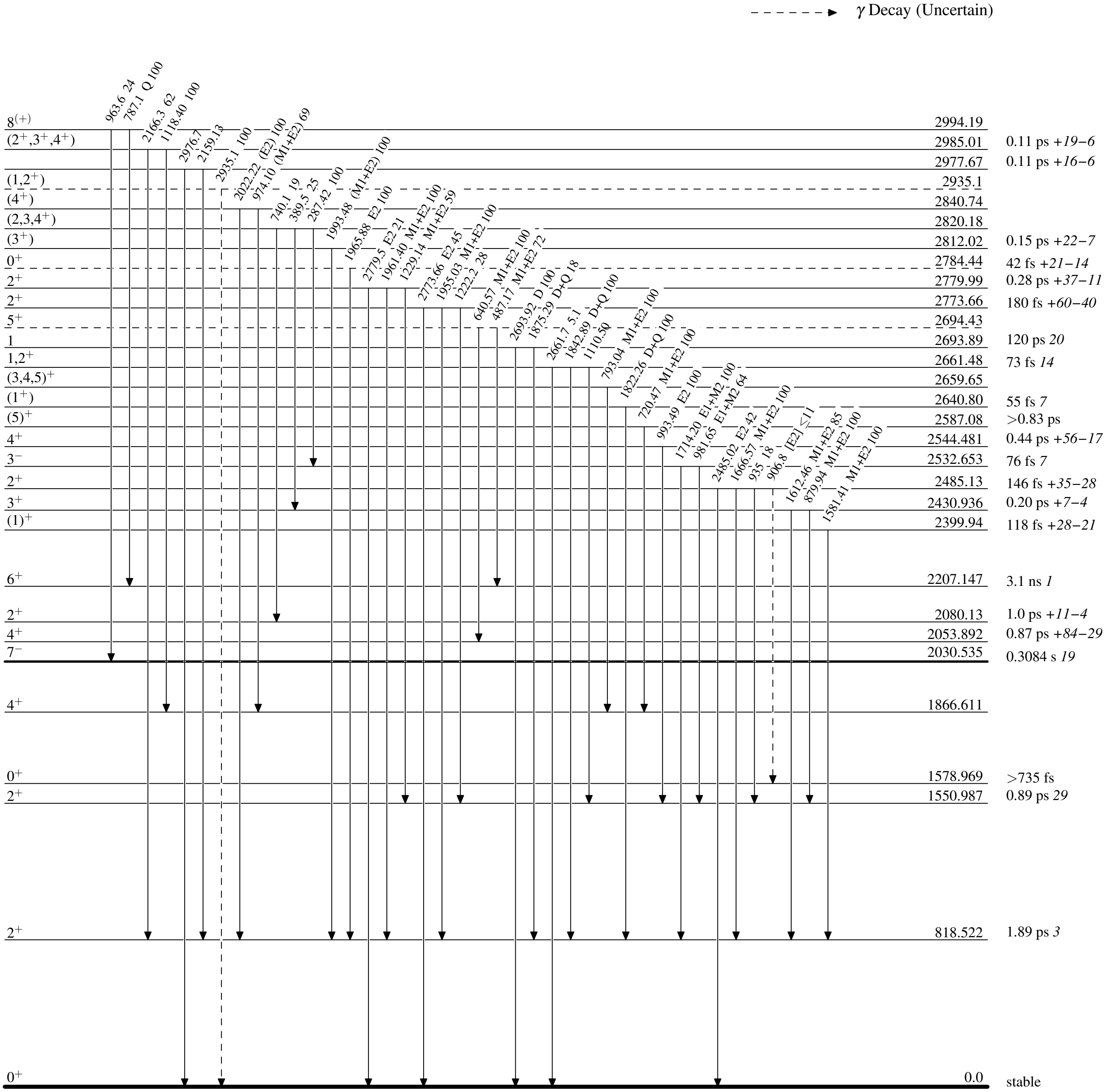
γ Decay (Uncertain)



Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



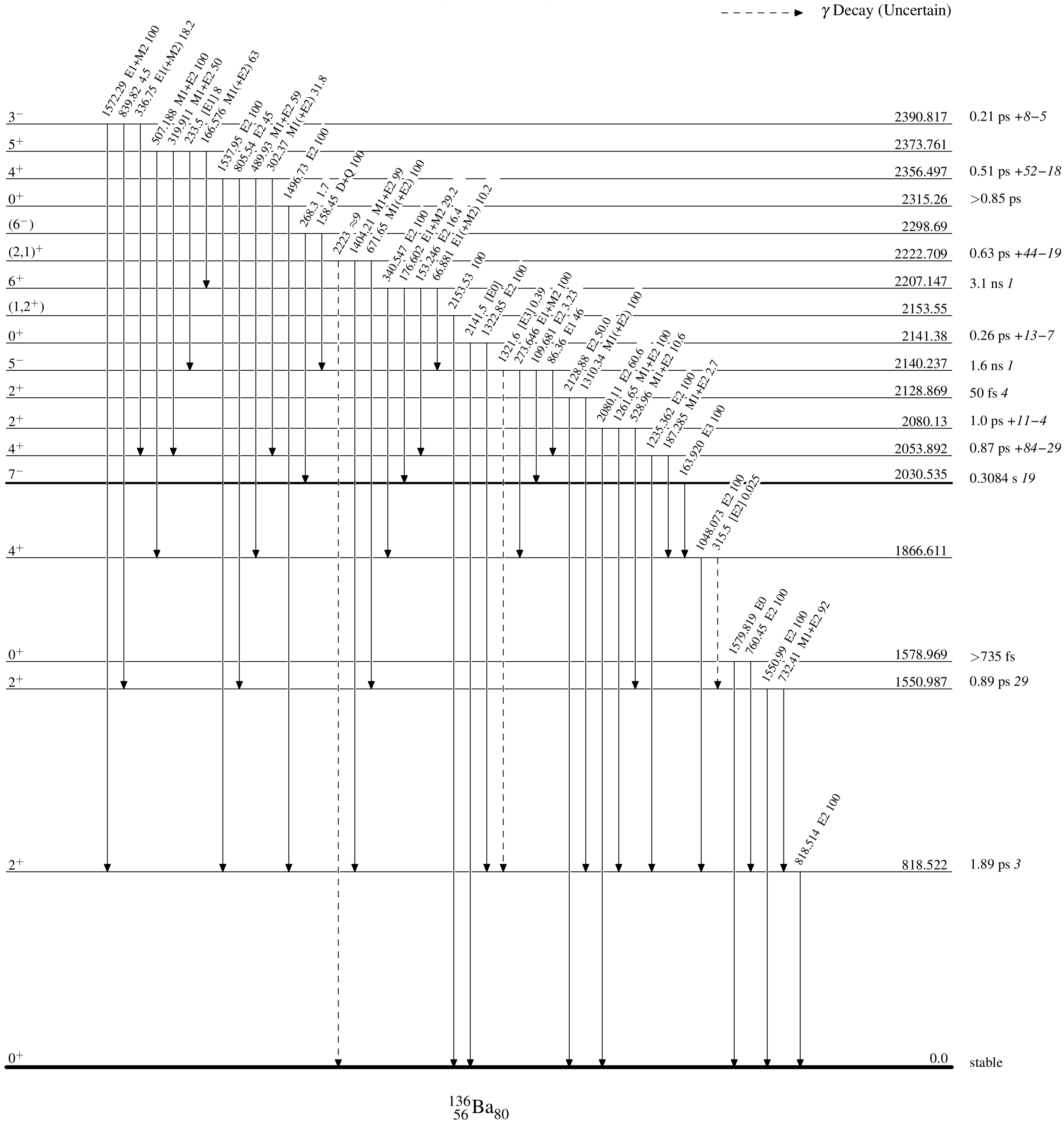
$^{136}_{56}Ba_{80}$

Adopted Levels, Gammas

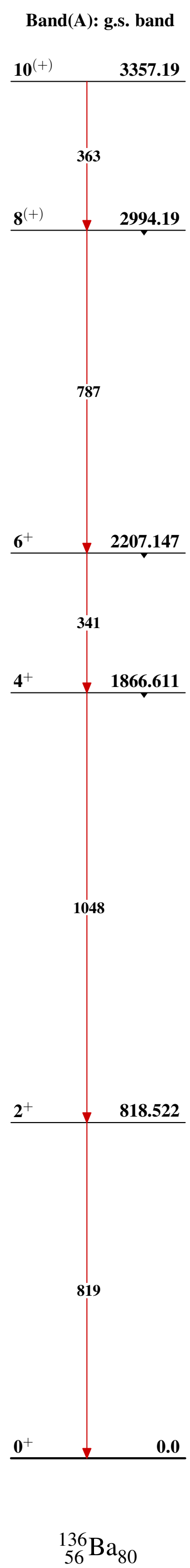
Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level



Adopted Levels, Gammas



Adopted Levels, Gammas

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

Q(β^-)=−1742 *3*; S(n)=8611.72 *4*; S(p)=9005.00 *18*; Q(α)=−2560.7 *3* 2017Wa10
S(2n)=15517.35 *8*, S(2p)=16410.4 *3* (2017Wa10).
First identification of ^{138}Ba nuclide by F. W. Aston in 1925: Philos Mag 49, 1191 (1925). See 2010Sh20.
Nuclear Structure Theory: 2011To17, 2001An05, 2001Sh06, 2001Ty03, 2000Vr04, 2000Yo08, 1997Ho05.
Other measurements:
2015Wa30: ^{198}Pt(^{136}Xe,Xγ) E=7.98 MeV/nucleon. Measured σ.
2004Va03: ^{198}Pt(^{136}Xe,Xγ) E=850 MeV. Measured $T_{1/2}$.
Double giant-dipole resonance: 1990Au01, 1991Au04, 1992Ba02.
Giant quadrupole resonance: 1991BeZT.
Giant dipole resonance: 1996Be30.
Isotope shift, Δ<r^2> measurements: 2000Ga58, 1995Va36, 1995Zh57.
Neutron induced reactions on ^{137}Ba and ^{138}Ba: 2000ZhZV, 1999ZhZR, 1998Ko07.

^{138}Ba Levels

Cross Reference (XREF) Flags

A	^{138}Cs β^- decay (32.5 min)	G	^{137}Ba(n,γ) E=thermal	M	^{138}Ba(α,$\alpha'\gamma$)
B	^{138}Cs β^- decay (2.91 min)	H	^{137}Ba(d,p)	N	^{138}Ba(α,α')
C	^{138}La ε decay	I	^{138}Ba(γ,γ'),(pol γ,γ')	O	^{139}La(d,^{3}He)
D	^{136}Xe(^{3}He,n)	J	^{138}Ba(e,e$'$)	P	^{238}U(^{12}C,Fγ),^{208}Pb(^{18}O,Fγ)
E	^{136}Xe(α,2nγ)	K	^{138}Ba(n,n$'\gamma$)	Q	Coulomb excitation
F	^{136}Ba(t,p)	L	^{138}Ba(p,p$'$)		

E(level)[†]	J$^\pi$	$T_{1/2}$[@]	XREF	Comments
0.0[&]	0$^+$	stable	ABCDEFGHIJKLMNOPQ	Evaluated nuclear charge radius <r^2>$^{1/2}$=4.838 fm *5* (2013An02).
1435.805[&] *10*	2$^+$	0.199 ps *6*	ABCDE GHIJKL NOPQ	μ=+1.44 *22* (1987Ba65,2014StZZ) Q=−0.14 *7* (1989Bu07,2016St14) B(E2)↑=0.231 *9* J$^\pi$: 1435.795γ E2 to 0$^+$ g.s.; L(d,p)=0 from 3/2$^+$; L(p,p$'$)=L(α,α')=2. $T_{1/2}$: weighted average of 0.204 ps *6* from B(E2)↑ in Coulomb excitation, 0.186 ps *10* from B(E2)↑ in (e,e$'$), 0.193 ps *+15−13* from measured width in (γ,γ'). Other: 0.19 ps *+12−6* in (n,n$'\gamma$) by DSAM. μ: from g-factor=0.72 *11* (1987Ba65) in Coulomb excitation. Q: −0.14 *7* is for constructive interference from second 2$^+$ state, +0.08 *7* for destructive interference (1989Bu07) in Coulomb excitation. B(E2)↑: weighted average of 0.249 *13* from (e,e$'$) and 0.227 *6* from Coulomb excitation.
1898.588[&] *11*	4$^+$	2.160 ns *11*	AB E G KL NOP	μ=+3.2 *6* (2014StZZ,1985Be04) J$^\pi$: L(α,α')=L(p,p$'$)=4; L(d,^{3}He)=4 from 7/2$^+$; 462.796γ E2 to 2$^+$. $T_{1/2}$: from $\beta\gamma\gamma$(t) in ^{138}Cs β^- decay (32.5 m), weighted average of 2.164 ns *11* (1995Ma75), 2.13 ns *3* (2011Ro42) and 2.17 ns *8* (1963Cu04). Other: 2.3 ns *1* from γ(t) in (α,2nγ). μ: from g-factor=0.80 *14* (1985Be04) in ^{138}Cs β^- decay (32.5 m).
2090.536[&] *21*	6$^+$	0.85 μs *10*	AB E G KL NOP	μ=+5.88 *12* (1976Ik04) XREF: N(2120).

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{138}Ba Levels (continued)

E(level)†	Jπ	$T_{1/2}$@	XREF	Comments
				Jπ: L(p,p′)=6. $T_{1/2}$: weighted average of 0.8 μs *1* from βγ(t) in ^{138}Cs β^- decay (2.91 m), 0.8 μs *2* from γ(t) in (α,2nγ) and 1.25 μs *25* from γ(t) 2004Va03 via ^{198}Pt(^{136}Xe,Xγ) reaction. μ: from g-factor=0.98 *2* (1976Ik04, TDPAD) in (α,2nγ). Additional information 1.
2189.861 *22*	(1,2$^+$)	≥0.8 ps	G K	Jπ: possible 2189.2γ to 0$^+$; strong primary feeding from 2$^+$ in (n,γ) E=thermal. Jπ=0$^+$ from (n,n′γ) based on 754.12γ isotropic is inconsistent. $T_{1/2}$: from (n,n′γ) using DSAM.
2203.05 *3*	6$^+$	55 ps *17*	AB E G KL oP	Jπ: 112.52γ M1+E2 to 6$^+$ and 980.6γ stretched E2 from 8$^+$. $T_{1/2}$: from βγγ(t) in ^{138}Cs β^- decay (32.5 m).
2217.874 *18*	2$^+$	0.130 ps *10*	A E G I KL No Q	Jπ: 2217.86γ E2 to 0$^+$; L(p,p′)=2. $T_{1/2}$: weighted average of 0.135 ps *+21−16* from B(E2)↑ in Coulomb excitation, 0.114 ps *+14−12* from width in (γ,γ′), and 0.137 ps *10* in (n,n′γ) using DSAM.
2307.515 *17*	4$^+$	7 ps *3*	AB E G KL N P	XREF: N(2270). Jπ: L(p,p′)=4; L(d,^{3}He)=4+2 from 7/2$^+$; 871.68γ E2 to 2$^+$, 408.97γ M1+E2 to 4$^+$. $T_{1/2}$: from βγγ(t) in ^{138}Cs β^- decay (32.5 m). Other: ≤0.07 ns in (α,2nγ) using DSAM.
2340	0$^+$		D	Jπ: L(^{3}He,n)=0+(2).
2415.337 *19*	5$^+$	16 ps *8*	AB E G KL OP	XREF: O(2440). Jπ: 516.70γ M1+E2 to 4$^+$, 324.84γ M1+E2 to 6$^+$. $T_{1/2}$: from βγγ(t) in ^{138}Cs β^- decay (32.5 m). Other: ≤0.07 ns from γ(t) in (α,2nγ).
2445.550 *15*	3$^+$	5 ps *4*	A E G KL O	XREF: O(2470). Jπ: 1009.70γ M1+E2 to 2$^+$, 546.975γ M1+E2 to 4$^+$. $T_{1/2}$: from βγγ(t) in ^{138}Cs β^- decay (32.5 m). Other: ≥0.7 ps in (n,n′γ) using DSAM.
2582.18 *23*	4$^+$		L	Jπ: L=4 in (p,p′).
2582.99 *3*	1$^+$	0.13 ps *+4−3*	A E G KL	Jπ: 1147.17γ M1+E2 to 2$^+$, 2583.03γ D to 0$^+$. $T_{1/2}$: from (n,n′γ) using DSAM. Other: ≤7 ps from βγγ(t) in ^{138}Cs β^- decay (32.5 m).
2639.39 *4*	2$^+$	0.32 ps *+10−5*	A E G I KL N	XREF: N(2650). Jπ: L(p,p′)=2; 2639.35γ E2 to 0$^+$. $T_{1/2}$: weighted average of 0.26 ps *+10−5* from width in (γ,γ′) and 0.42 ps *+12−8* using DSAM in (n,n′γ).
2779.31 *3*	4$^+$	≤6 ps	A E G KL	Jπ: L(p,p′)=4. $T_{1/2}$: from βγγ(t) in ^{138}Cs β^- decay (32.5 m).
2795.2? *3*	(1,2$^+$)		G	E(level): This level is proposed in (n,γ) E=thermal (1995Bo05) based on the observation of the 2794-5817 coincidence, which, however, could also assume a level at 5817 instead of at 2794. A level at 5815 is proposed by 2006Vo11 in (γ,γ′) from the observed 5817γ and the 2794γ is not observed in (n,n′γ), which makes this 2794 level questionable. Jπ: possible 2794.9γ to 0$^+$.
2851.444 *22*	4$^+$	≤11 ps	A E G K	Jπ: 1415.71γ stretched E2 to 2$^+$, 952.86γ M1+E2 to 4$^+$. $T_{1/2}$: from βγγ(t) in ^{138}Cs β^- decay (32.5 m), $T_{1/2}$≥1.5 ps from (n,n′γ) using DSAM.
2880.66 *8*	3$^-$	0.055 ps *6*	A DE GH JKL N Q	B(E3)↑=0.133 *13* (1985Bu01) XREF: D(2850). Jπ: L(α,α′)=L(p,p′)=3; L(d,p)=3 from 3/2$^+$. $T_{1/2}$: from (n,n′γ) using DSAM. Other: ≤11 ps from βγγ(t) in ^{138}Cs β^- decay (32.5 m).

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Adopted Levels, Gammas (continued)

^{138}Ba Levels (continued)

E(level)†	J^{π}	$T_{1/2}$@	XREF	Comments
				B(E3)↑: from 1985Bu01 in Coulomb excitation. Other: 0.195 *12* from 1972LeYB in (e,e′).
≈2900			H	
2916.61? *18*	(1,2$^+$)		G	E(level): This level is proposed in (n,γ) E=thermal (1995Bo05) based on the observation of the 2917-5695 coincidence, which, however, could also assume a level at 5695 instead of at 2794. A level at 5695 is proposed by 2006Vo11 in (γ,γ') from the observed 5695γ and the 2717γ is not observed in (n,n′γ), which makes this 2917 level questionable. J^{π}: possible 2916.98γ to 0$^+$.
2931.40 *4*	2$^+$	0.19 ps *+5−4*	A E G KL	J^{π}: 2931.3γ E2 to 0$^+$. $T_{1/2}$: from (n,n′γ) using DSAM.
2991.07 *4*	3$^+$	≤11 ps	A G KL	J^{π}: 773.20γ and 1555.25γ M1+E2 to 2$^+$, 683.70γ D+Q to 4$^+$. $T_{1/2}$: from $\beta\gamma\gamma$(t) in ^{138}Cs β^- decay (32.5 m).
3049.91 *3*	2$^+$	0.33 ps *+14−8*	A E G KL	J^{π}: 1614.08γ M1+E2 to 2$^+$, 3049.6γ to 0$^+$, 1151.26γ to 4$^+$. $T_{1/2}$: from (n,n′γ) using DSAM.
3154.71 *6*	4$^+$		E G KL	J^{π}: L(p,p′)=4; 1256.23γ D+Q to 4$^+$, 1064.14γ to 6$^+$, 739.31γ to 3$^+$.
3163.27 *7*	(2)$^+$	0.28 ps *+55−12*	A E G K	J^{π}: 1727.3γ M1(+E2) to 2$^+$, 1264.70γ (Q) to 4$^+$, strong primary γ from 2$^+$ in (n,γ) E=thermal. $T_{1/2}$: from (n,n′γ) using DSAM.
3183.60& *22*	8$^+$	20 ps *+20−14*	E K P	J^{π}: 1093.0γ stretched E2 to 6$^+$; band structure. $T_{1/2}$: from (α,2nγ) using DSAM.
3243.06 *8*	3		A G K	J^{π}: 935.85γ D+Q to 4$^+$, 1806.81γ D+Q to 2$^+$.
3257.24 *7*	3		A E G KL	J^{π}: 1358.80γ D+Q to 4$^+$, 1821.33γ to 2$^+$.
3309.4 *3*	(5,6,7)		E K	J^{π}: 1106.3γ D,Q to 6$^+$.
3338.72 *6*	2$^+$	31 fs *9*	A GHI KL N	J^{π}: L(p,p′)=2; 3338.68γ E2 to 0$^+$. $T_{1/2}$: weighted average of 31 fs *9* from width in (γ,γ') and 31 fs *+9−8* from (n,n′γ) using DSAM.
3352.6 *3*	(1,2$^+$)		A	J^{π}: 3352.6γ to 0$^+$.
3359.7 *3*	7$^+$	25 ps *10*	E K P	J^{π}: 944.2γ E2 to 5$^+$. $T_{1/2}$: from (α,2nγ) using DSAM.
3366.71 *7*	2$^+$	31 fs *+10−8*	A G I KL	J^{π}: L(p,p′)=2; 3366.72γ E2 to 0$^+$. $T_{1/2}$: weighted average of 29 fs *+21−13* from width in (γ,γ') and 31 fs *+10−8* from (n,n′γ) using DSAM.
3376.63 *8*	3		G K	J^{π}: 1940.74γ D+Q to 2$^+$, 1478.28γ D+Q to 4$^+$.
3437.5 *6*	(1,2$^+$)		A	J^{π}: 3437.5γ to 0$^+$.
3442.18 *12*	2$^{(+)}$		A G K	J^{π}: 3442.25γ Q to 0$^+$.
3485.98 *5*			K	J^{π}: 1587.6γ to 4$^+$, 1040.42γ to 3$^+$.
≈3500	(4$^+$)		N	J^{π}: L(α,α')=(4).
3504.28 *10*	2$^-$	≥0.2 ps	GH K	J^{π}: L(d,p)=3; 3504.91γ Q to 0$^+$. $T_{1/2}$: from (n,n′γ) using DSAM.
3534	$^-$		H	J^{π}: L(d,p)=3 from 3/2$^+$.
3562.25 *8*	(4)$^-$		H KL	J^{π}: L(d,p)=3 from 3/2$^+$; 1116.71γ D+Q to 3$^+$, 1663.2γ to 4$^+$; (4)$^-$ from analysis of p-decay of IAR in ^{138}Ba+p and in ^{137}Ba(d,p) (1967Mo15).
3600.73 *10*	1	≥0.09 ps	G K	J^{π}: 3600.56γ D to 0$^+$, 2164.96γ to 2$^+$. $T_{1/2}$: from (n,n′γ) using DSAM.
3610.1 *3*			E K	J^{π}: 1407.0γ D,Q to 6$^+$.
3617.8 *4*	0$^+$		F K	J^{π}: L(t,p)=0.
3622.1 *3*	10$^+$	0.51 ns *7*	E K	J^{π}: 438.5γ E2 γ to 8$^+$. $T_{1/2}$: from γ(t) in (α,2nγ).

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Adopted Levels, Gammas (continued)

^{138}Ba Levels (continued)

E(level)[†]	J^π	$T_{1/2}$[@]	XREF	Comments
3632.8[e] *4*	9^-	31 ps *18*	E K P	J^π: 449.2γ E1 to 8^+; band structure. $T_{1/2}$: from (α,2nγ) using DSAM.
3643.08 *11*	2^+	19 fs *+16−11*	A GI Kl	J^π: 3643.10γ E2 to 0^+. $T_{1/2}$: from (n,n′γ) using DSAM. Other: ≤15 fs from (γ,γ').
3646.71 *13*	$(3)^-$		A GH Kl	J^π: L(d,p)=3 from $3/2^+$; 766.03γ D+Q to 3^-; $(3)^-$ from analysis of p-decay of IAR in ^{138}Ba+p and in ^{137}Ba(d,p) (1967Mo15).
3652.6 *8*	$(1,2^+)$		A	J^π: 3652.5γ to 0^+.
3678.2 *5*	8^-	≤0.07 ns	E	J^π: 318.5γ E1 7^+. $T_{1/2}$: from γ(t) in (α,2nγ).
3684.7 *3*	1		K	J^π: 3684.6γ D to 0^+.
3693.92 *12*			A G K	
3734.4 *3*	2^+	0.08 ps *+13−4*	K	J^π: 3734.3γ E2 to 0^+. $T_{1/2}$: from (n,n′γ) using DSAM.
3800.06 *24*	2^+	0.09 ps *+21−6*	K	J^π: 3800.1γ E2 to 0^+. $T_{1/2}$: from (n,n′γ) using DSAM.
3837.50 *10*	(2^+)		G	J^π: 3837γ to 0^+, 957.6γ to 3^-.
3859.5 *3*	$(5)^-$		H KL	J^π: L(d,p)=3 from $3/2^+$; 1960.9γ (D) to 4^+.
3910.5[&] *4*	10^+	≤14 ps	E P	J^π: 726.9γ E2 to 8^+, 288.4γ D+Q to 10^+, band structure. $T_{1/2}$: from (α,2nγ).
3922.13 *6*	$(3)^-$		A GH KL	J^π: L(d,p)=1 from $3/2^+$; 2486.51γ to 2^+, 2023.62γ (D) to 4^+.
3931.18 *24*			K	
3934.87 *11*	2^+		A G K	J^π: 3935.2γ to 0^+, 2499.4γ to 2^+, 1054.36γ to 3^-, primary transition from 2^+ in (n,γ) E=thermal, log *ft*=7.8 from 3^- parent.
4001.47 *11*	$2^{(+)}$		G K	J^π: 4001.40γ Q to 0^+.
4011.9? *3*	$(2^+,3,4^+)$		A	J^π: 2114.3γ to 4^+, 745.5γ to 3, 368.7γ to 2^+.
4013.7 *3*	$(1,2^+)$		G	J^π: 4012.7γ to 0^+.
4026.00 *11*	1^-	2.11 fs *+17−15*	GHI KL	J^π: 4025.80γ E1 to 0^+. Interpreted as $2^+\otimes3^-$ two-phonon state (1994KnZZ,1995He25,1996Zi02). $T_{1/2}$: from width in (γ,γ'). Other: ≤35 fs from (n,n′γ) using DSAM.
4043	2^+		F	J^π: L(t,p)=2.
4079.88 *23*	$(1)^-$		A GH L	J^π: L(d,p)=1 from $3/2^+$; 4080.1γ to 0^+.
4083.4 *4*	$(1,2^+)$		G	J^π: 4083.3γ to 0^+.
4114.8 *5*			E	
4115.42 *8*	$(1,2^+)$		G	J^π: 4114.5γ to 0^+.
4130.55 *20*			D G	
4143.3 *3*	$(1)^-$		GH	J^π: L(d,p)=1 from $3/2^+$; 4143.2γ to 0^+; fed by primary transition from 2^+ in (n,γ) E=thermal.
4157.5 *5*			E	
4165.1 *3*	$(4)^-$		H KL N	XREF: N(?). J^π: L(d,p)=3, 1284.4γ to 3^-; $(4)^-$ from analysis of p-decay of IAR in ^{138}Ba+p and in ^{137}Ba(d,p) (1967Mo15).
4197.15 *10*	(1,2,3)		G	J^π: fed by primary transition from 2^+ in (n,γ) E=thermal.
4242.11 *18*	$(1,2^+)$		A GH KL	J^π: fed by primary transition from 2^+ in (n,γ) E=thermal; 4242γ to 0^+.
4280.24 *8*	$(1,2)^-$		GH L	J^π: L(d,p)=1 from 3/2; 1398.46γ to 3^-, 1695.9γ to 1^+, 4280.31γ to 0^+. 2^- is not excluded since 1995Bo05 in (n,γ) E=thermal observed that the 4280.31γ in the 4332-4280 cascade is very weak and Mult(4280γ)=M2 is possible.
4323.56 *7*	1^-	3.6 fs *+19−12*	GHI L	J^π: 4323.50γ D to 0^+; L(d,p)=1 from $3/2^+$.
4332.27 *6*	$(1,2^+)$		G	J^π: 4332.23γ to 0^+.

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Adopted Levels, Gammas (continued)

^{138}Ba Levels (continued)

E(level)[†]	J$^\pi$	T$_{1/2}$[@]	XREF	Comments
4359.47 *10*	(1$^+$,2,3)		G	J$^\pi$: 1913.9γ to 3$^+$; fed by primary transition from 2$^+$ in (n,γ) E=thermal.
4445.48 *7*	1$^-$	10.4 fs *+20−14*	GHI L	J$^\pi$: L(d,p)=1; strong 4445.40γ to 0$^+$; fed by primary transition from 2$^+$ in (n,γ) E=thermal.
4508.09 *15*	(2$^+$,3)		A G	J$^\pi$: 2609.54γ to 4$^+$, 3073.4γ to 2$^+$; fed by primary transition from 2$^+$ in (n,γ) E=thermal.
4535.99 *8*	1$^-$	2.5 fs *+5−4*	GHI M	J$^\pi$: L(d,p)=1; 4535.93γ to 0$^+$; J=1 from intensity ratio in (γ,γ').
4564.45 *9*	(2,3)$^-$		GH	J$^\pi$: L(d,p)=1 from 3/2$^+$; 1981.55γ to 1$^+$, 2257.31γ to 4$^+$, 3129.5γ to 2$^+$. 1995Bo05 in (n,γ) thermal assign J^π=(3)$^-$ but state that it is not conclusive.
4580.19 *16*	(1,2,3)		G	J$^\pi$: fed by primary transition from 2$^+$.
4584.2 *5*			E	
4586.3 *4*	(1)$^-$		GH L	J$^\pi$: L(d,p)=1 from 3/2$^+$; 3150.6γ to 2$^+$, 4585.6γ to 0$^+$.
4615.46 *15*			K	
4629.73 *13*			A K	
4645.72 *10*	(1,2,3)$^-$		GH L	J$^\pi$: L(d,p)=1 from 3/2$^+$; fed by primary transition from 2$^+$.
4665.14 *18*	(1$^-$,2$^+$)		G	J$^\pi$: 4664.12γ to 0$^+$, 2082.95γ to 1$^+$, 1784.7γ to 3$^-$.
4689.0[&] *4*	12$^+$	≤14 ps	E P	J$^\pi$: 778.5γ E2 to 10$^+$, band structure. T$_{1/2}$: from (α,2nγ) using DSAM.
4704.2[e] *4*	(11$^-$)		P	J$^\pi$: 1071.3γ to 9$^-$, 1082.1γ to 10$^+$, band structure.
4707.41 *9*	1$^-$	7.5 fs *+22−14*	GHI L	J$^\pi$: L(d,p)=1 from 3/2$^+$; J=1 from scattering asymmetries in (γ,γ'); 4707.21γ to 0$^+$.
4743.44 *12*	(2,3)$^-$		GH L	J$^\pi$: L(d,p)=1 from 3/2$^+$; 3306.40γ, 2525.9γ and 2104.08γ to 2$^+$, 1501.0γ to 2525.9γ to J=3; fed by primary transition from 2$^+$; no g.s. transition to 0$^+$.
4795.78 *19*	(2,3)$^-$		GH L	J$^\pi$: L(d,p)=1+3 from 3/2$^+$; fed by primary transition from 2$^+$; no g.s. transition to 0$^+$.
4855.52 *12*	1$^{(-)}$[‡]	0.28 fs *+39−16*	G I M	
4860	+		D	J$^\pi$: L=0+(2) in (^{3}He,n).
4863.9 *5*			E	
4871.74 *15*	(2,3)$^-$		GH	J$^\pi$: L(d,p)=1+3 from 3/2$^+$, primary transition, no γ to 0$^+$ g.s.
5027.67 *17*	(2$^-$,3)		G L	J$^\pi$: fed by primary transition from 2$^+$ in (n,γ) E=thermal, no γ to g.s.
5128.4 *5*			P	
5145.5 *6*	1[‡]	0.85 fs *+17−12*	I M	
5186.0[e] *5*	(13$^-$)		P	J$^\pi$: 481.8γ to (11$^-$), band structure.
5284.0 *7*	1[‡]	1.6 fs *+4−3*	I	
5358.3 *5*			P	
5390.8 *6*	1$^{(-)}$[‡]	0.69 fs *+16−11*	I M	
5394.2[d] *5*	(13$^-$)		P	J$^\pi$: proposed in ^{238}U(^{12}C,Fγ),^{208}Pb(^{18}O,Fγ).
5475.8 *6*	1[‡]	1.43 fs *+27−19*	I M	
5511.6 *7*	1$^-$[‡]	0.23 fs *+5−3*	I M	
5582.2 *7*	1$^-$[‡]	1.38 fs *+31−21*	I	
5644.8 *5*	1$^-$[‡]	0.29 fs *+6−4*	I M	
5655.4 *7*	1$^-$[‡]	0.85 fs *+22−14*	I M	
5694.6 *7*	1$^-$[‡]	1.30 fs *+27−19*	I M	
5740	0$^+$		D	J$^\pi$: L=0 in (^{3}He,n).
5741.8[b] *6*	(11$^+$)		P	J$^\pi$: band structure.
5743.0 *6*	1$^-$[‡]	0.88 fs *+19−14*	I	
5752.5 *8*	1[#]	2.1 fs *+5−3*	I	
5766.4 *6*	1$^-$[‡]	0.79 fs *+15−11*	I	

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Adopted Levels, Gammas (continued)

^{138}Ba Levels (continued)

E(level)†	Jπ	T1/2@	XREF	Comments
5815.1 7	1−‡	1.09 fs +22−16	I M	
5873.7 6	1−‡	0.44 fs +8−6	I M	
5921.6[c] 6	(14−)		P	Jπ: band structure.
5925.5[b] 4	(12+)		P	Jπ: band structure.
5963.6 6	1−‡	0.56 fs +11−8	I M	
6102.3 7	1−‡	0.42 fs +50−15	I	
6114.6 9	1−‡	0.72 fs +31−17	I	
6193.0 5	1−‡	0.25 fs +5−4	I	
6198.4[d] 6	(15−)		P	Jπ: band structure.
6210.9[b] 5	(13+)		P	Jπ: band structure.
6244.8 8	1−‡	0.82 fs +16−11	I	
6280	0+		D	Jπ: L=0 in (^{3}He,n).
6348.0 7	1−‡	0.42 fs +24−25	I	
6361.8 6	1−‡	0.35 fs +6−5	I	
6410.3 6	1−‡	0.19 fs +4−3	I	
6434.5 6	1−‡	0.20 fs +4−3	I	
6466.0 7	1#	0.76 fs +15−11	I	
6486.5 9	1#	1.8 fs +5−3	I	
6552.8 8	1#	0.75 fs +17−12	I	
6575.5 8	1#	0.66 fs +14−10	I	
6612.9 6	1#	0.16 fs +3−2	I M	
6635.3 8	1#	0.95 fs +22−15	I	
6657.6[b] 5	(14+)		P	Jπ: band structure.
6663.9 7	1#	0.63 fs +12−9	I	
6678.8 5	1#	0.18 fs +3−2	I	
6693.6 5	1#	0.17 fs +3−2	I	
6703.7 6	1#	0.43 fs +8−6	I	
6759.4[c] 7	(16−)		P	Jπ: band structure.
6802.1 8	1#	0.74 fs 13	I	
6813.6 6	1#	0.21 fs +5−3	I	
6821.8 11	1#	0.99 fs +28−18	I	
6830	0+		D	Jπ: L=0 in (^{3}He,n).
6839.3 8	1#	0.65 fs +14−10	I	
6848.5 7	1#	0.33 fs +7−5	I	
6862.2 6	1#	0.25 fs +5−4	I M	
6870.6 7	1#	0.40 fs +8−6	I	
6895.0 6	1#	0.16 fs +3−2	I	
6922.3 8	1#	0.42 fs +8−6	I	
6957.0 12	1#	0.63 fs +16−11	I	
6981.1 8	1#	0.74 fs +16−11	I	
6988.8[a] 5	(14+)		P	Jπ: band structure.
7040.3 9	1#	0.80 fs +19−13	I	
7106.1 15	1#	0.76 fs +17−12	I	
7144.0 9	1#	0.97 fs +26−17	I	
7155.8[d] 8	(17−)		P	Jπ: band structure.

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Adopted Levels, Gammas (continued)

^{138}Ba Levels (continued)

E(level)†	J^π	$T_{1/2}$@	XREF	Comments
7211.8 *8*	1#	0.27 fs *+6−4*	I	
7227.7[a] *5*	(15+)		P	J^π: band structure.
7276.0 *10*	1#	0.18 fs *+4−3*	I	
7334.3 *10*	1#	0.51 fs *+11−8*	I	
7376.8 *9*	1#	0.44 fs *+9−7*	I	
7403.6 *8*			P	
7533.8[a] *6*	(16+)		P	J^π: band structure.
7546.9 *22*	1#	0.75 fs *+22−14*	I	
7705.8 *12*	1#	0.38 fs *+8−6*	I	
7774.2 *7*	1#	0.20 fs *+4−3*	I	
7805.5 *8*	1#	0.33 fs *+7−5*	I	
7819.9 *8*	1#	0.30 fs *+8−5*	I	
7871.3 *10*	1#	0.33 fs *+9−6*	I	
7980.5[a] *8*	(17+)		P	J^π: band structure.
8012.7 *9*			P	
8075.9 *8*	1#	0.15 fs *+3−2*	I	
8281.9[a] *9*	(18+)		P	J^π: band structure.
8433.5 *14*	1−#	0.52 fs *+19−11*	I	
8938.3[a] *10*	(19+)		P	J^π: band structure.
9334.4[a] *12*	(20+)		P	J^π: band structure.

† From a least-squares fit to γ-ray energies.
‡ From γ scattering asymmetry in (γ,γ').
# From γ intensity ratio in (γ,γ').
@ From (n,n$'\gamma$) using DSAM for levels up to 4026 and from widths in (γ,γ') for levels above that, unless otherwise noted.
& Band(A): g.s. band.
a Band(B): Band based on (14+).
b Band(C): Band based on (11+).
c Band(D): Band based on (14−).
d Band(d): Band based on (13−).
e Band(E): Band based on 9−.

$\gamma(^{138}Ba)$

E_i(level)	J^π_i	E_γ[#]	I_γ[#]	E_f	J^π_f	Mult.[@]	δ[‡]	α[†]	Comments
1435.805	2^+	1435.795 *10*	100	0.0	0^+	E2		9.17×10^{-4}	α(K)=0.000743 *11*; α(L)=9.37×10^{-5} *14*; α(M)=1.92×10^{-5} *3* α(N)=4.14×10^{-6} *6*; α(O)=6.34×10^{-7} *9*; α(P)=4.62×10^{-8} *7*; α(IPF)=5.72×10^{-5} *8* B(E2)(W.u.)=11.0 *4* E_γ: from ^{138}La ε decay. Mult.: from ce data in ^{138}La ε decay, $\gamma(\theta)$ and γ(pol) in (n,n$'\gamma$), and $\gamma(\theta)$ in (α,2nγ).
1898.588	4^+	462.785 *5*	100	1435.805	2^+	E2		0.01223	α(K)=0.01024 *15*; α(L)=0.001578 *22*; α(M)=0.000329 *5* α(N)=7.02×10^{-5} *10*; α(O)=1.037×10^{-5} *15*; α(P)=6.12×10^{-7} *9* B(E2)(W.u.)=0.2878 *15* E_γ: from ^{138}Cs β^- decay (32.5 m). Mult.: from ce data in ^{138}Cs β^- decay (32.5 m), $\gamma(\theta)$ and γ(pol) in (n,n$'\gamma$), and $\gamma(\theta)$ in (α,2nγ).
2090.536	6^+	191.95 *2*	100	1898.588	4^+	[E2]		0.198	α(K)=0.1525 *22*; α(L)=0.0359 *5*; α(M)=0.00769 *11* α(N)=0.001615 *23*; α(O)=0.000224 *4*; α(P)=8.02×10^{-6} *12* B(E2)(W.u.)=0.053 *+8−6* E_γ: from (n,n$'\gamma$). Others: 191.96 *6* from ^{138}Cs β^- decay (32.5 m), 191.94 *9* from (n,γ) E=thermal.
2189.861	(1,2^+)	754.05 *2*	100 *6*	1435.805	2^+				E_γ: from (n,n$'\gamma$). Other: 754.12 *8* from (n,γ) E=thermal.
		2189.2 *4*	4.4 *11*	0.0	0^+				E_γ,I_γ: observed only in singles spectrum by 1995Bo05 in (n,γ) E=thermal, not observed by 2003Go02 in (n,n$'\gamma$).
2203.05	6^+	112.52 *3*	100 *7*	2090.536	6^+	M1+E2	−0.25 *2*	0.739 *12*	α(K)=0.618 *9*; α(L)=0.096 *3*; α(M)=0.0200 *6* α(N)=0.00428 *12*; α(O)=0.000637 *16*; α(P)=3.98×10^{-5} *6* B(M1)(W.u.)=0.15 *+7−4*; B(E2)(W.u.)=4.5×10^2 *+31−16* E_γ: weighted average of 112.50 *10* from ^{138}Cs β^- decay (32.5 m), 112.5 *3* from ^{138}Cs β^- decay (2.91 m), 112.6 *3* from (α,2nγ), 112.84 *17* from (n,γ) E=thermal, 112.51 *3* from (n,n$'\gamma$), and 112.1 *5* from ^{238}U(^{12}C,Fγ),^{208}Pb(^{18}O,Fγ). I_γ: from (n,n$'\gamma$). Mult.: from ce data in β^- decay (32.5 m) and $\gamma(\theta)$ in (α,2nγ) and (n,n$'\gamma$). δ: from $\gamma(\theta)$ in (α,2nγ). Other: −0.27 *+12−10* from (n,n$'\gamma$).
		304.0 *2*	2.0 *3*	1898.588	4^+				E_γ,I_γ: from (n,n$'\gamma$) only.
2217.874	2^+	782.09 *9*	2.6 *3*	1435.805	2^+	M1(+E2)	−0.02 *8*	0.00444	α(K)=0.00383 *6*; α(L)=0.000485 *7*; α(M)=9.95×10^{-5} *15* α(N)=2.15×10^{-5} *3*; α(O)=3.31×10^{-6} *5*; α(P)=2.46×10^{-7} *4* B(M1)(W.u.)=0.0090 *+21−18* E_γ: weighted average of 782.08 *9* from ^{138}Csβ^- decay

$^{138}_{56}Ba_{82}$-8

Adopted Levels, Gammas (continued)

γ(^{138}Ba) (continued)

E$_i$(level)	J$^\pi_i$	E$_\gamma$[#]	I$_\gamma$[#]	E$_f$	J$^\pi_f$	Mult.[@]	δ[‡]	α[†]	Comments
									(32.5 m), 782.8 *4* from (n,γ) E=thermal, and 782.06 *10* from (n,n′γ). I$_\gamma$: unweighted average of 2.16 *20* from ^{138}Cs β^- decay (32.5 m), 2.57 *14* from (n,γ) E=thermal, and 3.07 *23* from (n,n′γ). δ: or +2.5 *+7−4* (2003Go02) in (n,n′γ). Mult.,δ: from γ(θ) and γ(pol) in (n,n′γ).
2217.874	2$^+$	2217.86 *2*	100.0 *20*	0.0	0$^+$	E2		7.80×10^{-4}	α(K)=0.000330 *5*; α(L)=4.05×10^{-5} *6*; α(M)=8.29×10^{-6} *12* α(N)=1.79×10^{-6} *3*; α(O)=2.75×10^{-7} *4*; α(P)=2.05×10^{-8} *3*; α(IPF)=0.000400 *6* B(E2)(W.u.)=1.86 *+17−14* E$_\gamma$: from (n,n′γ). Others: 2218.00 *10* from ^{138}Cs β^- decay (32.5 m), 2217.76 *7* from (n,γ) E=thermal, 2218.0 *10* from (γ,γ′), and 2217.86 *2* from (n,n′γ). I$_\gamma$: from ^{138}Csβ^- decay (32.5 m). Mult.: from (n,n′γ) based on γ(θ) and RUL.
2307.515	4$^+$	408.97 *2*	90 *2*	1898.588	4$^+$	M1+E2	−0.23 *+5−7*	0.0216 *4*	α(K)=0.0185 *3*; α(L)=0.00242 *4*; α(M)=0.000499 *7* α(N)=0.0001076 *16*; α(O)=1.648×10^{-5} *24*; α(P)=1.201×10^{-6} *21* B(M1)(W.u.)=0.020 *+19−7*; B(E2)(W.u.)=4 *+7−3* E$_\gamma$: weighted average of 408.98 *6* from ^{138}Cs β^- decay (32.5 m), 408.8 *2* from ^{138}Cs β^- decay (2.91 m), 408.9 *3* from (α,2nγ), 409.02 *6* from (n,γ) E=thermal, and 408.96 *2* from (n,n′γ). I$_\gamma$: weighted average of 91.2 *18* from ^{138}Cs β^- decay (32.5 m) and 86 *4* from (n,n′γ). Others: 76.9 *4* from (n,γ) E=thermal, 52 *3* from (α,2nγ). Mult.: from ce data in ^{138}Cs β^- decay (32.5 m), γ(θ) and γ(pol) in (n,n′γ), γ(θ) in (α,2nγ). δ: from (n,n′γ). Others: −0.23 *7* in (α,2nγ).
		871.68 *2*	100 *3*	1435.805	2$^+$	E2		0.00245	α(K)=0.00210 *3*; α(L)=0.000281 *4*; α(M)=5.79×10^{-5} *9* α(N)=1.244×10^{-5} *18*; α(O)=1.88×10^{-6} *3*; α(P)=1.299×10^{-7} *19* B(E2)(W.u.)=2.0 *+17−7* E$_\gamma$: weighted average of 871.74 *9* from (n,γ) E=thermal, 871.68 *2* from (n,n′γ), 871.72 *7* from ^{138}Cs β^- decay (32.5 m). I$_\gamma$: from ^{138}Cs β^- decay (32.5 m). Mult.: from ce data in ^{138}Cs β^- decay (32.5 m), γ(θ) and γ(pol) in (n,n′γ).
2415.337	5$^+$	107.7 *1*	7.8 *12*	2307.515	4$^+$				E$_\gamma$: from (n,n′γ). Others: 107.5 *3* from ^{138}Cs β^- decay (2.91 m), 107.3 *3* (α,2nγ). I$_\gamma$: weighted average of 16 *8* from ^{138}Cs β^- decay, 7.1 *24* from ^{136}Xe(α,2nγ), and 7.8 *12* from ^{138}Ba(n,n′γ).
		212.28 *3*	38 *3*	2203.05	6$^+$	M1+E2	−0.07 *2*	0.1217	α(K)=0.1043 *15*; α(L)=0.01384 *20*; α(M)=0.00285 *4*

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

E_i(level)	J_i^π	E_γ#	I_γ#	E_f	J_f^π	Mult.@	δ‡	α†	Comments
									α(N)=0.000616 *9*; α(O)=9.42×10^{-5} *14*; α(P)=6.84×10^{-6} *10* B(M1)(W.u.)=0.026 *+34−11*; B(E2)(W.u.)=1.7 *+48−13* E_γ: from (n,n′γ). Others: 212.34 *8* from ^{138}Cs β^- decay (32.5 m), 212.0 *3* from ^{138}Cs β^- decay (2.91 m), 212.3 *3* from (α,2nγ), 212.20 *19* from (n,γ) E=thermal, I_γ: weighted average of 41 *3* from ^{138}Cs β^- decay (32.5 m), 45 *8* from ^{138}Cs β^- decay (2.91 m), and 34.9 *28* from (n,n′γ). Others: 16.7 *24* from (α,2nγ), 16.7 *9* (n,γ) E=thermal. Mult.,δ: D+Q from $\gamma(\theta)$ in (n,n′γ), polarity from no level-parity change determined from other experimental evidence.
2415.337	5$^+$	324.84 *11*	54 *7*	2090.536	6$^+$	M1+E2	−0.10 *2*	0.0394	α(K)=0.0338 *5*; α(L)=0.00442 *7*; α(M)=0.000911 *13* α(N)=0.000197 *3*; α(O)=3.01×10^{-5} *5*; α(P)=2.20×10^{-6} *3* B(M1)(W.u.)=0.010 *+14−5*; B(E2)(W.u.)=0.6 *+14−4* E_γ: unweighted average of 325.16 *8* from (n,γ) E=thermal, 324.83 *2* from (n,n′γ), 324.90 *8* from ^{138}Cs β^- decay (32.5 m), 324.5 *3* from ^{138}Cs β^- decay (2.91 m), 324.8 *3* from (α,2nγ). I_γ: unweighted average of 44 *3* from (n,γ) E=thermal, 64 *4* from (n,n′γ), 68 *4* from ^{138}Cs β^- decay (32.5 m), 40.5 *24* from (α,2nγ). Mult.: from ce data in ^{138}Cs β^- decay (32.5 m),$\gamma(\theta)$ and γ(pol) in (n,n′γ). δ: or −7.8 *+16−18* in (n,n′γ). Others: −0.08 *3* or −7.5 *15* in (α,2nγ).
		516.70 *2*	100 *5*	1898.588	4$^+$	M1+E2	−0.11 *4*	0.01209 *18*	α(K)=0.01041 *15*; α(L)=0.001339 *19*; α(M)=0.000275 *4* α(N)=5.94×10^{-5} *9*; α(O)=9.12×10^{-6} *13*; α(P)=6.74×10^{-7} *10* B(M1)(W.u.)=0.0047 *+57−19*; B(E2)(W.u.)=0.13 *+39−10* E_γ: from (n,n′γ). Others: 516.71 *12* from (n,γ) E=thermal, 516.74 *12* from ^{138}Cs β^- decay (32.5 m), 516.7 *4* from ^{238}U(^{12}C,Fγ), 516.2 *5* from ^{138}Cs β^- decay (2.91 m), 516.6 *3* from (α,2nγ). I_γ: from (α,2nγ). Mult.: from $\gamma(\theta)$ and γ(pol) in (n,n′γ) and (α,2nγ). δ: from (α,2nγ). Other: +0.059 *7* from (n,n′γ).
2445.550	3$^+$	138.10 *6*	7.5 *25*	2307.515	4$^+$	M1,E2		0.51 *11*	α(K)=0.39 *6*; α(L)=0.09 *5*; α(M)=0.020 *11* α(N)=0.0041 *22*; α(O)=0.0006 *3*; α(P)=2.20×10^{-5} *5* E_γ: weighted average of 138.08 *6* from ^{138}Cs β^- decay (32.5 m), and 138.13 *7* from (n,n′γ). E_γ: unweighted average of 5.0 *3* from ^{138}Cs β^- decay (32.5 m), and 10 *1* from (n,n′γ). Mult.: from ce data in ^{138}Cs β^- decay (32.5 m).
		227.73 *6*	5.08 *22*	2217.874	2$^+$	M1(+E2)	+0.01 *8*	0.1007 *15*	α(K)=0.0863 *13*; α(L)=0.01140 *17*; α(M)=0.00235 *4* α(N)=0.000507 *8*; α(O)=7.76×10^{-5} *12*; α(P)=5.66×10^{-6} *8* B(M1)(W.u.)=0.012 *+56−7*

$^{138}_{56}Ba_{82}$-10

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

E_i(level)	J^π_i	E_γ[#]	I_γ[#]	E_f	J^π_f	Mult.[@]	δ[‡]	α[†]	Comments
									E_γ: weighted average of 227.76 *6* from ^{138}Cs β^- decay (32.5 m), 227.7 *3* from (α,2nγ), 227.7 *3* from (n,γ) E=thermal, and 227.71 *6* from (n,n′γ). I_γ: weighted average of 5.06 *13* from ^{138}Cs β^- decay (32.5 m), 4 *4* from (α,2nγ), 4.4 *4* from (n,γ) E=thermal, and 6.4 *5* from (n,n′γ). Mult.: from ce data in ^{138}Cs β^- decay (32.5 m) and $\gamma(\theta)$ in (n,n′γ). δ: or −5.6 *+18−46* from (n,n′γ).
2445.550	3^+	546.975 *16*	35.7 *13*	1898.588	4^+	M1+E2	−0.13 *2*	0.01049	α(K)=0.00903 *13*; α(L)=0.001160 *17*; α(M)=0.000238 *4* α(N)=5.15×10^{-5} *8*; α(O)=7.90×10^{-6} *11*; α(P)=5.84×10^{-7} *9* B(M1)(W.u.)=0.006 *+27−3*; B(E2)(W.u.)=0.21 *+129−14* E_γ: weighted average of 546.990 *15* from ^{138}Cs β^- decay (32.5 m), 546.9 *3* from (α,2nγ), 546.89 *8* from (n,γ) E=thermal, and 546.93 *3* from (n,n′γ). I_γ: weighted average of 36.1 *8* from ^{138}Cs β^- decay (32.5 m), 24 *4* from (α,2nγ), 35.1 *18* from (n,γ) E=thermal, and 39 *3* from (n,n′γ). Mult.: from ce data and $\gamma(\theta)$ in ^{138}Cs β^- decay (32.5 m), $\gamma(\theta)$ and γ(pol) in (n,n′γ). δ: from (n,n′γ).
		1009.70 *2*	100.0 *21*	1435.805	2^+	M1+E2	−2.90 *15*	0.00184	α(K)=0.001585 *23*; α(L)=0.000206 *3*; α(M)=4.24×10^{-5} *7* α(N)=9.13×10^{-6} *14*; α(O)=1.391×10^{-6} *20*; α(P)=9.87×10^{-8} *15* B(M1)(W.u.)=0.00030 *+179−15*; B(E2)(W.u.)=1.5 *+81−7* E_γ: from (n,n′γ). Others: 1009.78 *7* from ^{138}Cs β^- decay (32.5 m), 1009.80 *8* from (n,γ) E=thermal, 1009.7 *3* from (α,2nγ). I_γ: from ^{138}Cs β^- decay (32.5 m). Mult.: from ce data in ^{138}Cs β^- decay (32.5 m), $\gamma(\theta)$ in (α,2nγ), $\gamma(\theta)$ and γ(pol) in (n,n′γ). δ: or −0.14 *3* from (α,2nγ). Others: −2.9 *1* (1984Di03) and +0.018 *7* (2003Go02) in (n,n′γ).
2582.99	1^+	365.18 *11*	14.4 *12*	2217.874	2^+	M1(+E2)	−0.1 *6*	0.0291 *16*	α(K)=0.0250 *16*; α(L)=0.00326 *7*; α(M)=0.000670 *16* α(N)=0.000145 *3*; α(O)=2.22×10^{-5} *4*; α(P)=1.63×10^{-6} *15* B(M1)(W.u.)=0.37 *+18−20* E_γ: weighted average of 365.29 *13* from ^{138}Cs β^- decay (32.5 m), and 365.10 *11* from (n,n′γ). Other: 364.65 *7* from (n,γ) E=thermal. I_γ: weighted average of 15.3 *19* from ^{138}Cs β^- decay (32.5 m), and 14.0 *12* from (n,n′γ). Other: 26.5 *14* from (n,γ) E=thermal for doublet (also placed from 2779 level). Mult.: D(+Q) from $\gamma(\theta)$ in (n,n′γ), polarity from no level-parity change determined from other experimental evidence. δ: or δ= −2.6 *+18−∞* in (n,n′γ).

From ENSDF

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

E_i(level)	J^π_i	E_γ[#]	I_γ[#]	E_f	J^π_f	Mult.[@]	δ[‡]	α[†]	Comments
2582.99	1^+	1147.17 *3*	100 *5*	1435.805	2^+	M1+E2	−0.19 *11*	0.00181 *4*	α(K)=0.00156 *3*; α(L)=0.000196 *4*; α(M)=4.01×10^{-5} *8* α(N)=8.66×10^{-6} *16*; α(O)=1.332×10^{-6} *25*; α(P)=9.97×10^{-8} *20*; α(IPF)=1.78×10^{-6} *3* B(M1)(W.u.)=0.080 *+31−24*; B(E2)(W.u.)=1.3 *+29−12* E_γ: weighted average of 1147.22 *9* from ^{138}Cs β^- decay (32.5 m), 1147.1 *3* from (α,2nγ), 1147.20 *13* from (n,γ) E=thermal, and 1147.16 *3* from (n,n′γ). I_γ: from (n,γ) E=thermal. Mult.,δ: from $\gamma(\theta)$ and γ(pol) in (n,n′γ).
		2583.03 *10*	20.3 *12*	0.0	0^+	M1		9.16×10^{-4}	α(K)=0.000273 *4*; α(L)=3.35×10^{-5} *5*; α(M)=6.85×10^{-6} *10* α(N)=1.480×10^{-6} *21*; α(O)=2.28×10^{-7} *4*; α(P)=1.726×10^{-8} *25*; α(IPF)=0.000600 *9* B(M1)(W.u.)=0.0015 *+7−5* E_γ: weighted average of 2583.15 *13* from ^{138}Cs β^- decay (32.5 m), 2583.02 *16* from (n,γ) E=thermal, and 2582.96 *10* from (n,n′γ). I_γ: weighted average of 19.2 *12* from ^{138}Cs β^- decay (32.5 m), 25 *5* from (n,γ) E=thermal, and 22.2 *19* from (n,n′γ). Mult.: D from $\gamma(\theta)$ in (n,n′γ), polarity from no level-parity change determined from other experimental evidence.
2639.39	2^+	193.89 *8*	4.5 *3*	2445.550	3^+	[M1,E2]		0.173 *18*	α(K)=0.140 *8*; α(L)=0.026 *9*; α(M)=0.0055 *19* α(N)=0.0012 *4*; α(O)=0.00017 *5*; α(P)=8.3×10^{-6} *5* E_γ: from ^{138}Cs β^- decay (32.5 m). Other: 193.9 *2* from (n,n′γ). I_γ: weighted average of 4.3 *3* from ^{138}Cs β^- decay (32.5 m) and 4.9 *4* from ^{138}Ba(n,n′γ).
		421.62 *14*	6.5 *11*	2217.874	2^+	M1(+E2)	−0.08 *12*	0.0202 *4*	α(K)=0.0173 *3*; α(L)=0.00225 *4*; α(M)=0.000462 *7* α(N)=9.97×10^{-5} *14*; α(O)=1.530×10^{-5} *22*; α(P)=1.126×10^{-6} *20* B(M1)(W.u.)=0.051 *+22−21* E_γ: unweighted average of 421.59 *7* from ^{138}Cs β^- decay (32.5 m), 421.87 *13* from (n,γ) E=thermal, and 421.41 *11* from (n,n′γ). I_γ: unweighted average of 5.6 *3* from ^{138}Cs β^- decay (32.5 m), 5.1 *6* from (n,γ) E=thermal, and 8.7 *7* from (n,n′γ). Mult.: D(+Q) from $\gamma(\theta)$ in (n,n′γ), polarity from no level-parity change determined from other experimental evidence. δ: or +2.9 *+18−9* in (n,n′γ).
		1203.82 *15*	5.2 *5*	1435.805	2^+				E_γ: weighted average of 1203.69 *13* from ^{138}Cs β^- decay (32.5 m), 1204.4 *3* from (α,2nγ), 1203.1 *20* from (n,γ) E=thermal, 1204.0 *4* from (n,n′γ).

$^{138}_{56}$Ba$_{82}$-12

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

E_i(level)	J_i^π	E_γ#	I_γ#	E_f	J_f^π	Mult.@	δ‡	α†	Comments
									I_γ: weighted average of 5.2 *5* from ^{138}Cs β^- decay (32.5 m), 5.1 *17* from (n,n′γ).
2639.39	2^+	2639.35 *4*	100 *3*	0.0	0^+	E2		8.78×10^{-4}	α(K)=0.000242 *4*; α(L)=2.96×10^{-5} *5*; α(M)=6.04×10^{-6} *9* α(N)=1.304×10^{-6} *19*; α(O)=2.01×10^{-7} *3*; α(P)=1.506×10^{-8} *21*; α(IPF)=0.000599 *9* B(E2)(W.u.)=0.28 *+6−7* E_γ: weighted average of 2639.59 *13* from ^{138}Cs β^- decay (32.5 m), 2639.26 *4* from (n,γ) E=thermal, 2639.7 *10* from (γ,γ'), and 2639.38 *3* from (n,n′γ). I_γ: from ^{138}Cs β^- decay (32.5 m). Mult.: Q from $\gamma(\theta)$ in (n,n′γ), M2 ruled out by RUL.
2779.31	4^+	333.79 *10*	9.3 *8*	2445.550	3^+				E_γ: weighted average of 333.86 *16* from ^{138}Cs β^- decay (32.5 m), 334.01 *12* from (n,γ) E=thermal, and 333.68 *8* from (n,n′γ). I_γ: weighted average of 7.8 *13* from ^{138}Cs β^- decay (32.5 m), 13 *7* from (n,γ) E=thermal, and 9.8 *8* from (n,n′γ).
		363.91 *4*	22.2 *10*	2415.337	5^+	M1+E2	−0.11 *3*	0.0293	α(K)=0.0252 *4*; α(L)=0.00329 *5*; α(M)=0.000676 *10* α(N)=0.0001459 *21*; α(O)=2.24×10^{-5} *4*; α(P)=1.639×10^{-6} *24* B(M1)(W.u.)>0.012; B(E2)(W.u.)>0.35 E_γ: weighted average of 363.93 *8* from ^{138}Cs β^- decay (32.5 m), 363.9 *3* from (α,2nγ), and 363.90 *4* from (n,n′γ). Other: 364.65 *7* from (n,γ) E=thermal. I_γ: weighted average of 21.3 *20* from ^{138}Cs β^- decay (32.5 m), and 26 *4* from (n,n′γ). Other: 48 *3* from (n,γ) E=thermal for doublet (also placed from 2583 level), 10 *3* from (α,2nγ). Mult.: D+Q from $\gamma(\theta)$ in (n,n′γ), polarity from no level-parity change determined from other experimental evidence. δ: or −4.7 *+6−9* in (n,n′γ).
		880.75 *10*	10.4 *15*	1898.588	4^+				E_γ: weighted average of 880.8 *3* from ^{138}Cs β^- decay (32.5 m), 880.62 *23* from (n,γ) E=thermal, and 880.77 *10* from (n,n′γ). I_γ: weighted average of 10 *3* from ^{138}Cs β^- decay (32.5 m), 9.3 *17* from (n,γ) E=thermal, and 11.3 *15* from (n,n′γ).
		1343.54 *3*	100 *5*	1435.805	2^+	(E2)		1.01×10^{-3}	α(K)=0.000846 *12*; α(L)=0.0001074 *15*; α(M)=2.20×10^{-5} *3* α(N)=4.75×10^{-6} *7*; α(O)=7.26×10^{-7} *11*; α(P)=5.26×10^{-8} *8*; α(IPF)=3.11×10^{-5} *5* B(E2)(W.u.)>0.36 E_γ: weighted average of 1343.59 *9* from ^{138}Cs β^- decay (32.5 m), 1343.4 *3* from (α,2nγ), 1343.43 *10* from (n,γ) E=thermal, and 1343.54 *3* from (n,n′γ). This peak could be an unresolved doublet with the second line associated with the de-excitation of the 3242 level, but that placement is uncertain. I_γ: from ^{138}Cs β^- decay (32.5 m). Mult.: from $\gamma(\theta)$ and γ(pol) in (n,n′γ).

$^{138}_{56}Ba_{82}$-13

Adopted Levels, Gammas (continued)

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

E_i(level)	J^π_i	E_γ[#]	I_γ[#]	E_f	J^π_f	Mult.[@]	δ[‡]	α[†]	Comments
2795.2?	(1,2$^+$)	1359.4[b] *3*	<94	1435.805	2$^+$				E_γ: placed only in (n,γ) E=thermal. See also 1359γ from 3258 level.
		2794.9[b] *8*	100 *25*	0.0	0$^+$				E_γ: observed only in (n,γ) E=thermal.
2851.444	4$^+$	436.07 *2*	2.6 *3*	2415.337	5$^+$				E_γ,I_γ: from (n,n$'\gamma$) only.
		952.86 *11*	14.7 *12*	1898.588	4$^+$	M1+E2	−1.5 *5*	0.00225 *16*	α(K)=0.00194 *14*; α(L)=0.000251 *15*; α(M)=5.2×10^{-5} *3* α(N)=1.11×10^{-5} *7*; α(O)=1.70×10^{-6} *11*; α(P)=1.22×10^{-7} *10* B(M1)(W.u.)>5.8×10^{-5}; B(E2)(W.u.)>0.097 E_γ: weighted average of 953.0 *3* from ^{138}Cs β^- decay (32.5 m), 952.7 *3* from (α,2nγ), 952.87 *17* from (n,γ) E=thermal, and 952.85 *11* from (n,n$'\gamma$). I_γ: weighted average of 14 *4* from ^{138}Cs β^- decay (32.5 m), 17 *4* from (α,2nγ), 15.1 *12* from (n,γ) E=thermal, and 14.2 *12* from (n,n$'\gamma$). Mult.: from $\gamma(\theta)$ and γ(pol) in (n,n$'\gamma$). δ: or −5 *+2−9* in (n,n$'\gamma$).
		1415.71 *3*	100 *5*	1435.805	2$^+$	E2		9.35×10^{-4}	α(K)=0.000763 *11*; α(L)=9.65×10^{-5} *14*; α(M)=1.98×10^{-5} *3* α(N)=4.26×10^{-6} *6*; α(O)=6.52×10^{-7} *10*; α(P)=4.75×10^{-8} *7*; α(IPF)=5.10×10^{-5} *8* B(E2)(W.u.)>0.18 E_γ: weighted average of 1415.68 *13* from ^{138}Cs β^- decay (32.5 m), 1415.7 *3* from (α,2nγ), 1415.66 *11* from (n,γ) E=thermal, and 1415.71 *3* from (n,n$'\gamma$). I_γ: from (n,γ) E=thermal. Mult.: from $\gamma(\theta)$ and γ(pol) in (n,n$'\gamma$).
2880.66	3$^-$	982.14[&] *2*	1.53 *21*	1898.588	4$^+$				E_γ,I_γ: from (n,γ) E=thermal only.
		1445.87[&] *2*	100 *13*	1435.805	2$^+$	E1(+M2)	+0.04 *2*	5.76×10^{-4} *9*	α(K)=0.000344 *6*; α(L)=4.17×10^{-5} *8*; α(M)=8.52×10^{-6} *16* α(N)=1.84×10^{-6} *4*; α(O)=2.82×10^{-7} *5*; α(P)=2.10×10^{-8} *4*; α(IPF)=0.000179 *3* B(E1)(W.u.)=0.00150 *+20−16* E_γ: weighted average of 1445.04 *25* from ^{138}Cs β^- decay (32.5 m), 1444.8 *3* from (α,2nγ), 1444.97 *6* from (n,γ) E=thermal, and 1444.86 *2* from (n,n$'\gamma$). I_γ: from (n,γ) E=thermal. Mult.: from $\gamma(\theta)$ and γ(pol) in (n,n$'\gamma$). δ: others: −0.14 *6* or −3.0 *4* from 1984Di03 in (n,n$'\gamma$).
2916.61?	(1,2$^+$)	1479.2[b] *4*	100 *11*	1435.805	2$^+$				E_γ,I_γ: from (n,γ) E=thermal only.
		2916.98[b] *20*	89 *50*	0.0	0$^+$				E_γ,I_γ: from (n,γ) E=thermal only.

Adopted Levels, Gammas (continued)

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

E_i(level)	J^π_i	E_γ[#]	I_γ[#]	E_f	J^π_f	Mult.[@]	δ[‡]	α[†]	Comments
2931.40	2^+	1495.59 *3*	100 *7*	1435.805	2^+	M1+E2	−0.75 *4*	1.01×10^{-3} *2*	α(K)=0.000804 *13*; α(L)=0.0001003 *15*; α(M)=2.05×10^{-5} *3* α(N)=4.44×10^{-6} *7*; α(O)=6.82×10^{-7} *11*; α(P)=5.08×10^{-8} *8*; α(IPF)=7.64×10^{-5} *11* B(M1)(W.u.)=0.020 +*7*−*6*; B(E2)(W.u.)=3.1 +*12*−*9* E_γ: weighted average of 1495.63 *23* from ^{138}Cs β^- decay (32.5 m), 1495.5 *3* from (α,2nγ), 1495.69 *11* from (n,γ) E=thermal, and 1495.58 *3* from (n,n′γ). I_γ: from (n,n′γ). Mult.,δ: from $\gamma(\theta)$ and γ(pol) in (n,n′γ).
		2931.3 *3*	10.1 *16*	0.0	0^+	E2		9.63×10^{-4}	α(K)=0.000202 *3*; α(L)=2.46×10^{-5} *4*; α(M)=5.02×10^{-6} *7* α(N)=1.083×10^{-6} *16*; α(O)=1.668×10^{-7} *24*; α(P)=1.255×10^{-8} *18*; α(IPF)=0.000730 *11* B(E2)(W.u.)=0.030 +*17*−*11* E_γ: weighted average of 2931.4 *4* from ^{138}Cs β^- decay (32.5 m), 2930.9 *8* from (n,γ) E=thermal, and 2931.3 *3* from (n,n′γ). I_γ: unweighted average of 10.8 *21* from ^{138}Cs β^- decay (32.5 m), 12.4 *18* from (n,γ) E=thermal, and 7.2 *11* from (n,n′γ). Mult.: Q from $\gamma(\theta)$ in (n,n′γ), M2 ruled out by RUL.
2991.07	3^+	575.7 *4*	5.6 *23*	2415.337	5^+				E_γ,I_γ: from ^{138}Cs β^- decay (32.5 m). Other: Eγ=575.7 *20*, Iγ=38 from (n,γ) E=thermal.
		683.70 *13*	32 *9*	2307.515	4^+	M1+E2	−2.5 *5*	0.00460 *13*	α(K)=0.00392 *12*; α(L)=0.000538 *13*; α(M)=0.0001113 *25* α(N)=2.39×10^{-5} *6*; α(O)=3.60×10^{-6} *9*; α(P)=2.43×10^{-7} *8* B(M1)(W.u.)>0.00010; B(E2)(W.u.)>1.1 E_γ: weighted average of 683.59 *15* from ^{138}Cs β^- decay (32.5 m), 683.69 *15* from (n,γ) E=thermal, and 683.78 *13* from (n,n′γ). I_γ: unweighted average of 30 *4* from ^{138}Cs β^- decay (32.5 m), 18.3 *17* from (n,γ) E=thermal, and 48 *3* from (n,n′γ). Mult.: D+Q from $\gamma(\theta)$ in (n,n′γ), polarity from no level-parity change determined from other experimental evidence in (n,n′γ). δ: or −0.27 *6* in (n,n′γ).
		773.20 *7*	56 *3*	2217.874	2^+	M1+E2	−2.5 *3*	0.00342 *7*	α(K)=0.00292 *6*; α(L)=0.000394 *7*; α(M)=8.12×10^{-5} *14* α(N)=1.74×10^{-5} *3*; α(O)=2.64×10^{-6} *5*; α(P)=1.82×10^{-7} *4* B(M1)(W.u.)>0.00014; B(E2)(W.u.)>1.1 E_γ: weighted average of 773.31 *10* from ^{138}Cs β^- decay (32.5 m), 773.42 *15* from (n,γ) E=thermal, and 773.15 *5* from (n,n′γ). I_γ: weighted average of 64 *5* from ^{138}Cs β^- decay (32.5 m), 53 *3* from (n,γ) E=thermal, and 58 *5* from (n,n′γ).

Adopted Levels, Gammas (continued)

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

E_i(level)	J^π_i	E_γ[#]	I_γ[#]	E_f	J^π_f	Mult.[@]	δ[‡]	α[†]	Comments
									Mult.: from $\gamma(\theta)$ and γ(pol) in (n,n′γ). δ: or −0.18 *4* (2003Go02) in (n,n′γ). Other: −2.0 *+4−6* (1984Di03) in (n,n′γ).
2991.07	3^+	1555.25 *4*	100 *5*	1435.805	2^+	M1+E2	+9.8 *+21−14*	8.37×10^{-4}	α(K)=0.000638 *9*; α(L)=8.01×10^{-5} *12*; α(M)=1.640×10^{-5} *23* α(N)=3.54×10^{-6} *5*; α(O)=5.42×10^{-7} *8*; α(P)=3.97×10^{-8} *6*; α(IPF)=9.83×10^{-5} *14* B(M1)(W.u.)>1.9×10^{-6}; B(E2)(W.u.)>0.068 E_γ: weighted average of 1555.31 *10* from ^{138}Cs β^- decay (32.5 m), 1555.54 *18* from (n,γ) E=thermal, and 1555.24 *3* from (n,n′γ). I_γ: from (n,γ) E=thermal. Mult.: from $\gamma(\theta)$ and γ(pol) in (n,n′γ). δ: from (n,n′γ) (2003Go02). Other: or 0.21 *+4−3* (1984Di03) in (n,n′γ).
3049.91	2^+	862.3 *20*	22	2189.861	$(1,2^+)$				E_γ,I_γ: from (n,γ) E=thermal only.
		1151.26 *18*	13.2 *11*	1898.588	4^+				E_γ,I_γ: from (n,n′γ). Also observed in (n,γ) E=thermal.
		1614.08 *3*	100 *5*	1435.805	2^+	M1+E2	+0.16 *2*	9.69×10^{-4}	α(K)=0.000733 *11*; α(L)=9.10×10^{-5} *13*; α(M)=1.86×10^{-5} *3* α(N)=4.02×10^{-6} *6*; α(O)=6.20×10^{-7} *9*; α(P)=4.66×10^{-8} *7*; α(IPF)=0.0001217 *17* B(M1)(W.u.)=0.010 *4*; B(E2)(W.u.)=0.06 *+5−3* E_γ: weighted average of 1614.09 *20* from ^{138}Cs β^- decay (32.5 m), 1614.0 *3* from (α,2nγ), 1614.26 *12* from (n,γ) E=thermal, and 1614.07 *3* from (n,n′γ). This γ is also placed from 3911 level in (n,γ) E=thermal, but that placement is not confirmed in other γ studies. I_γ: from (n,γ) E=thermal. Mult.: from $\gamma(\theta)$ and γ(pol) in (n,n′γ). δ: from 2003Go02 in (n,n′γ). Other: −008 *5* or 3.1 *+6−5* from from 1984Di03 in (n,n′γ).
		3049.6 *3*	26.2 *11*	0.0	0^+				E_γ: unweighted average of 3049.9 *3* from ^{138}Cs β^- decay (32.5 m) and 3049.27 *5* from (n,γ) E=thermal. I_γ: weighted average of 23 *3* from ^{138}Cs β^- decay (32.5 m) and 26.5 *10* from (n,γ) E=thermal.
3154.71	4^+	375.6 *2*	21 *3*	2779.31	4^+				E_γ,I_γ: from (n,n′γ) only.
		708.74 *18*	31 *2*	2445.550	3^+				E_γ,I_γ: from (n,γ) E=thermal only, Iγ normalized to Iγ(1256γ)=100.
		739.31 *20*	44 *10*	2415.337	5^+				E_γ: weighted average of 739.0 *3* from (n,γ) E=thermal and 739.44 *19* from (n,n′γ). I_γ: unweighted average of 34 *8* from (n,γ) E=thermal and 54 *5* from (n,n′γ).
		1064.14 *10*	67 *9*	2090.536	6^+				E_γ: weighted average of 1064.0 *3* from (α,2nγ), 1064.5 *3* from (n,γ) E=thermal, and 1064.11 *10* from (n,n′γ). I_γ: unweighted average of 63 *5* from (n,γ) E=thermal and 87 *12*

$^{138}_{56}Ba_{82}$-16

Adopted Levels, Gammas (continued)

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

E_i(level)	J^π_i	E_γ[#]	I_γ[#]	E_f	J^π_f	Mult.[@]	δ[‡]	α[†]	Comments
									from (n,n′γ). 1995Bo05 in (n,γ) E=thermal also place this transition from the 4707 and 4115 levels but those placements are not confirmed in other γ studies.
3154.71	4^+	1256.23 *10*	100 *9*	1898.588	4^+	M1+E2	−1.0 +2−3	0.00132 *5*	α(K)=0.00112 *5*; α(L)=0.000142 *5*; α(M)=2.91×10^{-5} *11* α(N)=6.28×10^{-6} *23*; α(O)=9.6×10^{-7} *4*; α(P)=7.1×10^{-8} *3*; α(IPF)=1.385×10^{-5} *21* E_γ: weighted average of 1256.3 *3* from (n,γ) E=thermal and 1256.22 *10* from (n,n′γ). I_γ: from (n,n′γ), 100 *8* from (n,γ) E=thermal. Mult.,δ: D+Q from γ(θ) in (n,n′γ), polarity from no level-parity change determined from other experimental evidence.
		1719.2[b] *3*	161 *13*	1435.805	2^+				E_γ,I_γ: observed in (n,γ) E=thermal only.
3163.27	$(2)^+$	717.61 *13*	16.5 *13*	2445.550	3^+				E_γ: weighted average of 717.7 *3* from ^{138}Cs β^- decay (32.5 m), 717.56 *13* from (n,γ) E=thermal, and 717.67 *17* from (n,n′γ). I_γ: weighted average of 16.9 *13* from (n,γ) E=thermal, and 15.8 *17* from (n,n′γ).
		855.7 *3*	9.7 *8*	2307.515	4^+				E_γ: weighted average of 855.6 *5* from ^{138}Cs β^- decay (32.5 m), 855.6 *4* from (n,γ) E=thermal, and 855.7 *3* from (n,n′γ). I_γ: weighted average of 9.2 *8* from (n,γ) E=thermal, and 11.1 *14* from (n,n′γ).
		945.5 *3*	12.6 *7*	2217.874	2^+				E_γ: weighted average of 946.0 *5* from ^{138}Cs β^- decay (32.5 m) and 945.3 *3* from (n,γ) E=thermal. Not observed in (n,n′γ). I_γ: from (n,γ) E=thermal.
		1264.70 *10*	60 *6*	1898.588	4^+	(Q)			E_γ: weighted average of 1264.94 *16* from ^{138}Cs β^- decay (32.5 m), 1264.7 *3* from (α,2nγ), 1264.29 *25* from (n,γ) E=thermal, and 1264.67 *10* from (n,n′γ). I_γ: weighted average of 64 *4* from (n,γ) E=thermal, and 51 *6* from (n,n′γ). This transition is observed as the strongest one in ^{138}Cs β^- decay (32.5 m), with I(1264.7γ)/I(1727.3γ)=123 *15*/100 *12*. Mult.: from γ(θ) in (n,n′γ).
		1727.3 *2*	100 *7*	1435.805	2^+	M1(+E2)	+0.05 *5*	9.06×10^{-4}	α(K)=0.000636 *9*; α(L)=7.87×10^{-5} *11*; α(M)=1.612×10^{-5} *23* α(N)=3.48×10^{-6} *5*; α(O)=5.36×10^{-7} *8*; α(P)=4.04×10^{-8} *6*; α(IPF)=0.0001711 *24* B(M1)(W.u.)=0.008 +7−6 E_γ: unweighted average of 1727.68 *18* from ^{138}Cs β^- decay (32.5 m), 1727.2 *2* from (n,γ) E=thermal, and 1727.02 *6* from (n,n′γ).

$^{138}_{56}Ba_{82}$-17

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

E_i(level)	J^π_i	E_γ[#]	I_γ[#]	E_f	J^π_f	Mult.[@]	δ[‡]	α[†]	Comments
									I_γ: from (n,γ) E=thermal. Others: 100 *9* from (n,n′γ). Mult.: from $\gamma(\theta)$ and γ(pol) in (n,n′γ). δ: or 2.0 *+5−3* in (n,n′γ).
3183.60	8^+	980.6 *3*	32.4 *20*	2203.05	6^+	E2		0.00189	α(K)=0.001621 *23*; α(L)=0.000213 *3*; α(M)=4.39×10^{-5} *7* α(N)=9.43×10^{-6} *14*; α(O)=1.433×10^{-6} *20*; α(P)=1.005×10^{-7} *14* B(E2)(W.u.)=0.18 *+47−10* E_γ: weighted average of 980.7 *3* from (α,2nγ), 980.7 *3* from (n,n′γ), and 980.3 *3* from ^{238}U(^{12}C,Fγ),^{208}Pb(^{18}O,Fγ). I_γ: weighted average of 31.7 *20* from (α,2nγ), 42 *7* from (n,n′γ), and 32 *7* from ^{238}U(^{12}C,Fγ),^{208}Pb(^{18}O,Fγ). Mult.: Q from $\gamma(\theta)$ in (α,2nγ) and M2 ruled out by RUL.
		1093.0 *3*	100 *4*	2090.536	6^+	E2		1.50×10^{-3}	α(K)=0.001287 *18*; α(L)=0.0001669 *24*; α(M)=3.43×10^{-5} *5* α(N)=7.38×10^{-6} *11*; α(O)=1.125×10^{-6} *16*; α(P)=7.99×10^{-8} *12* B(E2)(W.u.)=0.32 *+79−17* E_γ: weighted average of 1093.3 *3* from (α,2nγ), 1093.1 *3* from (n,n′γ), and 1092.7 *3* from ^{238}U(^{12}C,Fγ),^{208}Pb(^{18}O,Fγ). I_γ: from (α,2nγ). Mult.: Q from $\gamma(\theta)$ and γ(pol) in (α,2nγ), M2 ruled out by RUL.
3243.06	3	362		2880.66	3^-				E_γ: observed in (n,γ) E=thermal only.
		796.7 *3*	20 *3*	2445.550	3^+				E_γ,I_γ: from (n,n′γ) only.
		935.85 *9*	100 *8*	2307.515	4^+	D+Q	+0.25 *7*		E_γ: weighted average of 935.03 *12* from ^{138}Cs β^- decay (32.5 m), 934.81 *12* from (n,γ) E=thermal, and 934.78 *9* from (n,n′γ). I_γ: from (n,n′γ). Others: 100 *6* from (n,γ) E=thermal, 100 *9* from ^{138}Cs β^- decay (32.5 m). Mult.: from $\gamma(\theta)$ in (n,n′γ). δ: or +8 *+6−3* in (n,n′γ).
		1343[b]		1898.588	4^+				E_γ: observed in the coincidence spectrum (1995Bo05) in (n,γ) E=thermal, could be unresolved with the 1343.54γ from 2779 level; placed by 1995Bo05 in (n,γ) E=thermal and 2003Go02 in (n,n′γ) but it is uncertain.
		1806.81 *18*	65 *14*	1435.805	2^+	D+Q	+0.17 *5*		E_γ: weighted average of 1806.65 *18* from ^{138}Cs β^- decay (32.5 m), 1807.1 *2* from (n,γ) E=thermal, and 1806.77 *18* from (n,n′γ). I_γ: unweighted average of 51 *6* from ^{138}Cs β^- decay (32.5 m), 79 *6* from (n,n′γ). Other: 106 *10* from (n,n′γ) E=thermal. Mult.: from $\gamma(\theta)$ in (n,n′γ). δ: or −28 *+6−∞* in (n,n′γ).
3257.24	3	1358.80 *11*	58 *5*	1898.588	4^+	D+Q	+0.11 *6*		E_γ: weighted average of 1359.1 *5* from ^{138}Cs β^- decay (32.5 m), 1358.6 *3* from (α,2nγ), 1359.4 *3* from (n,γ) E=thermal, and 1358.75 *9* from (n,n′γ). 1995Bo05 in (n,γ) E=thermal also place this transition from a level at 4872 level, but it is not confirmed in other γ studies. I_γ: weighted average of 62 *25* from (α,2nγ), 50 *4* from (n,γ)

From ENSDF

$^{138}_{56}$Ba$_{82}$-18

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

E_i(level)	J_i^π	E_γ[#]	I_γ[#]	E_f	J_f^π	Mult.[@]	δ[‡]	α[†]	Comments
									E=thermal, and 65 *4* from (n,n′γ). Mult.: from $\gamma(\theta)$ in (n,n′γ). δ: or −50 *+40−600* in (n,n′γ).
3257.24	3	1821.33 *8*	100 *8*	1435.805	2^+	D+Q	+0.46 *4*		E_γ: weighted average of 1821.7 *3* from ^{138}Cs β^- decay (32.5 m), 1821.2 *3* from (α,2nγ), 1821.4 *2* from (n,γ) E=thermal, and 1821.30 *8* from (n,n′γ). 1995Bo05 in (n,γ) E=thermal also place this transition from a level at 2794 level, but it is not confirmed in other γ studies. I_γ: from (n,n′γ). Mult.: from $\gamma(\theta)$ in (n,n′γ). δ: or +4.2 *+7−6* in (n,n′γ).
3309.4	(5,6,7)	1106.3 *3*	100	2203.05	6^+	D,Q			Mult.: from $\gamma(\theta)$ in (α,2nγ).
3338.72	2^+	893.3[a] *3*	<4.4[a]	2445.550	3^+				E_γ,I_γ: from (n,γ) E=thermal only.
		1120.7	4.3 *7*	2217.874	2^+				E_γ,I_γ: from (n,γ) E=thermal only.
		1902.8 *2*	13.0 *18*	1435.805	2^+				E_γ: weighted average of 1903.2 *4* from ^{138}Cs β^- decay (32.5 m), 1902.6 *2* from (n,γ) E=thermal, and 1903.0 *4* from (n,n′γ). I_γ: weighted average of 30 *9* from ^{138}Cs β^- decay (32.5 m), 14.3 *14* from (n,γ) E=thermal, and 11.0 *15* from (n,n′γ).
		3338.68 *6*	100 *6*	0.0	0^+	E2		1.09×10^{-3}	α(K)=0.0001618 *23*; α(L)=1.96×10^{-5} *3*; α(M)=4.00×10^{-6} *6* α(N)=8.64×10^{-7} *12*; α(O)=1.331×10^{-7} *19*; α(P)=1.004×10^{-8} *14*; α(IPF)=0.000902 *13* B(E2)(W.u.)=0.87 *+45−22* E_γ: weighted average of 3339.01 *25* from ^{138}Cs β^- decay (32.5 m), 3338.62 *5* from (n,γ) E=thermal, 3338.4 *15* from (γ,γ'),(pol γ,γ'), and 3338.81 *8* from (n,n′γ). I_γ: from ^{138}Cs β^- decay (32.5 m). Mult.: Q from $\gamma(\theta)$ in (n,n′γ), M2 ruled out by RUL.
3352.6	($1,2^+$)	3352.6 *3*	100	0.0	0^+				E_γ: from ^{138}Cs β^- decay (32.5 m) only.
3359.7	7^+	944.4 *3*	100	2415.337	5^+	E2		0.00205	α(K)=0.001759 *25*; α(L)=0.000232 *4*; α(M)=4.79×10^{-5} *7* α(N)=1.029×10^{-5} *15*; α(O)=1.562×10^{-6} *22*; α(P)=1.090×10^{-7} *16* B(E2)(W.u.)=0.71 *+48−21* E_γ: weighted average of 944.2 *3* from (α,2nγ), 944.7 *3* from (n,n′γ) and 944.0 *5* from ^{238}U(^{12}C,Fγ),^{208}Pb(^{18}O,Fγ). Mult.: Q from $\gamma(\theta)$ in (α,2nγ) and (n,n′γ), M2 ruled out by RUL.
3366.71	2^+	921.43[a] *22*	<29[a]	2445.550	3^+				E_γ,I_γ: from (n,γ) E=thermal only.
		1931.2	7.1 *12*	1435.805	2^+				E_γ,I_γ: from (n,γ) E=thermal only.
		3366.72 *7*	100 *21*	0.0	0^+	E2		1.10×10^{-3}	α(K)=0.0001595 *23*; α(L)=1.93×10^{-5} *3*; α(M)=3.94×10^{-6} *6* α(N)=8.52×10^{-7} *12*; α(O)=1.312×10^{-7} *19*; α(P)=9.90×10^{-9} *14*; α(IPF)=0.000913 *13*

$^{138}_{56}$Ba$_{82}$-19

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

E_i(level)	J_i^π	E_γ[#]	I_γ[#]	E_f	J_f^π	Mult.[@]	δ[‡]	α[†]	Comments
									B(E2)(W.u.)=0.8 *+5−3* E_γ: weighted average of 3366.98 *25* from ^{138}Cs β^- decay (32.5 m), 3366.67 *10* from (n,γ) E=thermal, 3365.4 *15* from (γ,γ'),(polγ,γ'), and 3366.73 *7* from (n,n$'\gamma$). I_γ: from (n,γ) E=thermal. Mult.: Q from $\gamma(\theta)$ in (n,n$'\gamma$) and M2 ruled out by RUL.
3376.63	3	1069.1 *4*	32 *3*	2307.515	4^+				E_γ,I_γ: from (n,γ) E=thermal only.
		1158.7 *5*	32 *3*	2217.874	2^+				E_γ,I_γ: from (n,γ) E=thermal only.
		1478.28 *17*	37 *3*	1898.588	4^+	D+Q	−0.13 *12*		E_γ,I_γ: from (n,n$'\gamma$) only. Mult.: from $\gamma(\theta)$ in (n,n$'\gamma$). δ: or −4 *+1−6* in (n,n$'\gamma$).
		1940.74 *9*	100 *11*	1435.805	2^+	D+Q	+0.9 *+4−3*		E_γ: weighted average of 1940.67 *19* from (n,γ) E=thermal and 1940.76 *9* from (n,n$'\gamma$). It is also placed from the 4131 level in (n,γ) E=thermal, but not confirmed in (n,n$'\gamma$). I_γ: from (n,n$'\gamma$). Mult.,δ: from $\gamma(\theta)$ in (n,n$'\gamma$).
3437.5	$(1,2^+)$	3437.5 *6*	100	0.0	0^+				
3442.18	$2^{(+)}$	1251.7 *3*	46 *8*	2189.861	$(1,2^+)$				E_γ,I_γ: from (n,n$'\gamma$) only.
		3442.25 *13*	100 *9*	0.0	0^+	Q			E_γ: weighted average of 3442.6 *6* from ^{138}Cs β^- decay (32.5 m), 3442.30 *13* from (n,γ) E=thermal, and 3442.12 *18* from (n,n$'\gamma$). I_γ: from (n,n$'\gamma$). Mult.: from $\gamma(\theta)$ in (n,n$'\gamma$).
3485.98		1040.42 *4*	100 *8*	2445.550	3^+				E_γ,I_γ: from (n,n$'\gamma$) only.
		1587.6 *4*	7.5 *14*	1898.588	4^+				E_γ,I_γ: from (n,n$'\gamma$) only.
3504.28	2^-	1605.4 *2*	54 *5*	1898.588	4^+				E_γ,I_γ: from (n,n$'\gamma$) only.
		2068.15 *15*	<52	1435.805	2^+				E_γ: weighted average of 2068.16 *15* from (n,γ) E=thermal and 2068.1 *4* from (n,n$'\gamma$). Also placed from 4707 level. I_γ: from 39 *13*, unweighted average of 26 *4* from (n,γ) E=thermal and 52 *6* from (n,n$'\gamma$).
		3504.91 *18*	100 *8*	0.0	0^+	Q			E_γ: weighted average of 3504.5 25 from (n,γ) E=thermal and 3504.1 *2* from (n,n$'\gamma$). I_γ: from (n,n$'\gamma$). Mult.: Q from $\gamma(\theta)$ in (n,n$'\gamma$).
3562.25	$(4)^-$	1116.71 *8*	100 *9*	2445.550	3^+	E1+M2	+0.07 *4*	0.00194	α(K)=0.001672 *24*; α(L)=0.000210 *3*; α(M)=4.30×10^{-5} *6* α(N)=9.28×10^{-6} *13*; α(O)=1.428×10^{-6} *21*; α(P)=1.069×10^{-7} *16*; α(IPF)=6.83×10^{-7} *10* E_γ,I_γ: from (n,n$'\gamma$) only. Mult.,δ: D+Q from $\gamma(\theta)$ in (n,n$'\gamma$), polarity from level-parity change determined by L(d,p)=3.
		1663.2 *5*	16 *3*	1898.588	4^+				E_γ,I_γ: from (n,n$'\gamma$) only.
3600.73	1	2164.96 *12*	100 *10*	1435.805	2^+				E_γ: weighted average of 2164.99 *12* from (n,γ) E=thermal and 2164.8 *3* from (n,n$'\gamma$). I_γ: from (n,n$'\gamma$). Other: I(2164.96γ)/I(3600.56γ)=56 *10*/100 *12* from (n,γ) E=thermal.

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

E_i(level)	J^π_i	E_γ[#]	I_γ[#]	E_f	J^π_f	Mult.[@]	δ[‡]	α[†]	Comments
3600.73	1	3600.56 *17*	86 *9*	0.0	0^+	D			E_γ: weighted average of 3600.52 *17* from (n,γ) E=thermal and 3600.7 *3* from (n,n′γ). I_γ: from (n,n′γ). Mult.: from $\gamma(\theta)$ in (n,n′γ).
3610.1		1407.0 *3*	100	2203.05	6^+	D,Q		0.00104 *14*	α=0.00104 *14*; α(K)=0.00089 *12*; α(L)=0.00011 *2* E_γ: weighted average of 1406.9 *3* from (α,2nγ) and 1407.1 *4* from (n,n′γ). Mult.: from $\gamma(\theta)$ in (α,2nγ).
3617.8	0^+	2182.0 *4*	100	1435.805	2^+				E_γ: from (n,n′γ) only.
3622.1	10^+	438.5 *3*	100	3183.60	8^+	E2		0.01426	α(K)=0.01191 *17*; α(L)=0.00187 *3*; α(M)=0.000390 *6* α(N)=8.31×10^{-5} *12*; α(O)=1.223×10^{-5} *18*; α(P)=7.08×10^{-7} *10* B(E2)(W.u.)=1.59 *+26−20* E_γ: weighted average of 438.6 *3* from (α,2nγ) and 438.3 *3* from (n,n′γ). Mult.: from $\gamma(\theta)$ and γ(pol) in (α,2nγ).
3632.8	9^-	449.2 *3*	100	3183.60	8^+	E1		0.00418	α(K)=0.00361 *5*; α(L)=0.000456 *7*; α(M)=9.33×10^{-5} *14* α(N)=2.01×10^{-5} *3*; α(O)=3.05×10^{-6} *5*; α(P)=2.15×10^{-7} *3* B(E1)(W.u.)=9.E−5 *+13−4* E_γ: weighted average of 449.2 *3* from (α,2nγ), 449.2 *3* from (n,n′γ), and 449.1 *3* from (^{12}C,Fγ),(^{18}O,Fγ). Mult.: from $\gamma(\theta)$ and γ(pol) in (α,2nγ).
3643.08	2^+	1004.3 *5*	44 *5*	2639.39	2^+				E_γ,I_γ: from (n,γ) E=thermal only.
		1744.6 *2*	100 *6*	1898.588	4^+				E_γ: weighted average of 1744.6 *2* from (n,γ) E=thermal and 1743.95 *18* from (n,n′γ). I_γ: from (n,γ) E=thermal.
		2207	<126	1435.805	2^+				E_γ: from (n,γ) E=thermal only. I_γ: from Iγ in (n,γ) E=thermal only for unresolved 2207+2212 doublet.
		3643.10 *22*	≤119	0.0	0^+	E2		1.18×10^{-3}	α(K)=0.0001398 *20*; α(L)=1.690×10^{-5} *24*; α(M)=3.45×10^{-6} *5* α(N)=7.44×10^{-7} *11*; α(O)=1.147×10^{-7} *16*; α(P)=8.67×10^{-9} *13*; α(IPF)=0.001022 *15* B(E2)(W.u.)=0.24 *+99−24* E_γ: unweighted average of 3643.3 *4* from ^{138}Cs β^- decay (32.5 m), 3643.61 *3* from (n,γ) E=thermal, 3642.7 *15* from (γ,γ′),(pol γ,γ′), and 3642.8 *2* from (n,n′γ). I_γ: from (n,γ) E=thermal, possible contribution due to strong 3641γ in ^{139}Ba. Mult.: Q from $\gamma(\theta)$ in (n,n′γ), M2 ruled out by RUL.
3646.71	$(3)^-$	766.03 *12*	100 *9*	2880.66	3^-	M1(+E2)	−0.07 *10*	0.00466 *8*	α(K)=0.00402 *7*; α(L)=0.000509 *8*; α(M)=0.0001045 *16* α(N)=2.26×10^{-5} *4*; α(O)=3.47×10^{-6} *6*; α(P)=2.58×10^{-7} *5* E_γ: weighted average of 766.10 *12* from ^{138}Cs β^- decay

From ENSDF

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

E_i(level)	J^π_i	E_γ[#]	I_γ[#]	E_f	J^π_f	Mult.[@]	α[†]	Comments
								(32.5 m), 766.09 *21* from (n,γ) E=thermal, and 765.90 *14* from (n,n′γ). I_γ: from (n,n′γ). Mult.: from $\gamma(\theta)$ in (n,n′γ), polarity from level-parity change determined by L(d,p)=3. δ: or +1.5 *5* in (n,n′γ).
3646.71	(3)$^-$	1748.7 *5*	47 *21*	1898.588	4$^+$			E_γ,I_γ: from ^{138}Cs β^- decay (32.5 m), not observed in (n,n′γ). Iγ is normalized to Iγ(766.03γ)=100.
		2210.8 *3*	53 *5*	1435.805	2$^+$			E_γ: weighted average of 2210.7 *4* from ^{138}Cs β^- decay (32.5 m), and 2210.9 *3* from (n,n′γ). I_γ: from (n,n′γ).
3652.6	(1,2$^+$)	3652.5 *8*	100	0.0	0$^+$			E_γ: from ^{138}Cs β^- decay (32.5 m).
3678.2	8$^-$	318.5 *3*	100	3359.7	7$^+$	E1	0.00978	α(K)=0.00842 *12*; α(L)=0.001077 *16*; α(M)=0.000221 *4* α(N)=4.73×10^{-5} *7*; α(O)=7.15×10^{-6} *11*; α(P)=4.93×10^{-7} *7* B(E1)(W.u.)>0.00011 E_γ: from (α,2nγ) only. Mult.: from $\gamma(\theta)$ and γ(pol) in (α,2nγ).
3684.7	1	3684.6 *3*	100	0.0	0$^+$	D		E_γ,Mult.: from (n,n′γ).
3693.92		702.92 *17*	100 *16*	2991.07	3$^+$			E_γ: from ^{138}Cs β^- decay (32.5 m) only.
		813.1 *3*	72 *21*	2880.66	3$^-$			E_γ: weighted average of 813.0 *3* from ^{138}Cs β^- decay (32.5 m), 813.2 *4* from (n,γ) E=thermal, and 813.0 *4* from (n,n′γ). I_γ: from ^{138}Cs β^- decay (32.5 m).
		842.34 *25*	97 *14*	2851.444	4$^+$			E_γ: weighted average of 842.21 *16* from ^{138}Cs β^- decay (32.5 m) and 842.8 *3* from (n,γ) E=thermal. I_γ: from ^{138}Cs β^- decay (32.5 m).
		1386.5 *3*	90 *14*	2307.515	4$^+$			E_γ: weighted average of 1386.39 *21* from ^{138}Cs β^- decay (32.5 m) and 1387.0 *4* from (n,n′γ). I_γ: from ^{138}Cs β^- decay (32.5 m).
3734.4	2$^+$	3734.3 *3*	100	0.0	0$^+$	E2	1.21×10^{-3}	α(K)=0.0001341 *19*; α(L)=1.621×10^{-5} *23*; α(M)=3.31×10^{-6} *5* α(N)=7.14×10^{-7} *10*; α(O)=1.101×10^{-7} *16*; α(P)=8.32×10^{-9} *12*; α(IPF)=0.001060 *15* B(E2)(W.u.)=0.23 *+23−15* E_γ: from (n,n′γ). Mult.: Q from $\gamma(\theta)$ in (n,n′γ), M2 ruled out by RUL.
3800.06	2$^+$	1582.0 *4*	26 *5*	2217.874	2$^+$			E_γ,I_γ: from (n,n′γ).
		3800.1 *3*	100 *9*	0.0	0$^+$	E2	1.24×10^{-3}	α(K)=0.0001303 *19*; α(L)=1.574×10^{-5} *22*; α(M)=3.21×10^{-6} *5* α(N)=6.93×10^{-7} *10*; α(O)=1.069×10^{-7} *15*; α(P)=8.08×10^{-9} *12*; α(IPF)=0.001086 *16* B(E2)(W.u.)=0.15 *+33−11* E_γ,I_γ: from (n,n′γ). Mult.: Q from $\gamma(\theta)$ in (n,n′γ), M2 ruled out by RUL.
3837.50	(2$^+$)	957.6[a] *4*	<31[a]	2880.66	3$^-$			E_γ,I_γ: from (n,γ) E=thermal only.
		1620.10 *23*	100 *7*	2217.874	2$^+$			E_γ,I_γ: from (n,γ) E=thermal only.
		2401.46 *11*	93 *11*	1435.805	2$^+$			E_γ,I_γ: from (n,γ) E=thermal only.

$^{138}_{56}Ba_{82}$-22

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

E_i(level)	J_i^π	E_γ[#]	I_γ[#]	E_f	J_f^π	Mult.[@]	δ[‡]	α[†]	Comments
3837.50	(2$^+$)	3837		0.0	0$^+$				E_γ: from (n,γ) E=thermal only.
3859.5	(5)$^-$	1960.9 *3*	100	1898.588	4$^+$	(D)			E_γ,Mult.: from (n,n$'\gamma$).
3910.5	10$^+$	288.4 *3*	14 *7*	3622.1	10$^+$	M1+E2	−0.38 *10*	0.0540 *2*	α(K)=0.0460 *3*; α(L)=0.00630 *10*; α(M)=0.00129 *2*; α(N+..)=0.00035 *1* B(M1)(W.u.)>0.0065; B(E2)(W.u.)>4.2 E_γ: weighted average of 288.5 *3* from (α,2nγ) and 288.2 *3* from (^{12}C,Fγ),(^{18}O,Fγ). I_γ: unweighted average of 12 *4* from (α,2nγ) and 34 *12* from (^{12}C,Fγ),(^{18}O,Fγ). Mult.,δ: from $\gamma(\theta)$ in (α,2nγ), polarity from level-parity change determined fro other experimental evidence.
		726.9 *3*	100 *4*	3183.60	8$^+$	E2		0.00375	α(K)=0.00320 *5*; α(L)=0.000441 *7*; α(M)=9.11×10^{-5} *13* α(N)=1.96×10^{-5} *3*; α(O)=2.94×10^{-6} *5*; α(P)=1.96×10^{-7} *3* B(E2)(W.u.)>4.1 E_γ: weighted average of 727.1 *3* from (α,2nγ) and 726.7 *3* from (^{12}C,Fγ),(^{18}O,Fγ). I_γ: from (α,2nγ). Mult.: from $\gamma(\theta)$ and γ(pol) in (α,2nγ).
3922.13	(3)$^-$	1041.50 *11*	37 *2*	2880.66	3$^-$				E_γ: weighted average of 1041.4 *3* from ^{138}Cs β^- decay (32.5 m) and 1041.51 *11* from (n,γ) E=thermal. I_γ: weighted average of 54 *14* from ^{138}Cs β^- decay (32.5 m) and 37 *2* from (n,γ) E=thermal.
		1614.26 *12*	133 *7*	2307.515	4$^+$				E_γ,I_γ: from (n,γ) E=thermal only.
		2023.62 *8*	100 *9*	1898.588	4$^+$	(E1)		8.38×10^{-4}	α(K)=0.000453 *7*; α(L)=5.59×10^{-5} *8*; α(M)=1.144×10^{-5} *16* α(N)=2.47×10^{-6} *4*; α(O)=3.81×10^{-7} *6*; α(P)=2.87×10^{-8} *4*; α(IPF)=0.000315 *5* E_γ: weighted average of 2023.93 *20* from ^{138}Cs β^- decay (32.5 m), 2023.59 *7* from (n,γ) E=thermal, and 2023.5 *3* from (n,n$'\gamma$). I_γ: from (n,n$'\gamma$) E=thermal. Mult.: (D) from $\gamma(\theta)$ in (n,n$'\gamma$), polarity from level-parity change determined by L(d,p)=1.
		2486.51 *17*	17 *2*	1435.805	2$^+$				E_γ: weighted average of 2487.1 *6* from ^{138}Cs β^- decay (32.5 m), 2486.48 *17* from (n,γ) E=thermal, and 2486.1 *8* from (n,n$'\gamma$). I_γ: weighted average of 19 *7* from ^{138}Cs β^- decay (32.5 m), 17 *2* from (n,γ) E=thermal, and 16 *5* from (n,n$'\gamma$).
3931.18		1515.8 *4*	30 *7*	2415.337	5$^+$				E_γ,I_γ: from (n,n$'\gamma$) only.
		2032.6 *3*	100 *10*	1898.588	4$^+$				E_γ,I_γ: from (n,n$'\gamma$) only.
3934.87	2$^+$	596.2 *4*	16 *6*	3338.72	2$^+$				E_γ,I_γ: from ^{138}Cs β^- decay (32.5 m) only.
		1054.36 *16*	100 *12*	2880.66	3$^-$				E_γ: weighted average of 1054.32 *15* from ^{138}Cs β^- decay (32.5 m), 1054.9 *3* from (n,γ) E=thermal, and 1054.2 *2* from (n,n$'\gamma$). I_γ: from (n,n$'\gamma$). Others: 105 *28* from ^{138}Cs β^- decay (32.5 m).

$^{138}_{56}$Ba$_{82}$-23

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

E_i(level)	J^π_i	E_γ[#]	I_γ[#]	E_f	J^π_f	Mult.[@]	α[†]	Comments
3934.87	2^+	1627.8 *4*	78 *10*	2307.515	4^+			E_γ,I_γ: from (n,n′γ) only.
		1717.1 *3*	67 *15*	2217.874	2^+			E_γ,I_γ: from ^{138}Cs β^- decay (32.5 m) only.
		2499.4 *3*	77 *9*	1435.805	2^+			E_γ: weighted average of 2499.4 *3* from ^{138}Cs β^- decay (32.5 m), 2499.8 *5* from (n,γ) E=thermal, and 2499.3 *3* from (n,n′γ). I_γ: from (n,n′γ).
		3935.2 *5*	11 *2*	0.0	0^+			E_γ,I_γ: from ^{138}Cs β^- decay (32.5 m) only.
4001.47	$2^{(+)}$	2566	23 *17*	1435.805	2^+			E_γ,I_γ: from (n,n′γ) only.
		4001.40 *11*	100 *12*	0.0	0^+	Q		E_γ: weighted average of 4001.41 *11* from (n,γ) E=thermal and 4001.2 *4* from (n,n′γ). I_γ: from (n,n′γ).
4011.9?	$(2^+,3,4^+)$	368.7 *4*	64 *25*	3643.08	2^+			E_γ,I_γ: from ^{138}Cs β^- decay (32.5 m) only.
		754.5 *4*	1.0×10^2 *4*	3257.24	3			E_γ,I_γ: from ^{138}Cs β^- decay (32.5 m) only.
		2114.3 *7*	60 *27*	1898.588	4^+			E_γ,I_γ: from ^{138}Cs β^- decay (32.5 m) only.
4013.7	$(1,2^+)$	2578.1[a] *3*	<182[a]	1435.805	2^+			E_γ,I_γ: from (n,γ) E=thermal only.
		4012.7 *6*	100 *15*	0.0	0^+			E_γ,I_γ: from (n,γ) E=thermal only.
4026.00	1^-	2590.71 *24*	≈23	1435.805	2^+			E_γ,I_γ: from (n,γ) E=thermal. Other: Iγ<5 from 1995He25 in (γ,γ′).
		4025.80 *12*	<100	0.0	0^+	E1	1.75×10^{-3}	$\alpha(K)=7.23\times10^{-5}$ *11*; $\alpha(L)=8.60\times10^{-6}$ *12*; $\alpha(M)=1.752\times10^{-6}$ *25* $\alpha(N)=3.78\times10^{-7}$ *6*; $\alpha(O)=5.83\times10^{-8}$ *9*; $\alpha(P)=4.41\times10^{-9}$ *7*; α(IPF)=0.001665 *24* B(E1)(W.u.)<0.002 E_γ,I_γ: from (n,γ) E=thermal, also placed as primary transition. Mult.: from γ(lin pol) in (pol γ,γ′) and γ(θ) in (n,n′γ).
4079.88	$(1)^-$	1199.15 *24*	100 *18*	2880.66	3^-			E_γ,I_γ: unplaced γ in ^{138}Cs β^- decay (32.5 m). Seen and placed in (n,γ) E=thermal.
		4080.1 *5*	10.5 *14*	0.0	0^+			E_γ,I_γ: from ^{138}Cs β^- decay (32.5 m).
4083.4	$(1,2^+)$	4083.3 *4*	100	0.0	0^+			
4114.8		482.0 *3*	100	3632.8	9^-	D,Q		E_γ,Mult.: from (α,2nγ).
4115.42	$(1,2^+)$	749.38 *24*	27 *6*	3366.71	2^+			
		1064.5 *3*	<33	3049.91	2^+			E_γ: placed only in (n,γ) E=thermal. See 1064.14γ from 3155 level.
		2679.65 *8*	30 *4*	1435.805	2^+			
		4114.5 *3*	100 *8*	0.0	0^+			
4130.55		1940.67 *19*	100	2189.861	$(1,2^+)$			E_γ: see also 1940.7γ from 3377 level.
4143.3	$(1)^-$	4143.2 *3*	100	0.0	0^+			
4157.5		247.0 *3*	100	3910.5	10^+	D,Q		E_γ,Mult.: from (α,2nγ).
4165.1	$(4)^-$	1284.4 *3*	100	2880.66	3^-			E_γ: from (n,n′γ).
4197.15	$(1,2,3)$	2761.32 *10*	100	1435.805	2^+			
4242.11	$(1,2^+)$	2806.28 *18*	100 *10*	1435.805	2^+			E_γ: unweighted average of 2806.57 *17* from ^{138}Cs β^- decay (32.5 m), 2805.97 *10* from (n,γ) E=thermal, and 2806.3 *11* from (n,n′γ). I_γ: from (n,γ) E=thermal.
		4242	20	0.0	0^+			E_γ: seen only in (n,γ) E=thermal.
4280.24	$(1,2)^-$	1398.46[&] *22*	73 *8*	2880.66	3^-			
		1695.9[&] *2*	100 *6*	2582.99	1^+			
		2061.5 *4*	<97	2217.874	2^+			E_γ,I_γ: also placed from 4508 level.

$^{138}_{56}Ba_{82}$-24

γ(^{138}Ba) (continued)

E_i(level)	J^π_i	E_γ[#]	I_γ[#]	E_f	J^π_f	Mult.[@]	Comments
4280.24	(1,2)$^-$	2845 *3*	54	1435.805	2$^+$		
		4280.31 *8*	<27	0.0	0$^+$		E_γ: also placed as a primary transition in (n,γ) E=thermal.
4323.56	1$^-$	957.6[a] *4*	<13[a]	3366.71	2$^+$		
		1158.7 *5*	10.3 *9*	3163.27	(2)$^+$		
		4323.50 *7*	100 *6*	0.0	0$^+$	D	E_γ: weighted average of 4323.37 *7* from (n,γ) E=thermal, 4323.0 *7* from (γ,γ') and 4323.2 *4* from (n,n$'\gamma$). Mult.: from $\gamma(\theta)$ in (n,n$'\gamma$).
4332.27	(1,2$^+$)	2895.62[&] *9*		1435.805	2$^+$		
		4332.23 *6*		0.0	0$^+$		E_γ: also placed as a primary transition in (n,γ) E=thermal.
4359.47	(1$^+$,2,3)	1116.4 *3*	96 *8*	3243.06	3		
		1913.9 *1*	92 *8*	2445.550	3$^+$		
		2923.7 *3*	100 *19*	1435.805	2$^+$		
4445.48	1$^-$	4445.40 *7*	100	0.0	0$^+$		
4508.09	(2$^+$,3)	2061.9 *4*	100 *10*	2445.550	3$^+$		E_γ: unweighted average of 2062.34 *17* from ^{138}Cs β^- decay (32.5 m) and 2061.5 *4* from (n,γ) E=thermal. Also placed from 4280 level in (n,γ) E=thermal. I_γ: from ^{138}Cs β^- decay (32.5 m).
		2609.54 *16*	30 *5*	1898.588	4$^+$		E_γ: weighted average of 2609.3 *3* from ^{138}Cs β^- decay (32.5 m) and 2609.61 *16* from (n,γ) E=thermal. I_γ: from ^{138}Cs β^- decay (32.5 m).
		3073.4 *9*	17 *4*	1435.805	2$^+$		E_γ: unweighted average of 3072.5 *4* from ^{138}Cs β^- decay (32.5 m) and 3074.25 *11* from (n,γ) E=thermal. I_γ: from ^{138}Cs β^- decay (32.5 m).
4535.99	1$^-$	893.3[a] *3*	<16[a]	3643.08	2$^+$		
		2345.86[a] *18*	<51[a]	2189.861	(1,2$^+$)		
		3096.6[b] *6*	110 *16*	1435.805	2$^+$		E_γ: placed only in (n,γ) E=thermal. Poor fit, inconsistent with level-energy difference=3100. The evaluator has considered this placement questionable.
		4535.93 *9*	100 *5*	0.0	0$^+$		E_γ: weighted average of 4535.94 *6* from (n,γ) E=thermal and 4535.1 *6* from (γ,γ'),(pol γ,γ').
4564.45	(2,3)$^-$	921.43[a] *22*	<64[a]	3643.08	2$^+$		
		1981.55 *15*	73 *9*	2582.99	1$^+$		
		2257.31 *18*	60 *7*	2307.515	4$^+$		
		2345.86[a] *18*	<91[a]	2217.874	2$^+$		
		3129.5 *5*	100 *14*	1435.805	2$^+$		
4580.19	(1,2,3)	1337.65 *24*	71 *8*	3243.06	3		
		3143.98 *20*	100 *33*	1435.805	2$^+$		
4584.2		962.1 *3*	100	3622.1	10$^+$		E_γ: from (α,2nγ).
4586.3	(1)$^-$	3150.6 *4*	100 *12*	1435.805	2$^+$		
		4585.6 *7*	<86	0.0	0$^+$		E_γ: also placed as a primary transition in (n,γ) E=thermal.
4615.46		3179.62 *15*	100	1435.805	2$^+$		E_γ: from (n,n$'\gamma$).
4629.73		1778.25 *23*	100 *17*	2851.444	4$^+$		E_γ,I_γ: from ^{138}Cs β^- decay (32.5 m).
		2731.12 *15*	87 *6*	1898.588	4$^+$		E_γ,I_γ: from ^{138}Cs β^- decay (32.5 m).
4645.72	(1,2,3)$^-$	1766.2 *3*	36 *4*	2880.66	3$^-$		

$^{138}_{56}$Ba$_{82}$-25

Adopted Levels, Gammas (continued)

γ(^{138}Ba) (continued)

E$_i$(level)	J$^\pi_i$	E$_\gamma$[#]	I$_\gamma$[#]	E$_f$	J$^\pi_f$	Mult.[@]	α[†]	Comments
4645.72	(1,2,3)$^-$	1850.1[b] *2*	100 *7*	2795.2?	(1,2$^+$)			
		3209.75 *10*	75 *14*	1435.805	2$^+$			
4665.14	(1$^-$,2$^+$)	1784.7 *3*	85 *10*	2880.66	3$^-$			
		2082.95 *14*	100 *15*	2582.99	1$^+$			
		3230.01[&] *9*	35 *20*	1435.805	2$^+$			
		4664.12[&] *11*	31 *4*	0.0	0$^+$			
4689.0	12$^+$	778.5 *3*	100	3910.5	10$^+$	E2	0.00318	α(K)=0.00272 *4*; α(L)=0.000370 *6*; α(M)=7.65×10^{-5} *11* α(N)=1.642×10^{-5} *23*; α(O)=2.48×10^{-6} *4*; α(P)=1.676×10^{-7} *24* B(E2)(W.u.)>3.3 E$_\gamma$: weighted average of 778.6 *3* from (α,2nγ) and 778.4 *3* from (^{12}C,Fγ),(^{18}O,Fγ). Mult.: Q from $\gamma(\theta)$ in (α,2nγ), M2 ruled out by RUL.
4704.2	(11$^-$)	1071.3 *3*	100 *30*	3632.8	9$^-$			E$_\gamma$,I$_\gamma$: from ^{238}U(^{12}C,Fγ),^{208}Pb(^{18}O,Fγ).
		1082.1 *3*	100 *30*	3622.1	10$^+$			E$_\gamma$,I$_\gamma$: from ^{238}U(^{12}C,Fγ),^{208}Pb(^{18}O,Fγ).
4707.41	1$^-$	1064.5 *3*	<93	3643.08	2$^+$			E$_\gamma$: placed only in (n,γ) E=thermal. See 1064.14γ from 3155 level.
		2068.16 *15*	<134	2639.39	2$^+$			E$_\gamma$,I$_\gamma$: also placed from 3504 level in (n,γ) E=thermal.
		4707.21 *11*	100 *7*	0.0	0$^+$			E$_\gamma$: other: 4705.6 *9* from (γ,γ').
4743.44	(2,3)$^-$	1501.0 *3*	55 *5*	3243.06	3			
		2104.08 *16*	100 *14*	2639.39	2$^+$			
		2525.9 *3*	48 *6*	2217.874	2$^+$			
		3306.4 *3*	100 *14*	1435.805	2$^+$			
4795.78	(2,3)$^-$	957.6[a] *4*	48[a] *4*	3837.50	(2$^+$)			
		2578.1[a] *3*	100[a] *11*	2217.874	2$^+$			
		3360.1 *3*	41 *6*	1435.805	2$^+$			
4855.52	1$^{(-)}$	921.43[a] *22*	<87[a]	3934.87	2$^+$			
		2272.6 *6*	36 *5*	2582.99	1$^+$			
		4855.11 *14*	100 *19*	0.0	0$^+$			
4863.9		1241.8 *3*	100	3622.1	10$^+$			E$_\gamma$: from (α,2nγ).
4871.74	(2,3)$^-$	1821.4 *2*	<107	3049.91	2$^+$			E$_\gamma$,I$_\gamma$: placed only by 1995Bo05 in (n,γ) E=thermal, not confirmed in other γ studies. See also 1821γ from 3258 level.
		3436.40 *22*	<100	1435.805	2$^+$			E$_\gamma$,I$_\gamma$: placed only by 1995Bo05 in (n,γ) E=thermal, not confirmed in other γ studies. See also 3436γ from 3436 level.
5027.67	(2$^-$,3)	3591.81 *17*	100	1435.805	2$^+$			
5128.4		1506.3 *5*	100	3622.1	10$^+$			E$_\gamma$: from ^{238}U(^{12}C,Fγ),^{208}Pb(^{18}O,Fγ).
5145.5	1	5145.4 *6*		0.0	0$^+$			
5186.0	(13$^-$)	481.8 *3*	100	4704.2	(11$^-$)			E$_\gamma$: from ^{238}U(^{12}C,Fγ),^{208}Pb(^{18}O,Fγ).
5284.0	1	5283.9 *7*		0.0	0$^+$			
5358.3		1736.4 *5*	100	3622.1	10$^+$			E$_\gamma$: from ^{238}U(^{12}C,Fγ),^{208}Pb(^{18}O,Fγ).
5390.8	1$^{(-)}$	5390.7 *6*		0.0	0$^+$			
5394.2	(13$^-$)	705.2 *3*	100	4689.0	12$^+$			E$_\gamma$: from ^{238}U(^{12}C,Fγ),^{208}Pb(^{18}O,Fγ).
5475.8	1	5475.7 *6*		0.0	0$^+$			
5511.6	1$^-$	4076		1435.805	2$^+$			

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

E_i(level)	J_i^π	E_γ[#]	I_γ[#]	E_f	J_f^π	Mult.[@]	α[†]	Comments
5511.6	1^-	5511.3 *10*		0.0	0^+	E1	0.00221	α(K)=4.77×10^{-5} *7*; α(L)=5.65×10^{-6} *8*; α(M)=1.151×10^{-6} *17* α(N)=2.48×10^{-7} *4*; α(O)=3.83×10^{-8} *6*; α(P)=2.91×10^{-9} *4*; α(IPF)=0.00216 *3*
5582.2	1^-	5582.1 *7*		0.0	0^+	E1	0.00223	α(K)=4.69×10^{-5} *7*; α(L)=5.56×10^{-6} *8*; α(M)=1.132×10^{-6} *16* α(N)=2.44×10^{-7} *4*; α(O)=3.77×10^{-8} *6*; α(P)=2.86×10^{-9} *4*; α(IPF)=0.00218 *3* B(E1)(W.u.)=0.00105 *+19–20*
5644.8	1^-	4209		1435.805	2^+			
		5644.6 *5*		0.0	0^+	E1	0.00225	α(K)=4.62×10^{-5} *7*; α(L)=5.48×10^{-6} *8*; α(M)=1.116×10^{-6} *16* α(N)=2.41×10^{-7} *4*; α(O)=3.71×10^{-8} *6*; α(P)=2.82×10^{-9} *4*; α(IPF)=0.00220 *3*
5655.4	1^-	5655.3 *7*		0.0	0^+	E1	0.00225	α(K)=4.61×10^{-5} *7*; α(L)=5.47×10^{-6} *8*; α(M)=1.113×10^{-6} *16* α(N)=2.40×10^{-7} *4*; α(O)=3.70×10^{-8} *6*; α(P)=2.81×10^{-9} *4*; α(IPF)=0.00220 *3* B(E1)(W.u.)=0.0016 *4*
5694.6	1^-	5694.5 *7*		0.0	0^+	E1	0.00226	α(K)=4.57×10^{-5} *7*; α(L)=5.42×10^{-6} *8*; α(M)=1.103×10^{-6} *16* α(N)=2.38×10^{-7} *4*; α(O)=3.67×10^{-8} *6*; α(P)=2.79×10^{-9} *4*; α(IPF)=0.00221 *3* B(E1)(W.u.)=0.00105 *+18–19*
5741.8	(11^+)	2119.8 *8*	100	3622.1	10^+			
5743.0	1^-	4307	10	1435.805	2^+			I_γ: from Iγ(4307)/Iγ(5742.9)=0.10 *1* in (γ,γ').
		5742.9 *7*	100	0.0	0^+	E1	0.00228	α(K)=4.52×10^{-5} *7*; α(L)=5.36×10^{-6} *8*; α(M)=1.091×10^{-6} *16* α(N)=2.36×10^{-7} *4*; α(O)=3.63×10^{-8} *5*; α(P)=2.76×10^{-9} *4*; α(IPF)=0.00223 *4* B(E1)(W.u.)=0.00138 *+27–25*
5752.5	1	5752.4 *8*		0.0	0^+			
5766.4	1^-	5766.3 *6*		0.0	0^+	E1	0.00228	α(K)=4.50×10^{-5} *7*; α(L)=5.33×10^{-6} *8*; α(M)=1.085×10^{-6} *16* α(N)=2.34×10^{-7} *4*; α(O)=3.61×10^{-8} *5*; α(P)=2.74×10^{-9} *4*; α(IPF)=0.00223 *4* B(E1)(W.u.)=0.0017 *3*
5815.1	1^-	5815.0 *7*		0.0	0^+	E1	0.00230	α(K)=4.45×10^{-5} *7*; α(L)=5.28×10^{-6} *8*; α(M)=1.074×10^{-6} *15* α(N)=2.32×10^{-7} *4*; α(O)=3.57×10^{-8} *5*; α(P)=2.71×10^{-9} *4*; α(IPF)=0.00225 *4* B(E1)(W.u.)=0.00118 *+21–20*
5873.7	1^-	5873.6 *6*		0.0	0^+	E1	0.00231	α(K)=4.39×10^{-5} *7*; α(L)=5.21×10^{-6} *8*; α(M)=1.060×10^{-6} *15* α(N)=2.29×10^{-7} *4*; α(O)=3.53×10^{-8} *5*; α(P)=2.68×10^{-9} *4*; α(IPF)=0.00226 *4* B(E1)(W.u.)=0.0028 *5*
5921.6	(14^-)	527.4 *4*	100	5394.2	(13^-)			
5925.5	(12^+)	183.7 *5*	54 *21*	5741.8	(11^+)			
		567.3 *3*	100 *30*	5358.3				
		797.1 *4*	49 *25*	5128.4				
		1221.2 *5*	44 *21*	4704.2	(11^-)			
		1236.4 *4*	98 *30*	4689.0	12^+			
		2303.6 *8*	23 *12*	3622.1	10^+			
5963.6	1^-	5963.5 *6*		0.0	0^+	E1	0.00234	α(K)=4.31×10^{-5} *6*; α(L)=5.11×10^{-6} *8*; α(M)=1.039×10^{-6} *15* α(N)=2.24×10^{-7} *4*; α(O)=3.46×10^{-8} *5*; α(P)=2.63×10^{-9} *4*; α(IPF)=0.00229 *4* B(E1)(W.u.)=0.0021 *4*
6102.3	1^-	6102.2 *7*		0.0	0^+	E1		B(E1)(W.u.)=0.0027 *15*
6114.6	1^-	6114.5 *9*		0.0	0^+	E1		B(E1)(W.u.)=0.0015 *5*
6193.0	1^-	6192.9 *5*		0.0	0^+	E1		B(E1)(W.u.)=0.0043 *+9–8*
6198.4	(15^-)	804.2 *3*	100	5394.2	(13^-)			

$^{138}_{56}$Ba$_{82}$-27

Adopted Levels, Gammas (continued)

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

E_i(level)	J^π_i	E_γ#	I_γ#	E_f	J^π_f	Mult.@	Comments
6210.9	(13$^+$)	285.4 *3*	100 *33*	5925.5	(12$^+$)		
		1521.9 *5*	35 *13*	4689.0	12$^+$		
6244.8	1$^-$	6244.6 *8*		0.0	0$^+$	E1	B(E1)(W.u.)=0.00127 *+20−21*
6348.0	1$^-$	4912	16	1435.805	2$^+$		I_γ: from Iγ(4912)/Iγ(6348)=0.16 *+54−15* in (γ,γ′).
		6347.9 *8*	100	0.0	0$^+$	E1	B(E1)(W.u.)=0.0020 *+30−8*
6361.8	1$^-$	6361.6 *6*		0.0	0$^+$	E1	B(E1)(W.u.)=0.0028 *5*
6410.3	1$^-$	6410.1 *6*		0.0	0$^+$	E1	B(E1)(W.u.)=0.0051 *+10−9*
6434.5	1$^-$	6434.3 *6*		0.0	0$^+$	E1	B(E1)(W.u.)=0.0048 *+9−8*
6466.0	1	6465.8 *7*		0.0	0$^+$		
6486.5	1	6486.3 *9*		0.0	0$^+$		
6552.8	1	6552.6 *8*		0.0	0$^+$		
6575.5	1	6575.3 *8*		0.0	0$^+$		
6612.9	1	6612.7 *6*		0.0	0$^+$		
6635.3	1	6635.1 *8*		0.0	0$^+$		
6657.6	(14$^+$)	446.7 *3*	100	6210.9	(13$^+$)		
6663.9	1	6663.7 *7*		0.0	0$^+$		
6678.8	1	6678.6 *5*		0.0	0$^+$		
6693.6	1	6693.4 *5*		0.0	0$^+$		
6703.7	1	6703.5 *6*		0.0	0$^+$		
6759.4	(16$^-$)	837.8 *4*	100	5921.6	(14$^-$)		
6802.1	1	6801.9 *8*		0.0	0$^+$		
6813.6	1	6813.4 *6*		0.0	0$^+$		
6821.8	1	6821.6 *11*		0.0	0$^+$		
6839.3	1	6839.1 *8*		0.0	0$^+$		
6848.5	1	6848.3 *7*		0.0	0$^+$		
6862.2	1	6862.0 *6*		0.0	0$^+$		
6870.6	1	6870.4 *7*		0.0	0$^+$		
6895.0	1	6894.8 *6*		0.0	0$^+$		
6922.3	1	6922.1 *8*		0.0	0$^+$		
6957.0	1	6956.8 *12*		0.0	0$^+$		
6981.1	1	6980.9 *8*		0.0	0$^+$		
6988.8	(14$^+$)	778.0 *4*	100 *35*	6210.9	(13$^+$)		
		1067.1 *5*	65 *28*	5921.6	(14$^-$)		
		1802.6 *6*	54 *26*	5186.0	(13$^-$)		
7040.3	1	7040.1 *9*		0.0	0$^+$		
7106.1	1	7105.9 *15*		0.0	0$^+$		
7144.0	1	7143.8 *9*		0.0	0$^+$		
7155.8	(17$^-$)	957.4 *5*	100	6198.4	(15$^-$)		
7211.8	1	7211.6 *8*		0.0	0$^+$		
7227.7	(15$^+$)	239.0 *4*	31 *14*	6988.8	(14$^+$)		
		570.1 *3*	100 *30*	6657.6	(14$^+$)		
7276.0	1	7275.8 *10*		0.0	0$^+$		
7334.3	1	7334.1 *10*		0.0	0$^+$		

$^{138}_{56}Ba_{82}$-28

Adopted Levels, Gammas (continued)

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

E_i(level)	J^{π}_i	E_γ[#]	I_γ[#]	E_f	J^{π}_f
7376.8	1	7376.6 *9*		0.0	0^+
7403.6		1205.2 *5*	100	6198.4	(15^-)
7533.8	(16^+)	306.1 *3*	100	7227.7	(15^+)
7546.9	1	7546.7 *22*		0.0	0^+
7705.8	1	7705.6 *12*		0.0	0^+
7774.2	1	7774.0 *7*		0.0	0^+
7805.5	1	7805.3 *8*		0.0	0^+
7819.9	1	7819.7 *8*		0.0	0^+
7871.3	1	7871.1 *10*		0.0	0^+
7980.5	(17^+)	446.7 *5*	100	7533.8	(16^+)
8012.7		856.9 *5*	100	7155.8	(17^-)
8075.9	1	8075.6 *8*		0.0	0^+
8281.9	(18^+)	301.4 *4*	100	7980.5	(17^+)
8433.5	1^-	8433.2 *14*		0.0	0^+
8938.3	(19^+)	656.4 *5*	100	8281.9	(18^+)
9334.4	(20^+)	396.1 *5*	100 *48*	8938.3	(19^+)

[†] Additional information 2.

[‡] If No value given it was assumed δ=1.00 for E2/M1, δ=1.00 for E3/M2 and δ=0.10 for the other multipolarities.

[#] From (n,γ) E=thermal up to 5028 level and from (γ,γ') above that, unless otherwise noted.

[@] From γ scattering asymmetry in (γ,γ') for transitions from levels above 4026, unless otherwise noted.

[&] Poor fit. For fitting purpose only, uncertainties were increased to 0.3 keV to reduce the χ^2/dof to 2.9 from 12.9.

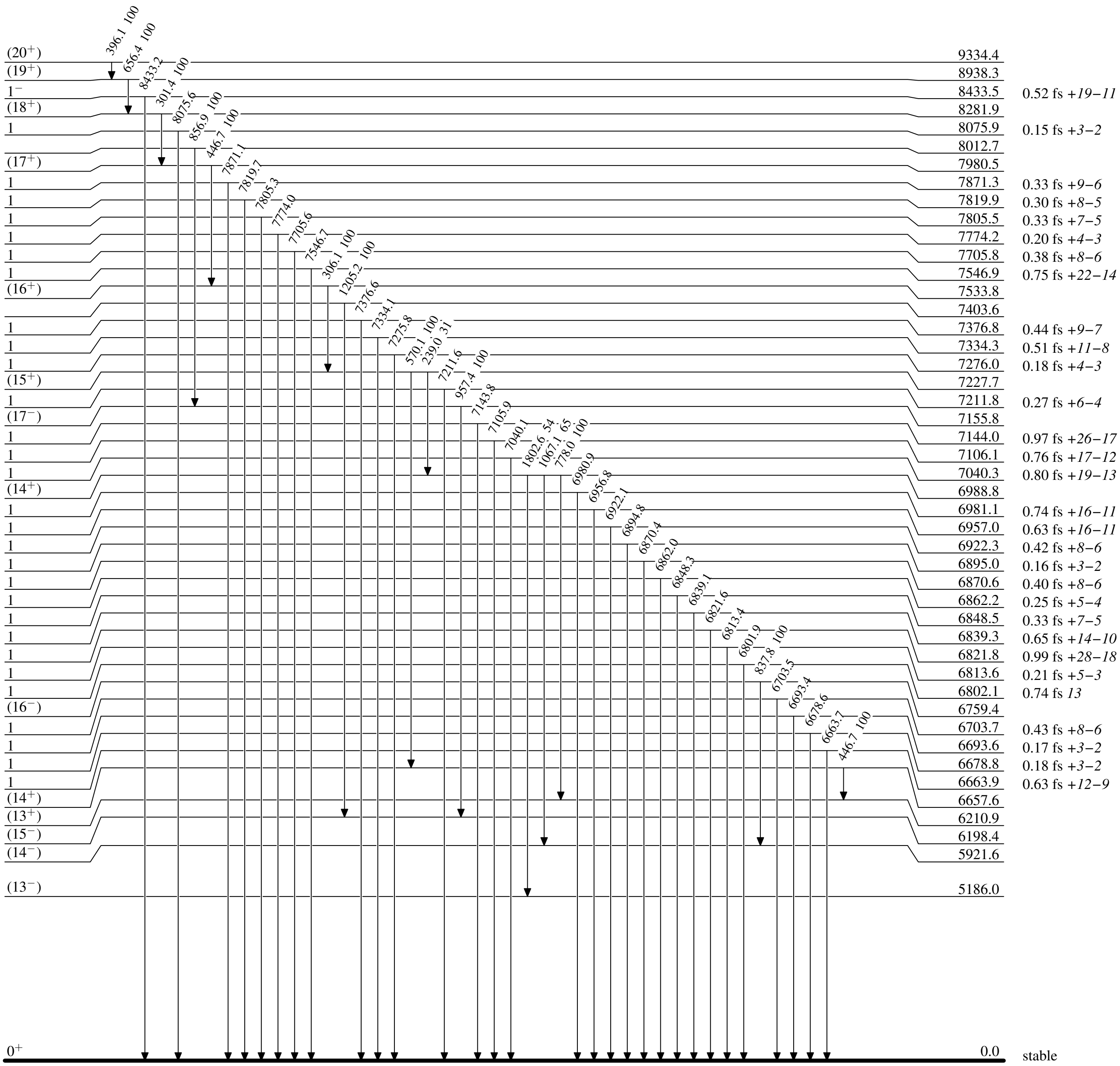
[a] Multiply placed with undivided intensity.

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

Adopted Levels, Gammas

Level Scheme

Intensities: Relative photon branching from each level

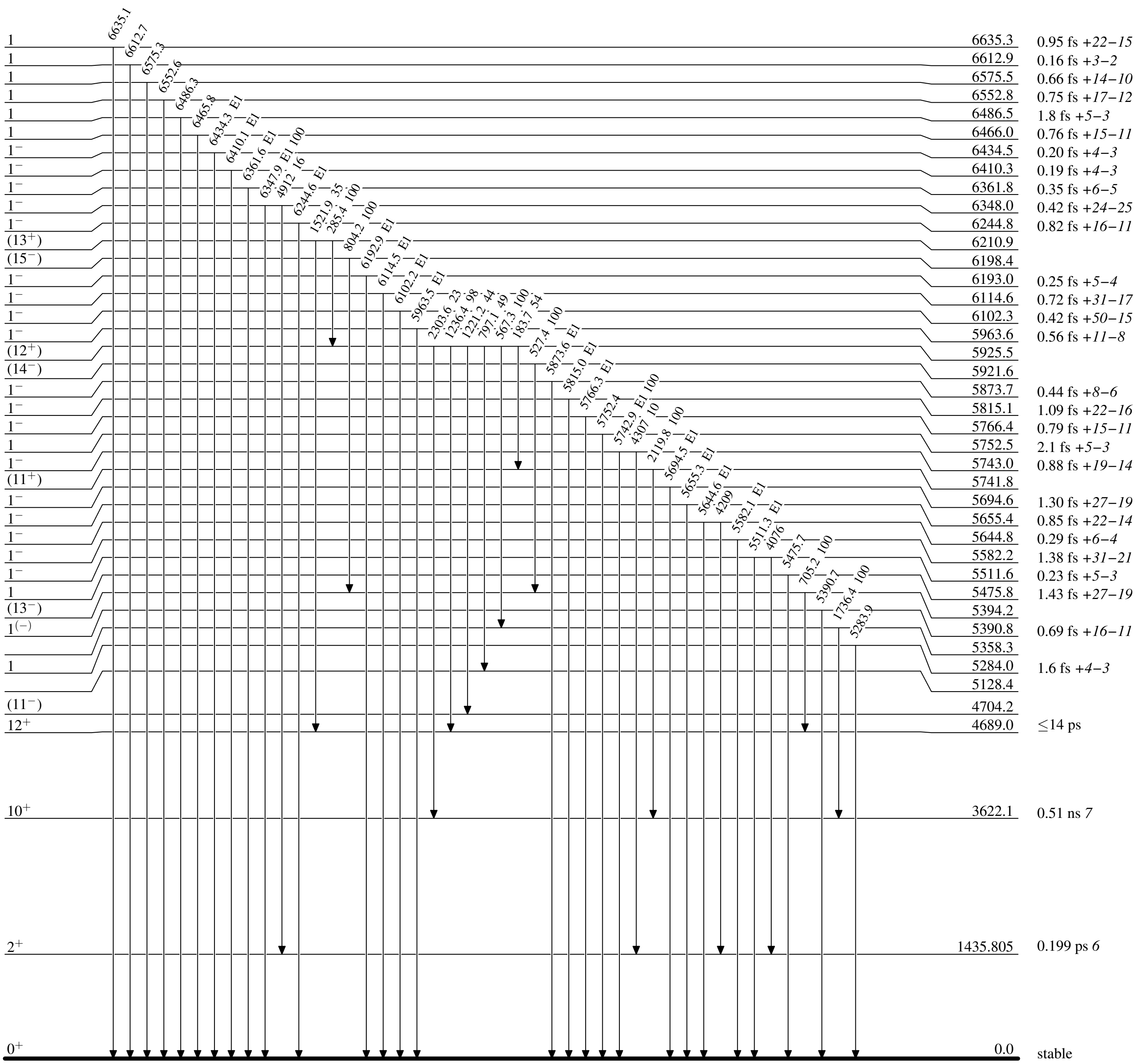


$^{138}_{56}Ba_{82}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

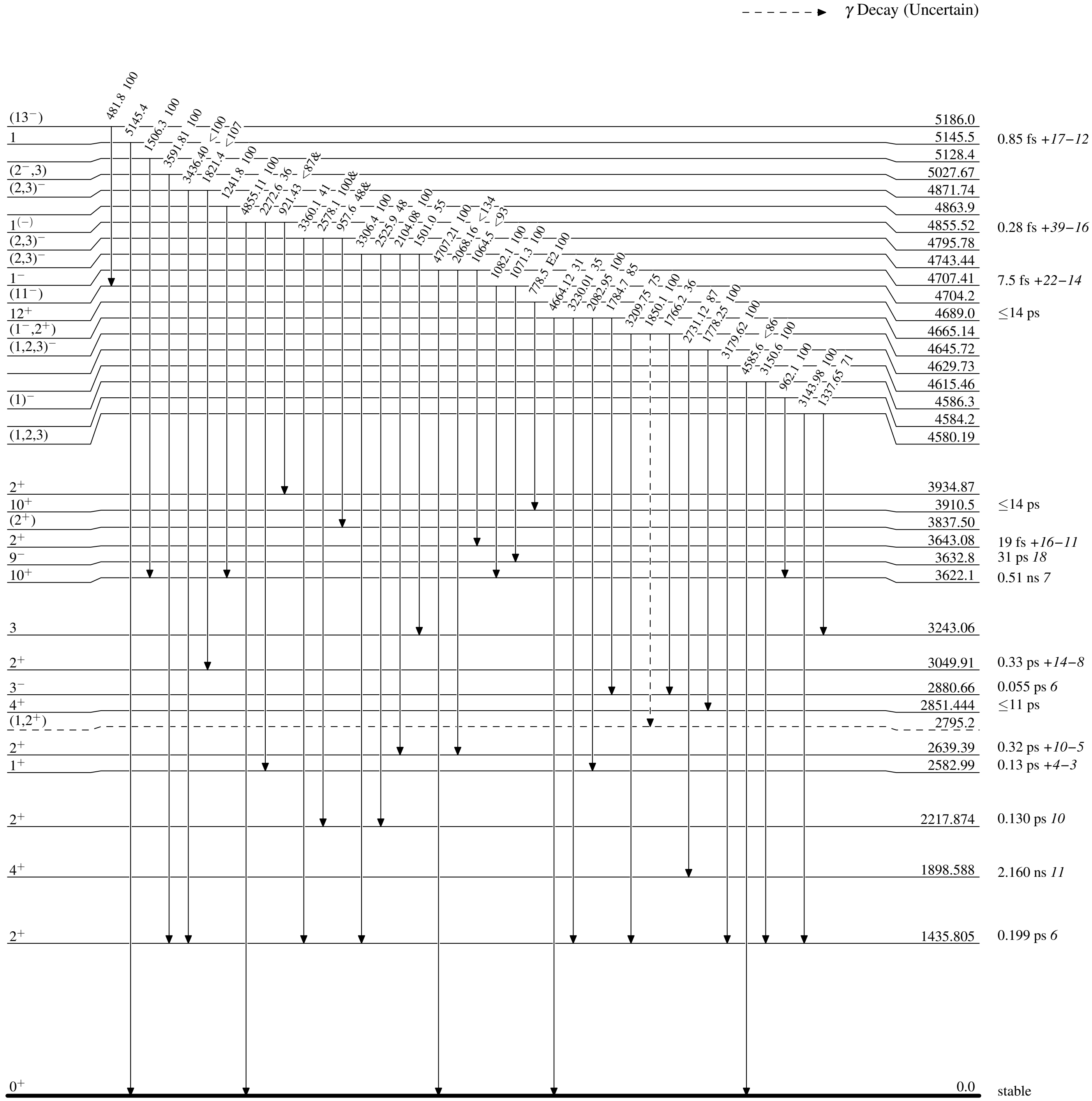


$^{138}_{56}Ba_{82}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given



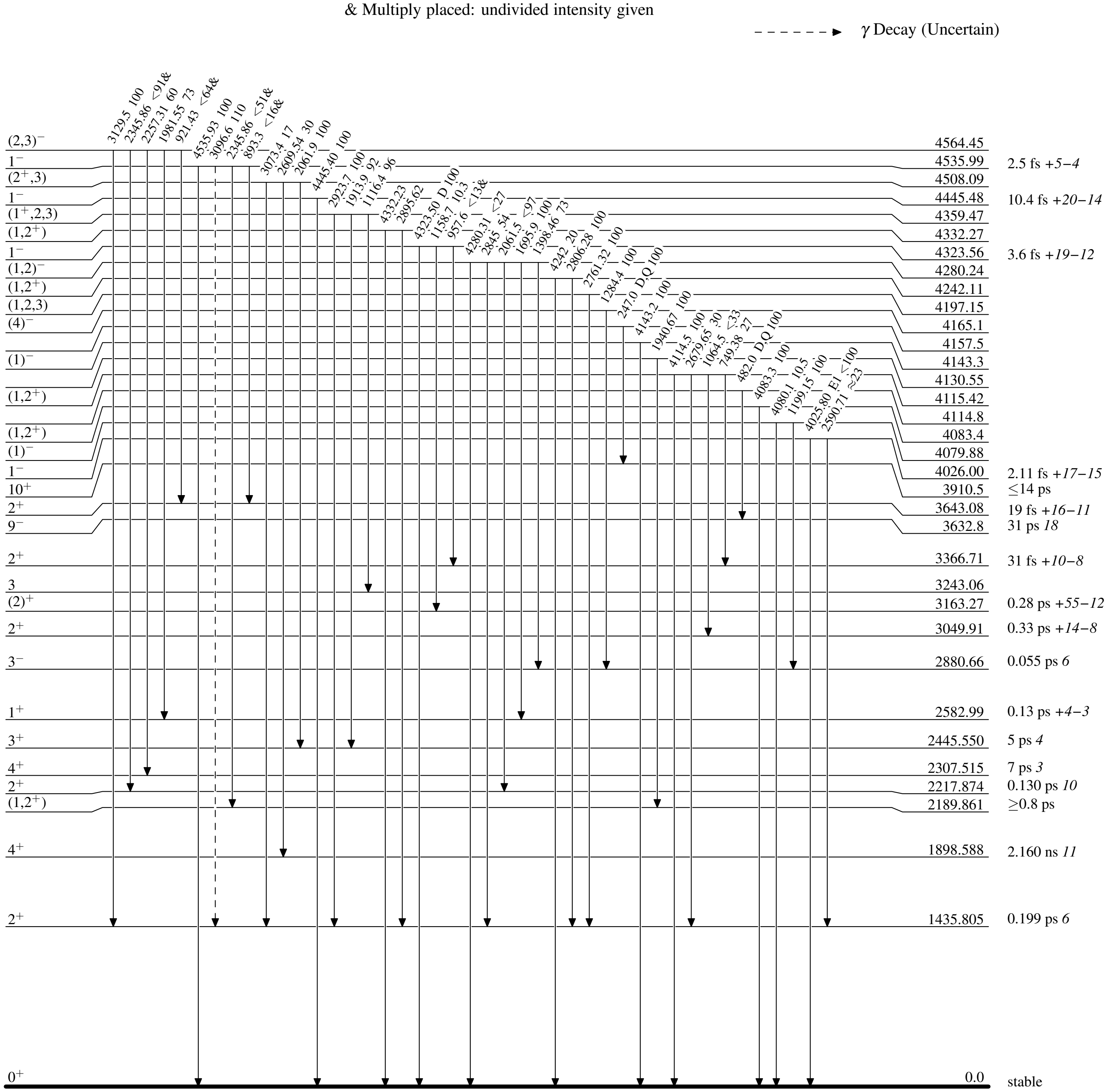
$^{138}_{56}Ba_{82}$

Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given

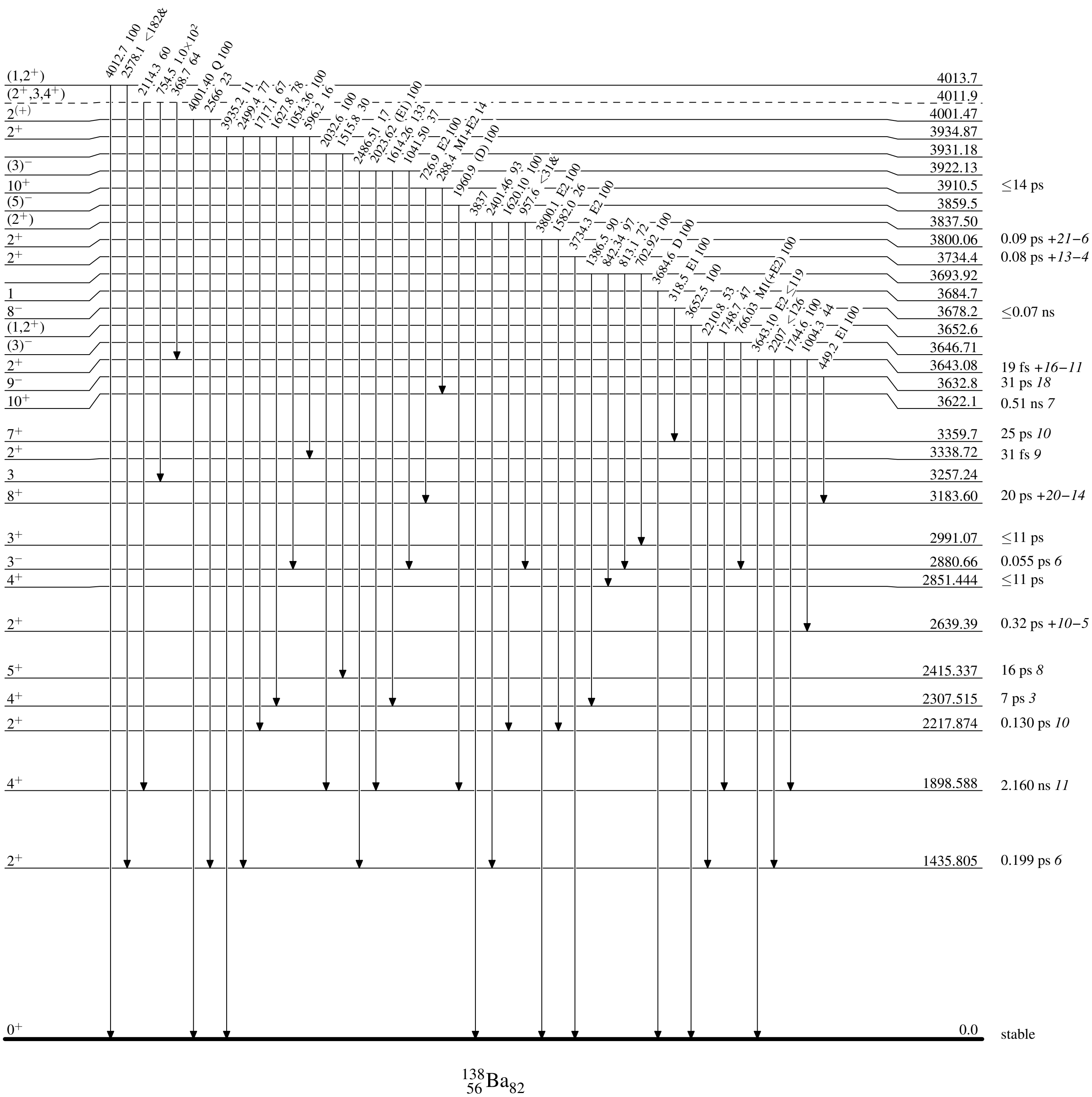


$^{138}_{56}Ba_{82}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given



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

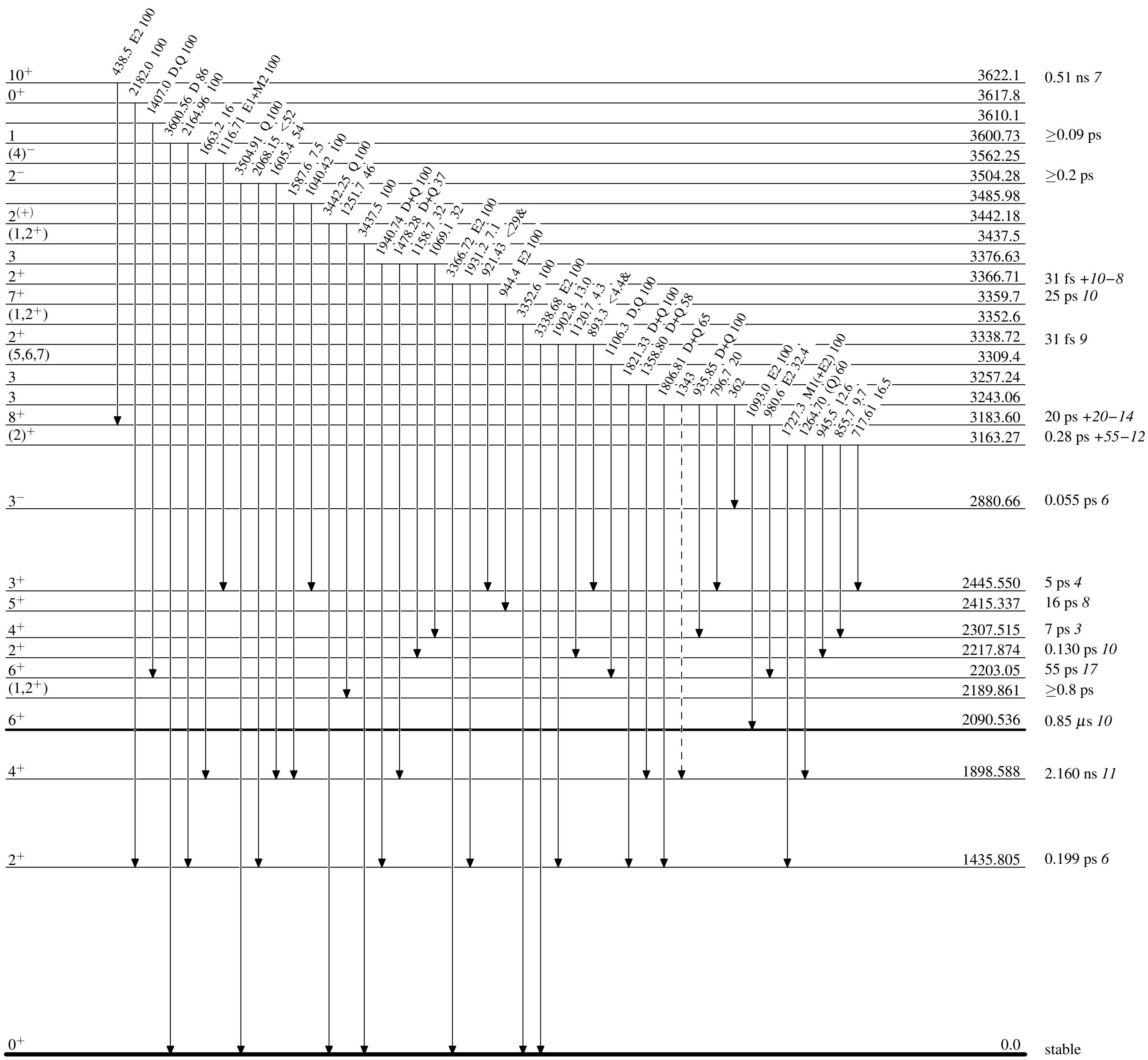
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given

- - - - - -► γ Decay (Uncertain)

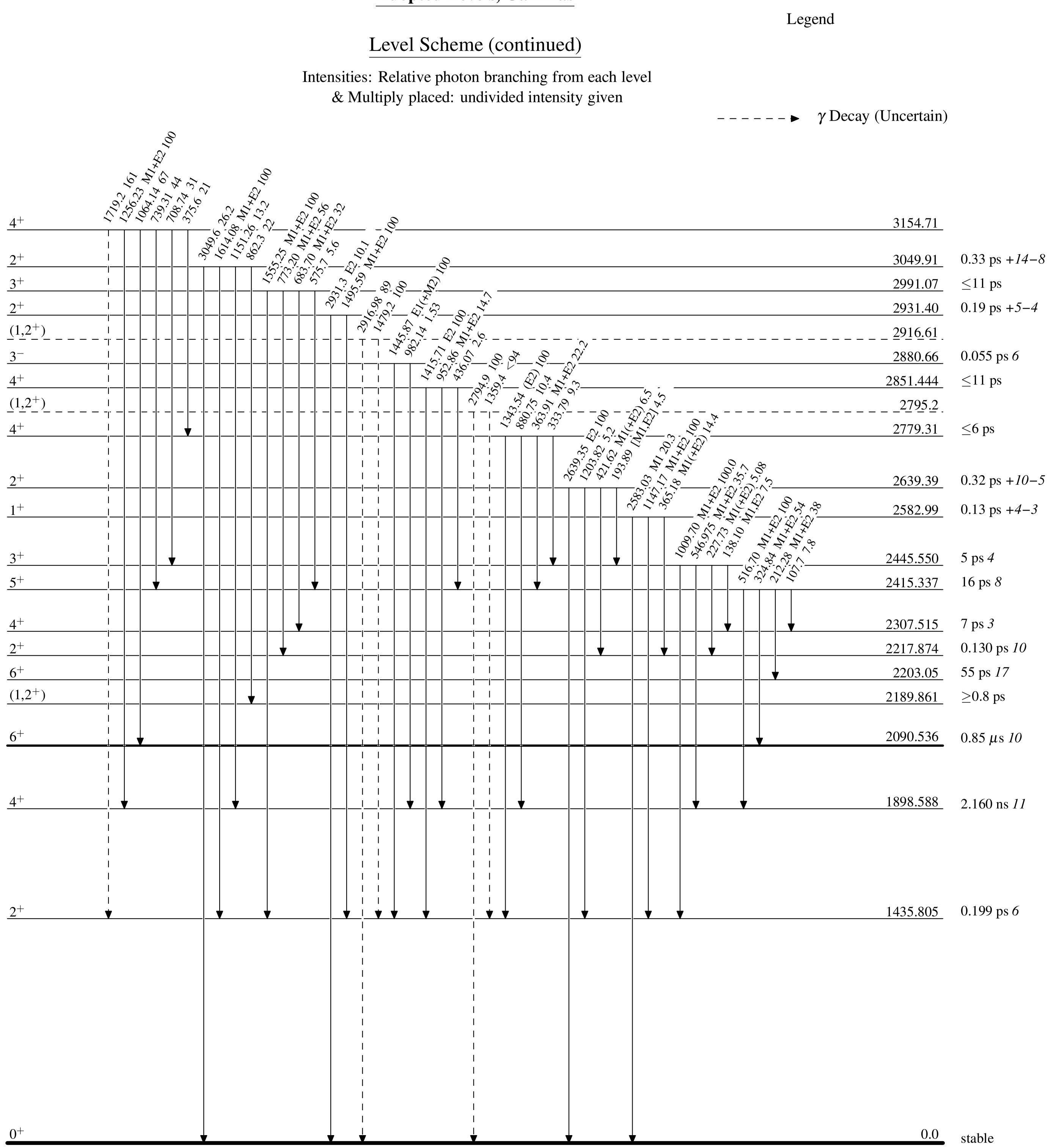


$^{138}_{56}Ba_{82}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given

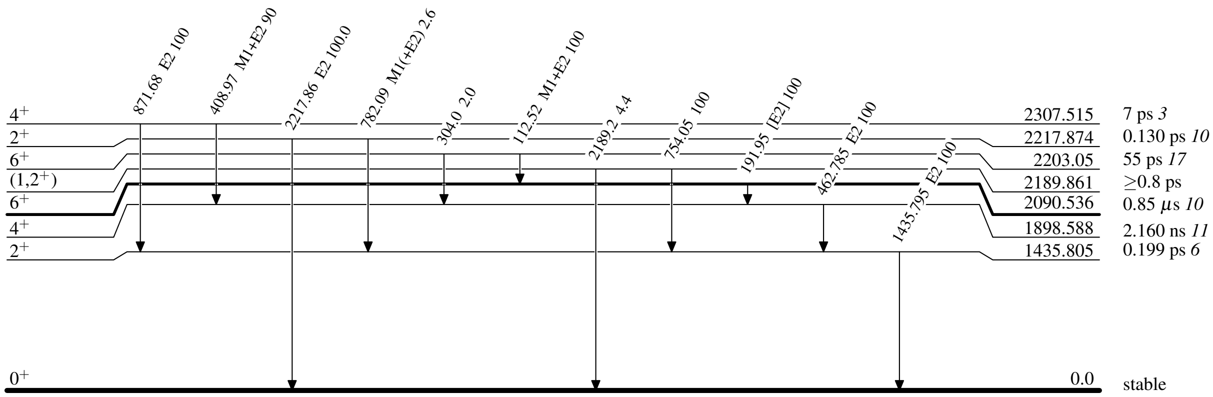


$^{138}_{56}Ba_{82}$

Adopted Levels, Gammas

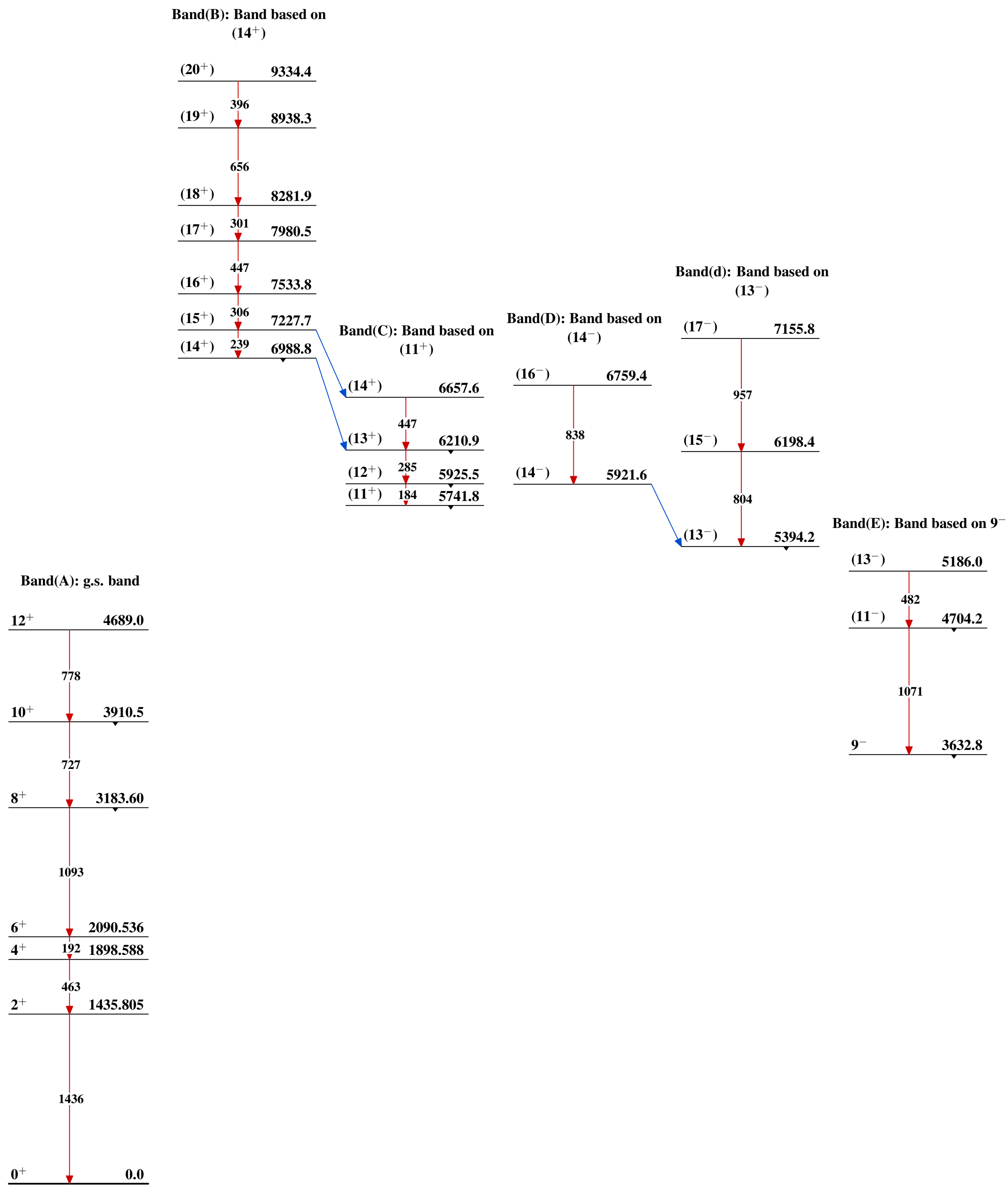
Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given



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

Adopted Levels, Gammas



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

Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	N. Nica	NDS 154, 1 (2018)	20-Nov-2018

Q(β^-)=1047 *8*; S(n)=6427 *8*; S(p)=9857 *9*; Q(α)=735 *8* 2017Wa10
2002Xu06, 2002Tr09, 2002Ad12: measured production cross-sections.
1999GaZX: measured charge radii.

^{140}Ba Levels

Cross Reference (XREF) Flags

A	^{140}Cs β^- decay	F	^{138}Ba(^{14}C,^{12}C) E=64 MeV
B	^{248}Cm SF decay	G	^{208}Pb(^{18}O,Xγ)
C	^{252}Cf SF decay	H	^{235}U(n,Fγ)
D	^{138}Ba(t,p) E=17 MeV	I	Coulomb excitation
E	^{12}C(^{136}Xe,^{140}Baγ)		

E(level)[†‡]	J^{π}[#]	$T_{1/2}$	XREF	Comments
0.0[b]	0^+	12.751 d *4*	ABCDEFGHI	%β^-=100 $T_{1/2}$: weighted average of 12.753 d *12* (2014Un01, superseding 12.7527 d 23 of 2002Un02 and 12.753 d *2* of (1982HoZJ)), and 12.751 d *4* (1983Wa26); other value (outlier not included in the average): 12.789 d *6* (1971Ba28).
602.37[b] *3*	2^+	7.2 ps *+15−6*	ABCDEFGHI	Q=−0.52 *34* (2012Ba40) B(E2)↑=0.484 *+38−101* (2012Ba40) $T_{1/2}$: from DSAM (2012Ba40), systematic uncertainty is included. Others: 9.7 *41* ps from ^{140}Cs β^- decay (1989Ma38); 7.3 *+19−5* ps (from B(E2)↑ in Coul. Ex., 2012Ba40). J^{π}: L=2 in (^{14}C,^{12}C). Q: from reorientation analysis of Coul. ex. yields. Diagonal E2 matrix element=−0.69 *45* (2012Ba40) from Coul. ex. yields. RMS charge radius <r^2>$^{1/2}$=4.8684 fm *59* (2013An02).
1130.60[b] *6*	4^+		ABCDEFGH	J^{π}: L=4 in (^{14}C,^{12}C).
1510.68 *6*	2^+[@]		A DEF	
1660.3[b] *3*	6^+		BC E GH	J^{π}: 2,6 from ΔJ=2 Q to 4^+; member of g.s. band.
1802.90[c] *7*	3^-[@]		ABCDEF	J^{π}: observed in (t,p) with significant σ (natural spin-parity level).
1823.80 *9*	0^+[@]		A D	
1951.61 *25*	3^+		A DE	J^{π}: γ to 4^+ is M1+E2, γ from 2^-.
1993.66 *9*	2^+[@]		A DE	J^{π}: γ to 2^+ is M1+E2, and γ to 0^+;
2061.2			A	
2138.24 *11*	$3^{(+)}$[@]		A E	J^{π}: γ to 2^+ is D+Q and γ to 4^+ is (M1+E2).
2152.1[c] *4*	(5^-)[&]		BC G	
2204.21 *10*	$2^+,3$[@]		A E	
2237.24 *7*	2^+[@]		A E	
2309.52 *14*	$2^+,1$[@]		A	J^{π}: 1, 2, 3 from D+Q to 2^+; significant branch to 0^+ g.s. eliminates 2^- and 3. If 1, the quadrupole mixing of 8.5% allows no π assignment; for 2^+ the E2 is only 4%.
2320.51 *15*	(3^-)		A	J^{π}: (2^+,3^-) from γ's from 1^- and 4^+; 2^+ less likely from no β- feeding from 1^- parent.
2429.52 *8*	$1,2^+$[@]		A	J^{π}: 1,2,3 from D+Q γ to 2^+; decay modes and log *ft* suggests 1 or 2^+.
2468.3[b] *4*	(8^+)		BC E G	J^{π}: syst. for N=84 even-even nuclei.

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{140}Ba Levels (continued)

E(level)[†‡]	J$^{\pi}$[#]	XREF	Comments
2521.81 *10*	1,2$^{(+)}$	A	J$^{\pi}$: (1,2^{+}) from γ's to 0^{+}, 2^{+}, and 2^{-}; 0,1,2 from log *ft*=7.2 via 1^{-} parent.
2620.3?		E	
2663.8 *3*		A	
2692.0 *4*	2	A	J$^{\pi}$: (2,3^{-}) from γ from 1^{-} and γ's to 3^{+} and 3^{-}; 0,1,2,3^{+} from log *ft*=8.4 via 1^{-} parent.
2704.04 *9*	1^{-}[@]	A	J$^{\pi}$: E1+M2 γ to 2^{+} and γ to 0^{+}.
2722.9[c] *4*	(7^{-})[&]	BC G	
2782.08 *21*	2$^{(+)}$,3^{+}	A	J$^{\pi}$: (2^{+},3) from γ's to 2^{+}, 4^{+} and from 2^{-} ; 0,1,2,3^{+} from log *ft*=8.4 from 1^{-} parent.
2787.55 *17*	1$^{(-)}$,2$^{(+)}$	A	J$^{\pi}$: (1^{-},2^{+}) from γ's to 0^{+} and 3^{-}; 0,1,2,3^{+} from log *ft*=8.1 via 1^{-} parent.
2800.3 *10*		G	J$^{\pi}$: (8^{+}) postulated by 2007Ve14 (^{208}Pb(^{18}O,xγ) dataset).
2870.80 *19*	2^{+}[@]	A	J$^{\pi}$: M1+E2 γ to 2^{+}.
2873.84 *17*	1$^{(+)}$,2$^{(+)}$	A	J$^{\pi}$: (1^{+},2^{+}) from γ's to 0^{+}, 2^{+}, and 2^{-}; 0,1,2,3^{+} from log *ft*=8.1 via 1^{-} parent.
2932.63 *7*	2^{-}[@]	A	
2973.63 *20*		A	
3098.47 *14*	1$^{(+)}$,2$^{(+)}$	A	J$^{\pi}$: (1^{+},2^{+}) from γ's to 0^{+} and 3^{+}; 0,1,2,3^{+} from log *ft*=8.0 via 1^{-} parent.
3296.8[c] *5*	(9^{-})[&]	BC G	
3383.8[b] *6*	(10^{+})[&]	BC G	
3451.48 *10*	1$^{(-)}$,2$^{(+)}$	A	J$^{\pi}$: (1^{-},2^{+}) from γ's to 0^{+}, 2^{+} and 3^{-}; 0,1,2 from log *ft*=7.2 via 1^{-} parent.
3520.6 *5*	1$^{(+)}$,2	A	J$^{\pi}$: (1^{+},2) from γ's to 2^{+}, 2^{-} and 3^{+}; 0,1,2 from log *ft*=7.1 via 1^{-} parent.
3526.6 *4*	(1^{+},2^{+})[@]	A	
3601.7 *5*	1$^{(-)}$,2$^{(+)}$	A	J$^{\pi}$: (1^{-},2^{+}) from γ's to 0^{+} and 3^{-}; 0,1,2 from log *ft*=7.1 via 1^{-} parent.
3656.08 *10*	2	A	J$^{\pi}$: (2,3^{-}) from γ's to 1^{-}, 3^{+} and 3^{-}; 0,1,2 from log *ft*=6.3 via 1^{-} parent.
3769.5[c] *6*	(11^{-})[&]	BC G	
3845.3 *6*		A	
3851.05 *9*	1[@]	A	
3943.79 *6*	1[@]	A	
3973.20 *10*	2	A	J$^{\pi}$: (2,3) from γ's to 1, 3^{+} and 3^{-}; 0,1,2 from log *ft*=6.3 via 1^{-} parent.
4032.56? *25*	1,2	A	J$^{\pi}$: (1,2) from γ's to 2^{+},2^{-} and from 1^{-}; 0,1,2 from log *ft*=7.3 via 1^{-} parent.
4037.25 *15*	2	A	J$^{\pi}$: (2,3^{+}) from γ's to 1^{+}, 2^{+}, 3^{+}, 3^{-} and from 2^{-}; 0,1,2 from log *ft*=6.6 via 1^{-} parent.
4079.96 *13*	1$^{(-)}$,2	A	J$^{\pi}$: (1^{-},2,3^{+}) from γ's to 1^{+}, 2^{+}, 3^{-} respectively; 0,1,2 from log *ft*=6.5 via 1^{-} parent.
4102.8[b] *8*	(12^{+})[&]	C	
4275.13 *24*	1,2	A	J$^{\pi}$: (1,2,3) from γ's to 2^{+} and 2^{-}; 0,1,2 from log *ft*=6.8 via 1^{-} parent.
4358.44 *17*	2[@]	A	
4388.06 *21*	1$^{(-)}$,2	A	J$^{\pi}$: (1^{-},2,3^{+}) from γ's to 1^{+} and 3^{-}; 0,1,2 from log *ft*=6.9 via 1^{-} parent.
4395.7 *4*		A	
4416.1 *3*	1,2$^{(+)}$	A	J$^{\pi}$: (1,2^{+}) from γ's to 0^{+}, 2^{+}, and 2^{-}; 0,1,2 from log *ft*=6.9 via 1^{-} parent.
4499.81 *11*	1$^{(+)}$,2$^{(+)}$	A	J$^{\pi}$: (1^{+},2^{+}) from γ's to 0^{+} and 3^{+} respectively; 0,1,2 from log *ft*=6.6 via 1^{-} parent.
4531.2[d] *8*	(13^{-})[a]	C G	Level placed in ^{252}Cf SF decay dataset in the octupole band was replaced in ^{208}Pb(^{18}O,Xγ) dataset (2007Ve14) as the bandhead of the ΔJ=1 band based on (13^{-}), which was adopted here.
4659.2[c] *11*	(13^{-})[a]	G	
4801.19? *21*	2	A	J$^{\pi}$: (2,3) from γ's to 1, 3^{+}, and 3^{-}; 0,1,2 from log *ft*=6.2 via 1^{-} parent.
4858.3[d] *12*	(14^{-})[a]	G	
4981.9? *5*	0$^{(+)}$,1,2$^{(+)}$	A	J$^{\pi}$: (0^{+},1,2^{+}) from γ's to 0^{+} and 2^{+}; 0,1,2 from log *ft*=6.2 via 1^{-} parent.
5076.5[d] *13*	(15^{-})[a]	G	
5109.98? *18*	1^{-},2^{-}	A	J$^{\pi}$: (1,2,3^{+}) from γ's to 1^{+}, 2^{+}, and 2^{-}; 0^{-},1^{-},2^{-} from log *ft*=5.7 via 1^{-} parent.
5173.69? *18*	1^{-},2^{-}	A	J$^{\pi}$: (1,2,3^{-}) from γ's to 1^{-} and 3; 0^{-},1^{-},2^{-} from log *ft*=5.5 via 1^{-} parent.
5183.14? *15*	2^{-}	A	J$^{\pi}$: (1^{+},2,3^{-}) from γ's to 1^{-} and 3^{+}; 0^{-},1^{-},2^{-} from log *ft*=5.5 via 1^{-} parent.
5310.43? *24*	1^{-},2^{-}	A	J$^{\pi}$: (1^{-},2,3^{+}) from γ's to 1^{+} and 3^{-}; 0^{-},1^{-},2^{-} from log *ft*=5.5 via 1^{-} parent.
5388.89? *12*	1^{-}	A	J$^{\pi}$: (1^{-},2^{+}) from γ's to 0^{+} and 3^{-}; 0^{-},1^{-},2^{-} from log *ft*=5.5 via 1^{-} parent.
5426.5[d] *13*	(16^{-})[a]	G	

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{140}Ba Levels (continued)

E(level)[†‡]	J^{π}[#]	XREF	Comments
5588.30? *23*	2^-	A	J^{π}: (2,3) from γ's to 2^+, 2^-, 3^+ and 3^-; 0^-,1^-,2^- from log *ft*=5.5 via 1^- parent.
5611.1? *4*	1^-,2^-	A	J^{π}: (1,2,3^+) from γ's to 1^+ and 3; 0^-,1^-,2^- from log *ft*=5.5 via 1^- parent.
5651.1? *3*	2^-	A	J^{π}: (1^+,2,3^-) from γ's to 1^- and 3^+; 0^-,1^-,2^- from log *ft*=5.5 via 1^- parent.
5765.3? *4*	2^-	A	J^{π}: (1^+,2,3^+) from γ's to 1^+ and 3^+; 0^-,1^-,2^- from log *ft*=5.5 via 1^- parent.

† From a least-squares fit to Eγ data (normalized χ^2=1.53> critical χ^2=1.25).

‡ Additional information 1.

\# Spin assignments (tentative) based on decay modes and log *ft* values from 1986Ro16, except where noted.

@ From $\gamma\gamma(\theta)$ for cascades with 2^+ to 0^+ E2 602γ. From ^{140}Cs β^- (1986Ro16).

& Spin assignments (tentative) from ^{252}Cf SF and ^{248}Cm SF based on assignments of transitions to g.s. and octupole bands (syst).

[a] Based on band membership.

[b] Band(A): g.s. band.

[c] Band(B): octupole band.

[d] Band(C): ΔJ=1 band based on (13^-). Possible configuration=$(\pi g^{-1}_{7/2})(\pi h^1_{11/2})\otimes(\nu f^2_{7/2})$ or $(\pi g^{-1}_{7/2})(\pi h^1_{11/2})\otimes(\nu f^1_{7/2})(\nu h^1_{9/2})$.

γ(^{140}Ba)

E$_i$(level)	J$^\pi_i$	E$_\gamma$†	I$_\gamma$‡	E$_f$	J$^\pi_f$	Mult.#	δ@a	α&	Comments
602.37	2$^+$	602.25 *5*	100	0.0	0$^+$	E2		0.00600	α(N)=3.24×10^{-5} *5*; α(O)=4.84×10^{-6} *7*; α(P)=3.09×10^{-7} *5* B(E2)(W.u.)=22.8 *+21−40* α(K)=0.00508 *8*; α(L)=0.000729 *11*; α(M)=0.0001513 *22*
1130.60	4$^+$	528.25 *5*	100	602.37	2$^+$	E2		0.00848	α(K)=0.00715 *10*; α(L)=0.001060 *15*; α(M)=0.000220 *3* α(N)=4.71×10^{-5} *7*; α(O)=7.00×10^{-6} *10*; α(P)=4.32×10^{-7} *6*
1510.68	2$^+$	908.25 *5*	100	602.37	2$^+$	E2+M1	−0.60 *+18−17*	0.00289 *11*	α(K)=0.00249 *10*; α(L)=0.000317 *11*; α(M)=6.51×10^{-5} *22* α(N)=1.41×10^{-5} *5*; α(O)=2.16×10^{-6} *8*; α(P)=1.59×10^{-7} *7*
1660.3	6$^+$	529.7 *3*	100	1130.60	4$^+$	Q			Mult.: from ^{248}Cm SF by DCO.
1802.90	3$^-$	672.1 *4*	24.1 *11*	1130.60	4$^+$	(E1+M2)	+0.13 *+7−6*	0.0020 *4*	α(K)=0.0017 *3*; α(L)=0.00021 *5*; α(M)=4.4×10^{-5} *9* α(N)=9.5×10^{-6} *20*; α(O)=1.4×10^{-6} *3*; α(P)=1.05×10^{-7} *22* δ: 0.00 *5*.
		1200.3 *1*	100.0 *7*	602.37	2$^+$	(E1)		5.74×10^{-4}	α(N)=2.53×10^{-6} *4*; α(O)=3.89×10^{-7} *6*; α(P)=2.88×10^{-8} *4*; α(IPF)=3.02×10^{-5} *5* α(K)=0.000472 *7*; α(L)=5.76×10^{-5} *8*; α(M)=1.175×10^{-5} *17* δ: −0.01 *2*.
1823.80	0$^+$	1221.4 *1*	100 *5*	602.37	2$^+$	E2		1.20×10^{-3}	α(N)=5.80×10^{-6} *9*; α(O)=8.86×10^{-7} *13*; α(P)=6.37×10^{-8} *9*; α(IPF)=9.00×10^{-6} *13* α(K)=0.001024 *15*; α(L)=0.0001312 *19*; α(M)=2.69×10^{-5} *4*
1951.61	3$^+$	820.9 *4*	100	1130.60	4$^+$	M1+E2		0.0034 *6*	α(K)=0.0029 *5*; α(L)=0.00038 *6*; α(M)=7.8×10^{-5} *11* α(N)=1.68×10^{-5} *24*; α(O)=2.6×10^{-6} *4*; α(P)=1.8×10^{-7} *4* δ: −0.51 to −2.4.
1993.66	2$^+$	1391.25 *10*	100 *2*	602.37	2$^+$	M1+E2	+0.18 *+5−6*	1.22×10^{-3} *2*	α(K)=0.001014 *15*; α(L)=0.0001263 *19*; α(M)=2.59×10^{-5} *4* α(N)=5.59×10^{-6} *9*; α(O)=8.60×10^{-7} *13*; α(P)=6.46×10^{-8} *10*; α(IPF)=4.30×10^{-5} *6*
		1993.5 *3*	28.2 *11*	0.0	0$^+$				
2138.24	3$^{(+)}$	627.5 *3*	18.6 *19*	1510.68	2$^+$				
		1008.1 *2*	100 *3*	1130.60	4$^+$	(M1+E2)	−4.5 *+14−26*	0.00181 *4*	α(K)=0.00156 *4*; α(L)=0.000203 *5*; α(M)=4.18×10^{-5} *9* α(N)=8.99×10^{-6} *19*; α(O)=1.37×10^{-6} *3*; α(P)=9.67×10^{-8} *24*
		1536.15 *20*	77 *3*	602.37	2$^+$	D+Q			δ: +0.04 *+13−12* or +3.6 +3.7-1.3,

$^{140}_{56}$Ba$_{84}$-4

Adopted Levels, Gammas (continued)

$\gamma(^{140}Ba)$ (continued)

E_i(level)	J^π_i	E_γ †	I_γ ‡	E_f	J^π_f	Mult. #	δ @a	α &	Comments
2152.1	(5^-)	491.9 *5*	100	1660.3	6^+				
		1021.5 *5*	25	1130.60	4^+				
2204.21	$2^+,3$	400.8 *5*	6.3 *32*	1802.90	3^-				
		693.4 *5*	21 *11*	1510.68	2^+				
		1072.9 *10*	39 *4*	1130.60	4^+				
		1601.75 *10*	100 *4*	602.37	2^+				
2237.24	2^+	413.4 *3*	6.3 *9*	1823.80	0^+				
		726.2 *5*	2.3 *19*	1510.68	2^+				
		1634.9 *1*	86 *1*	602.37	2^+	M1+E2	+1.00 *2*	8.79×10^{-4}	α(K)=0.000648 *10*; α(L)=8.06×10^{-5} *12*; α(M)=1.651×10^{-5} *24* α(N)=3.56×10^{-6} *5*; α(O)=5.48×10^{-7} *8*; α(P)=4.08×10^{-8} *6*; α(IPF)=0.0001300 *19*
		2237.25 *10*	100 *5*	0.0	0^+				
2309.52	$2^+,1$	798.9 *8*	9.1 *12*	1510.68	2^+				
		1707.4 *2*	100 *2*	602.37	2^+	D+Q			
		2309.3 *6*	20.3 *42*	0.0	0^+				
2320.51	(3^-)	809.8 *10*	19 *9*	1510.68	2^+				
		1190.0 *15*	76 *4*	1130.60	4^+				
		1718.05 *20*	100 *7*	602.37	2^+				
2429.52	$1,2^+$	918.3 *2*	36.1 *9*	1510.68	2^+	D+Q			
		1827.3 *2*	32.2 *18*	602.37	2^+				
		2429.6 *1*	100 *2*	0.0	0^+				
2468.3	(8^+)	808.0 *4*	100	1660.3	6^+	Q			Mult.: from ^{248}Cm SF by DCO.
2521.81	$1,2^{(+)}$	1010.4 *10*	12.8 *8*	1510.68	2^+				
		1918.7 *5*	6.2 *10*	602.37	2^+				
		2521.85 *10*	100 *7*	0.0	0^+				
2620.3?		960.0	100	1660.3	6^+				E_γ: measured by 2015St16 ($^{12}C(^{136}Xe,^{140}Ba\gamma)$ dataset).
2663.8		1154.2 *15*	29 *8*	1510.68	2^+				
		2061.5 *4*	100 *17*	602.37	2^+				
		2663.7 *10*	21 *13*	0.0	0^+				
2692.0	2	740.8 *10*	100 *36*	1951.61	3^+				
		889.1 *8*	64 *36*	1802.90	3^-				
		1181.4 *8*	36 *27*	1510.68	2^+				
		2089.7 *10*	82 *27*	602.37	2^+				
2704.04	1^-	2101.7 *1*	100 *1*	602.37	2^+	E1+M2	−0.09 *3*	8.80×10^{-4}	α(K)=0.000191 *5*; α(L)=2.30×10^{-5} *7*; α(M)=4.70×10^{-6} *13* α(N)=1.01×10^{-6} *3*; α(O)=1.56×10^{-7} *5*; α(P)=1.17×10^{-8} *4*; α(IPF)=0.000660 *10*
		2703.7 *2*	21.2 *5*	0.0	0^+				
2722.9	(7^-)	254.5 *5*	10	2468.3	(8^+)				
		570.9 *4*	100 *25*	2152.1	(5^-)				
		1062.5 *4*	48 *13*	1660.3	6^+				I_γ: from ^{248}Cm SF decay.
2782.08	$2^{(+)},3^+$	643.5 *5*	25 *11*	2138.24	$3^{(+)}$				
		1270.9 *4*	86 *11*	1510.68	2^+				
		1651.1 *5*	100 *18*	1130.60	4^+				

$^{140}_{56}Ba_{84}$-5

Adopted Levels, Gammas (continued)

$\gamma(^{140}Ba)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[‡]	E_f	J^π_f	Mult.[#]	δ[@a]	α[&]	Comments
2782.08	$2^{(+)},3^+$	2180.3 8	32 19	602.37	2^+				
2787.55	$1^{(-)},2^{(+)}$	984.5 9	29 10	1802.90	3^-				
		1276.6 5	40 10	1510.68	2^+				
		2185.2 2	100 6	602.37	2^+				
		2788.2 6	36.5 58	0.0	0^+				
2800.3		1140.2	100	1660.3	6^+				
2870.80	2^+	1068.0 10	6.2 22	1802.90	3^-				
		2268.4 2	100 2	602.37	2^+	M1+E2	−0.19 8	8.50×10^{-4}	α(K)=0.000356 6; α(L)=4.37×10^{-5} 7; α(M)=8.94×10^{-6} 13 α(N)=1.93×10^{-6} 3; α(O)=2.98×10^{-7} 5; α(P)=2.25×10^{-8} 4; α(IPF)=0.000440 7
2873.84	$1^{(+)},2^{(+)}$	881.1 5	13.6 37	1993.66	2^+				
		1363.3 5	60 4	1510.68	2^+				
		2873.6 2	100 4	0.0	0^+				
2932.63	2^-	411.7 8	2.3 9	2521.81	$1,2^{(+)}$				
		695.5 5	7.7 14	2237.24	2^+				
		728.9 6	2.4 7	2204.21	$2^+,3$				
		794.6 6	2.3 6	2138.24	$3^{(+)}$				
		939.0 5	0.6 4	1993.66	2^+				
		1129.65 5	≈33	1802.90	3^-	M1+E2	+1.7 2	0.00152 4	α(K)=0.00131 3; α(L)=0.000168 4; α(M)=3.45×10^{-5} 7 α(N)=7.43×10^{-6} 16; α(O)=1.136×10^{-6} 24; α(P)=8.23×10^{-8} 19; α(IPF)=1.088×10^{-6} 16
		1422.0 5	19.7 14	1510.68	2^+	D+Q	+0.41 +53−29		
		2330.50 10	100 1	602.37	2^+	D+Q			δ: +0.41 +53−29 or δ<−3.2 or >+2.9.
2973.63		735.9 3	100	2237.24	2^+				
3098.47	$1^{(+)},2^{(+)}$	862.3 14	15 9	2237.24	2^+				
		893.4 5	13 7	2204.21	$2^+,3$				
		1146.9 4	27.3 36	1951.61	3^+				
		2496.6 2	100 5	602.37	2^+				
		3098.6 3	47.3 55	0.0	0^+				
3296.8	(9^-)	573.9 4	51 15	2722.9	(7^-)				
		828.6 4	100 25	2468.3	(8^+)	D			Mult.: from ^{248}Cm SF by DCO.
3383.8	(10^+)	87[b]		3296.8	(9^-)				
		915.4 4	100	2468.3	(8^+)				
3451.48	$1^{(-)},2^{(+)}$	1627.2 10	18 8	1823.80	0^+				
		1648.5 10	14.3 41	1802.90	3^-				
		1940.2 8	19.4 51	1510.68	2^+				
		3451.45 10	100 4	0.0	0^+				
3520.6	$1^{(+)},2$	1381.8 9	7.5 21	2138.24	$3^{(+)}$				
		1526.8 8	8.2 27	1993.66	2^+				
		2009.9 3	100 4	1510.68	2^+				

$^{140}_{56}Ba_{84}$-6

$^{140}_{56}Ba_{84}$-7

$\gamma(^{140}Ba)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[‡]	E_f	J^π_f	Mult.[#]	δ[@a]
3526.6	$(1^+,2^+)$	862.3 *14*	32 *20*	2663.8			
		1288.5 *8*	88 *24*	2237.24	2^+		
		1323.4 *7*	52 *12*	2204.21	$2^+,3$		
		1701.8 *15*	100 *40*	1823.80	0^+		
		3526.6 *5*	64 *12*	0.0	0^+		
3601.7	$1^{(-)},2^{(+)}$	1171.6 *20*	9 *8*	2429.52	$1,2^+$		
		1281.1 *10*	23 *9*	2320.51	(3^-)		
		1291.9 *10*	53 *11*	2309.52	$2^+,1$		
		1396.4 *15*	23 *15*	2204.21	$2^+,3$		
		1799.3 *8*	53 *19*	1802.90	3^-		
		3601.8 *9*	100 *11*	0.0	0^+		
3656.08	2	873.2 *6*	2.0 *8*	2782.08	$2^{(+)},3^+$		
		1418.5 *7*	10.7 *15*	2237.24	2^+		
		1517.0 *5*	5.8 *6*	2138.24	$3^{(+)}$		
		1853.35 *10*	100 *5*	1802.90	3^-	D+Q	−0.24 *11*
		3053.3 *2*	32.6 *8*	602.37	2^+	D+(Q)	−0.04 *11*
3769.5	(11^-)	385.6 *5*	100 *33*	3383.8	(10^+)		
		472.8[b] *5*	75 *37*	3296.8	(9^-)		
3845.3		3845.2 *6*	100	0.0	0^+		
3851.05	1	980.7 *10*	10.1 *36*	2870.80	2^+		
		1064.0 *7*	17.3 *22*	2787.55	$1^{(-)},2^{(+)}$		
		1146.9 *4*	10.8 *14*	2704.04	1^-		
		1422.0 *5*	7.2 *36*	2429.52	$1,2^+$		
		1613.9 *1*	100 *2*	2237.24	2^+		
		1857.9 *6*	68 *14*	1993.66	2^+		
		2048.1 *3*	38.9 *22*	1802.90	3^-		
		2340.00 *15*	33.1 *43*	1510.68	2^+	D+Q	−0.67 *32*
		3248.5 *10*	24 *7*	602.37	2^+		
		3851.1 *10*	2.9 *22*	0.0	0^+		
3943.79	1	969.4 *7*	5.6 *33*	2973.63			
		1513.8 *5*	28.9 *56*	2429.52	$1,2^+$		
		1949.9 *7*	100 *9*	1993.66	2^+	D+Q	−0.34 *20*
		2120.0 *4*	18.9 *33*	1823.80	0^+		
		3341.2 *5*	89 *4*	602.37	2^+		
		3944.1 *3*	71 *14*	0.0	0^+		
3973.20	2	1000.7 *5*	14.8 *39*	2973.63			
		1040.50 *15*	35.2 *23*	2932.63	2^-		
		1101.6 *10*	11.7 *39*	2870.80	2^+		
		1663.85 *20*	27.3 *23*	2309.52	$2^+,1$		
		1735.8 *10*	80 *16*	2237.24	2^+		
		1835.0 *4*	27.3 *23*	2138.24	$3^{(+)}$		
		2022.6 *9*	16 *6*	1951.61	3^+		
		2170.0 *2*	100 *3*	1802.90	3^-		

$^{140}_{56}Ba_{84}$-7

Adopted Levels, Gammas (continued)

$\gamma(^{140}Ba)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[‡]	E_f	J^π_f	Mult.[#]	δ[@a]	Comments
3973.20	2	2462.9 *5*	55 *8*	1510.68	2^+	D+Q	+0.31 *+63−39*	
		3371.00 *25*	75.8 *31*	602.37	2^+	D+Q		
4032.56?	1,2	934.9[b] *3*	32 *16*	3098.47	$1^{(+)},2^{(+)}$			
		1057.2[b] *5*	48 *16*	2973.63				E_γ: differs by 3σ from ΔE_{levels}.
		1098.6[b] *10*	100 *20*	2932.63	2^-			
		1158.5[b] *8*	12 *8*	2873.84	$1^{(+)},2^{(+)}$			
		1795.0[b] *10*	60 *40*	2237.24	2^+			
4037.25	2	939.0 *5*	4.7 *35*	3098.47	$1^{(+)},2^{(+)}$			
		1064.0 *7*	28.2 *35*	2973.63				
		1104.8 *10*	14 *6*	2932.63	2^-			
		1164.4 *20*	7 *5*	2873.84	$1^{(+)},2^{(+)}$			
		1607.7 *4*	42 *7*	2429.52	$1,2^+$			
		1799.3 *8*	33 *12*	2237.24	2^+			
		1899.6 *9*	24.7 *47*	2138.24	$3^{(+)}$			
		2236.0 *15*	35 *12*	1802.90	3^-			
		3435.0 *2*	100 *5*	602.37	2^+			
4079.96	$1^{(-)},2$	980.7 *10*	11.3 *40*	3098.47	$1^{(+)},2^{(+)}$			
		1291.9 *10*	23 *5*	2787.55	$1^{(-)},2^{(+)}$			
		1375.9 *4*	16.1 *24*	2704.04	1^-			
		1651.1 *5*	22.6 *40*	2429.52	$1,2^+$			
		1770.2 *6*	8.9 *24*	2309.52	$2^+,1$			
		2086.8 *10*	14.5 *40*	1993.66	2^+			
		2277.00 *15*	100 *5*	1802.90	3^-			
		3477.6 *3*	27.4 *24*	602.37	2^+			
4102.8	(12^+)	719.0 *5*	100	3383.8	(10^+)			
4275.13	1,2	1299.2 *15*	100 *7*	2973.63				
		1339.2 *15*	42 *14*	2932.63	2^-			
		1492.3 *5*	42 *12*	2782.08	$2^{(+)},3^+$			
		2038.5 *5*	42 *7*	2237.24	2^+			
		2764.8 *4*	44 *7*	1510.68	2^+			
4358.44	2	1928.2 *7*	15.4 *26*	2429.52	$1,2^+$			
		2038.5 *5*	15.4 *26*	2320.51	(3^-)			
		2848.2 *2*	100 *4*	1510.68	2^+	D+Q		
4388.06	$1^{(-)},2$	862.3 *14*	13 *8*	3526.6	$(1^+,2^+)$			
		1454.7 *4*	48 *6*	2932.63	2^-			
		2067.7 *3*	100 *5*	2320.51	(3^-)			
4395.7		3793.3 *4*	100	602.37	2^+			
4416.1	$1,2^{(+)}$	760.3 *10*	26 *15*	3656.08	2			
		1319.7 *20*	15 *11*	3098.47	$1^{(+)},2^{(+)}$			
		1442.4 *3*	100 *11*	2973.63				
		1542.3 *6*	52 *15*	2873.84	$1^{(+)},2^{(+)}$			

$^{140}_{56}Ba_{84}$-8

Adopted Levels, Gammas (continued)

$\gamma(^{140}Ba)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[‡]	E_f	J^π_f	Comments
4416.1	1,2$^{(+)}$	4416.5 *6*	44 *11*	0.0	0^+	
4499.81	$1^{(+)},2^{(+)}$	555.5 *2*	66.7 *48*	3943.79	1	
		1795.0 *10*	36 *24*	2704.04	1^-	
		1807.9 *5*	14 *10*	2692.0	2	
		2362.00 *15*	100 *14*	2138.24	$3^{(+)}$	E_γ: differs by 3σ from ΔE_{levels}.
		2674.6 *5*	33.3 *48*	1823.80	0^+	
4531.2	(13^-)	761.7 *5*	100	3769.5	(11^-)	
4659.2	(13^-)	889.2	100	3769.5	(11^-)	
4801.19?	2	949.4[b] *7*	25 *8*	3851.05	1	
		2280.3[b] *7*	58 *17*	2521.81	1,2$^{(+)}$	
		2371.5[b] *4*	53 *11*	2429.52	1,2$^+$	
		2564.1[b] *7*	31 *8*	2237.24	2^+	
		2663.7[b] *10*	14 *8*	2138.24	$3^{(+)}$	
		2998.2[b] *3*	100 *6*	1802.90	3^-	
4858.3	(14^-)	328.4	100	4531.2	(13^-)	
4981.9?	$0^{(+)}$,1,2$^{(+)}$	944.3[b] *10*	35 *15*	4037.25	2	
		949.4[b] *7*	45 *15*	4032.56?	1,2	
		2459.5[b] *10*	100 *50*	2521.81	1,2$^{(+)}$	
		4982.4[b] *8*	35 *15*	0.0	0^+	
5076.5	(15^-)	218.2	100	4858.3	(14^-)	
5109.98?	$1^-,2^-$	1137.5[b] *4*	42 *5*	3973.20	2	
		1454.7[b] *4*	70 *9*	3656.08	2	
		2236.0[b] *15*	70 *23*	2873.84	$1^{(+)},2^{(+)}$	
		3115.9[b] *2*	100 *9*	1993.66	2^+	
5173.69?	$1^-,2^-$	758.5[b] *10*	9 *5*	4416.1	1,2$^{(+)}$	
		1137.5[b] *4*	22.0 *24*	4037.25	2	
		1517.0[b] *5*	46 *5*	3656.08	2	
		2387.1[b] *10*	10 *5*	2787.55	$1^{(-)},2^{(+)}$	
		2969.2[b] *2*	100 *4*	2204.21	2^+,3	
		4572.1[b] *10*	5.0 *24*	602.37	2^+	
5183.14?	2^-	794.6[b] *6*	37 *9*	4388.06	$1^{(-)}$,2	
		826.9[b] *15*	12 *7*	4358.44	2	
		1526.8[b] *8*	28 *9*	3656.08	2	
		2250.9[b] *3*	67 *9*	2932.63	2^-	
		2312.4[b] *8*	37 *23*	2870.80	2^+	
		2401.1[b] *6*	28 *5*	2782.08	$2^{(+)},3^+$	

γ(^{140}Ba) (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[‡]	E_f	J^π_f	Comments
5183.14?	2^-	2477.5[b] 8	21 7	2704.04	1^-	
		2660.8[b] 10	12 7	2521.81	$1,2^{(+)}$	
		3189.5[b] 2	100 9	1993.66	2^+	
		3671.7[b] 5	40 7	1510.68	2^+	
		4053.2[b] 10	12 7	1130.60	4^+	Mult.: could be M2 from J^π's.
5310.43?	$1^-,2^-$	1459.25[b] 35	100 14	3851.05	1	
		1784.0[b] 15	28 10	3526.6	$(1^+,2^+)$	
		2646.8[b] 5	52 14	2663.8		
		3318.7[b] 9	52 14	1993.66	2^+	
		3507.1[b] 4	59 10	1802.90	3^-	
5388.89?	1^-	889.1[b] 8	18 10	4499.81	$1^{(+)},2^{(+)}$	
		1000.7[b] 5	48 13	4388.06	$1^{(-)},2$	
		1031.5[b] 3	63 8	4358.44	2	E_γ: differs by 3σ from ΔE_{levels}.
		1113.6[b] 10	15 10	4275.13	1,2	
		2456.4[b] 10	38 25	2932.63	2^-	
		2513.3[b] 15	100 50	2873.84	$1^{(+)},2^{(+)}$	
		3067.8[b] 3	73 8	2320.51	(3^-)	
		3394.4[b] 4	55 8	1993.66	2^+	
		3565.00[b] 25	73 8	1823.80	0^+	
		4786.3[b] 10	10 5	602.37	2^+	
5426.5	(16^-)	568.2	100	4858.3	(14^-)	
5588.30?	2^-	1171.6[b] 20	8 7	4416.1	$1,2^{(+)}$	
		1737.5[b] 10	100 33	3851.05	1	
		2656.7[b] 10	5 3	2932.63	2^-	
		3066.8[b] 3	48 5	2521.81	$1,2^{(+)}$	
		3159.8[b] 10	7 3	2429.52	$1,2^+$	
		3267.6[b] 7	34 7	2320.51	(3^-)	
		3383.0[b] 5	18 7	2204.21	$2^+,3$	
		3635.4[b] 9	36 5	1951.61	3^+	
5611.1?	$1^-,2^-$	2089.7[b] 10	22.5 75	3520.6	$1^{(+)},2$	
		2513.3[b] 15	100 50	3098.47	$1^{(+)},2^{(+)}$	
		2737.2[b] 13	23 8	2873.84	$1^{(+)},2^{(+)}$	
		3088.7[b] 5	45 8	2521.81	$1,2^{(+)}$	
		3303.7[b] 9	33 10	2309.52	$2^+,1$	
		3407.1[b] 10	13 8	2204.21	$2^+,3$	

$^{140}_{56}Ba_{84}$-10

Adopted Levels, Gammas (continued)

$\gamma(^{140}Ba)$ (continued)

E_i(level)	J^π_i	E_γ [†]	I_γ [‡]	E_f	J^π_f
5651.1?	2^-	1262.9 [b] *6*	18 *5*	4388.06	$1^{(-)}$,2
		1375.9 [b] *4*	25 *4*	4275.13	1,2
		2553.6 [b] *6*	10 *5*	3098.47	$1^{(+)}$,$2^{(+)}$
		3341 [b] *5*	100 *5*	2309.52	2^+,1
		3412.8 [b] *10*	6 *4*	2237.24	2^+
		3657.7 [b] *10*	5.0 *25*	1993.66	2^+
5651.1?	2^-	3698.9 [b] *7*	9 *4*	1951.61	3^+
5765.3?	2^-	2109.2 [b] *4*	54 *1*	3656.08	2
		2666.7 [b] *10*	11 *6*	3098.47	$1^{(+)}$,$2^{(+)}$
		3242.8 [b] *10*	100 *19*	2521.81	1,$2^{(+)}$
		3627.9 [b] *9*	29 *6*	2138.24	$3^{(+)}$

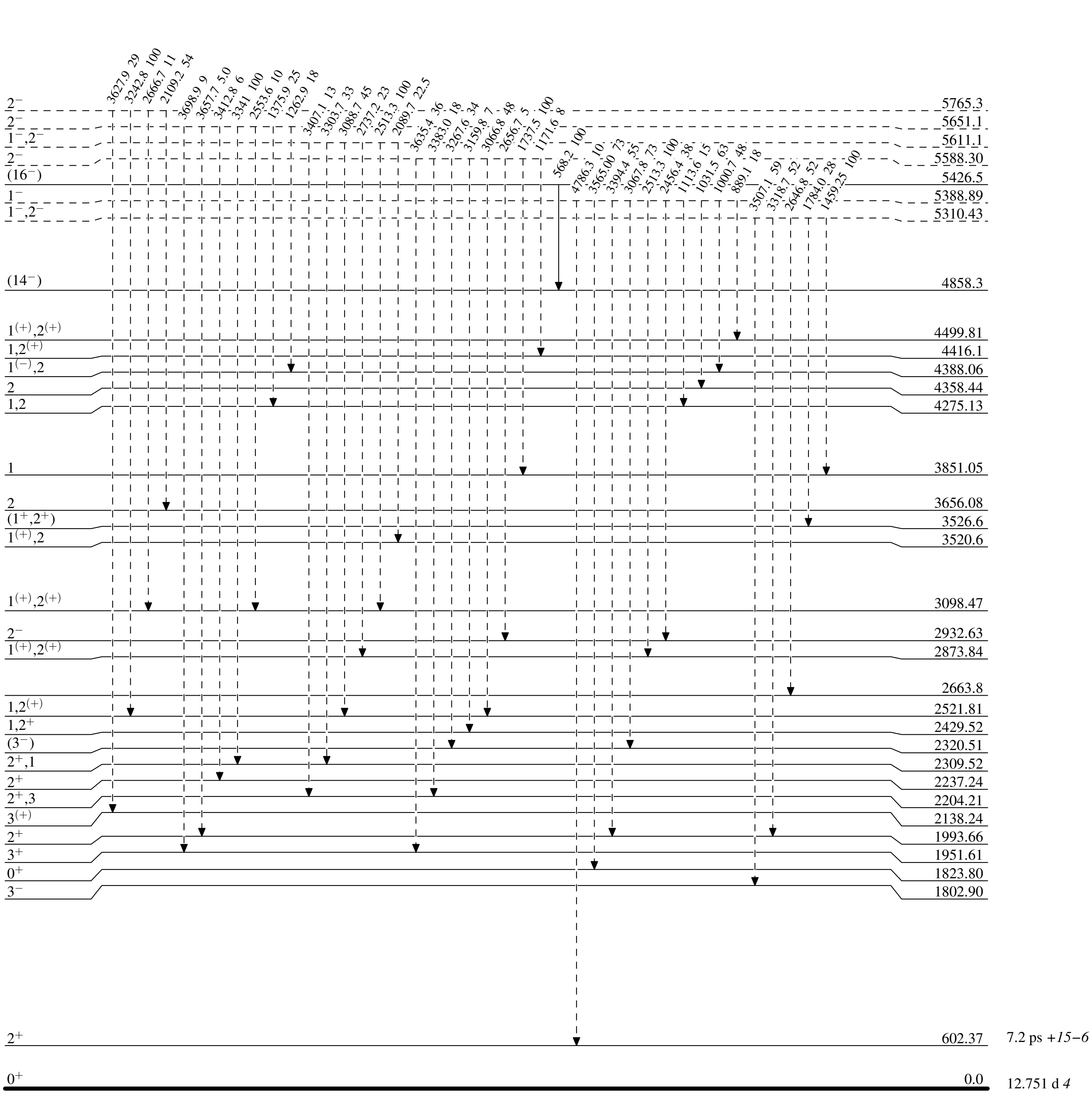
† From ^{140}Cs β^-. γ's from band levels from ^{252}Cf SF and ^{248}Cm SF.
‡ From ^{140}Cs β^-.
# From ^{140}Cs β^- by $\gamma\gamma(\theta)$ (1986Ro16). It was assumed that M2 cannot compete with E1; therefore, D+Q are M1+E2 and Q γ's are E2.
@ From ^{140}Cs β^- by $\gamma\gamma(\theta)$ (1986Ro16).
& Additional information 2.
a If no value given it was assumed δ=1.00 for E2/M1, δ=1.00 for E3/M2 and δ=0.10 for the other multipolarities.
b Placement of transition in the level scheme is uncertain.

$^{140}_{56}Ba_{84}$-11

Adopted Levels, Gammas

Level Scheme

Intensities: Relative photon branching from each level

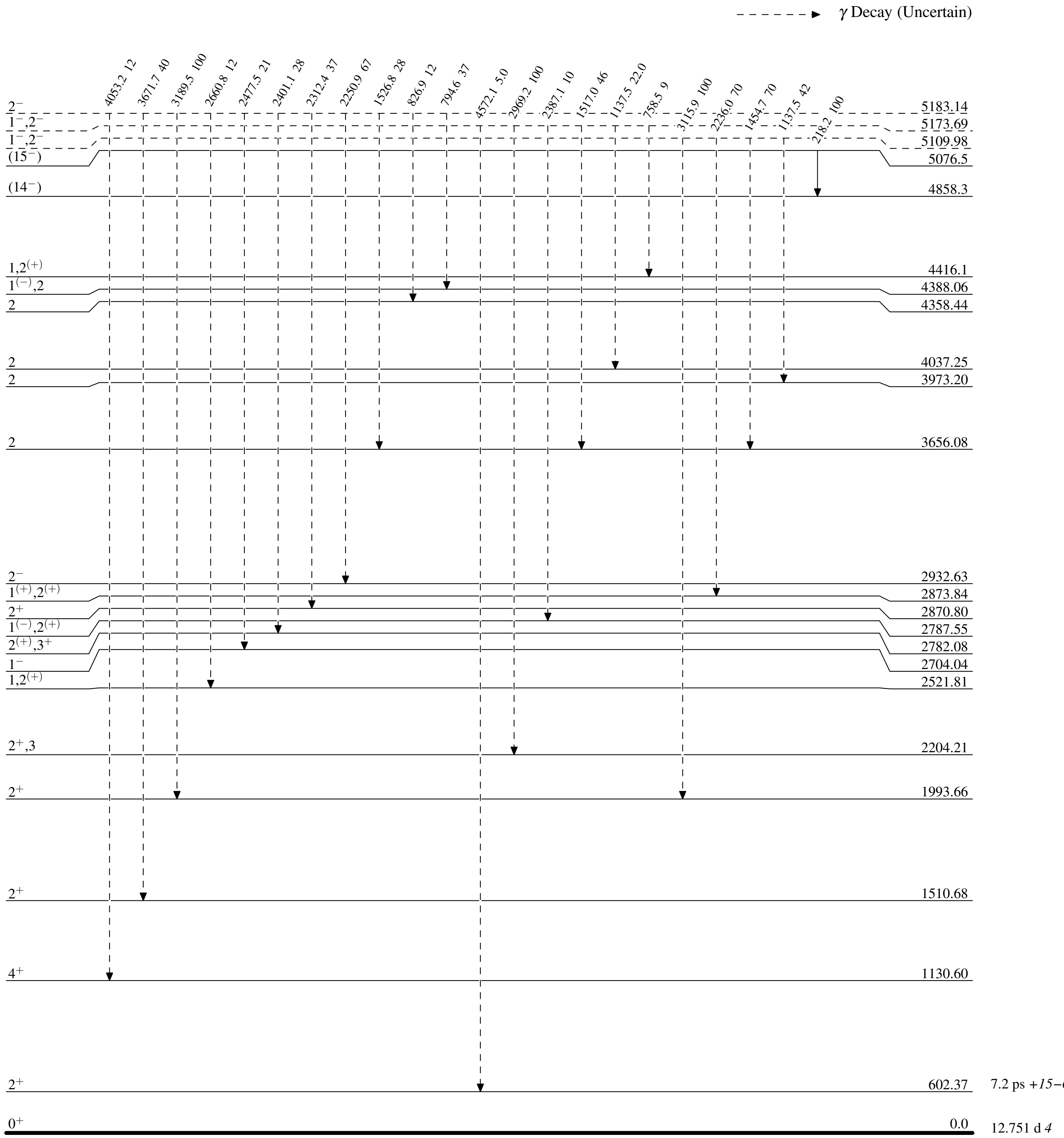


$^{140}_{56}Ba_{84}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



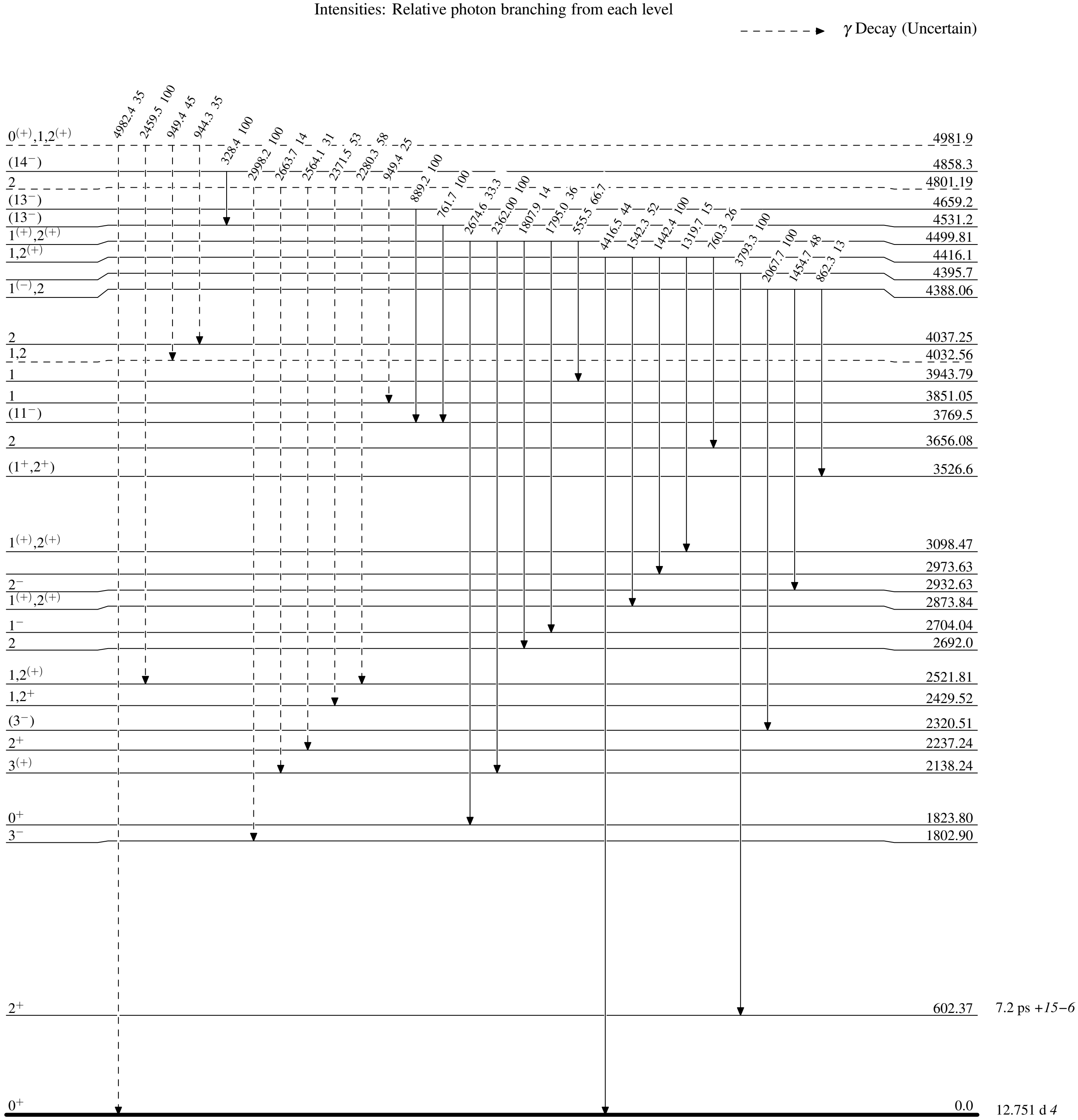
$^{140}_{56}Ba_{84}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

Legend

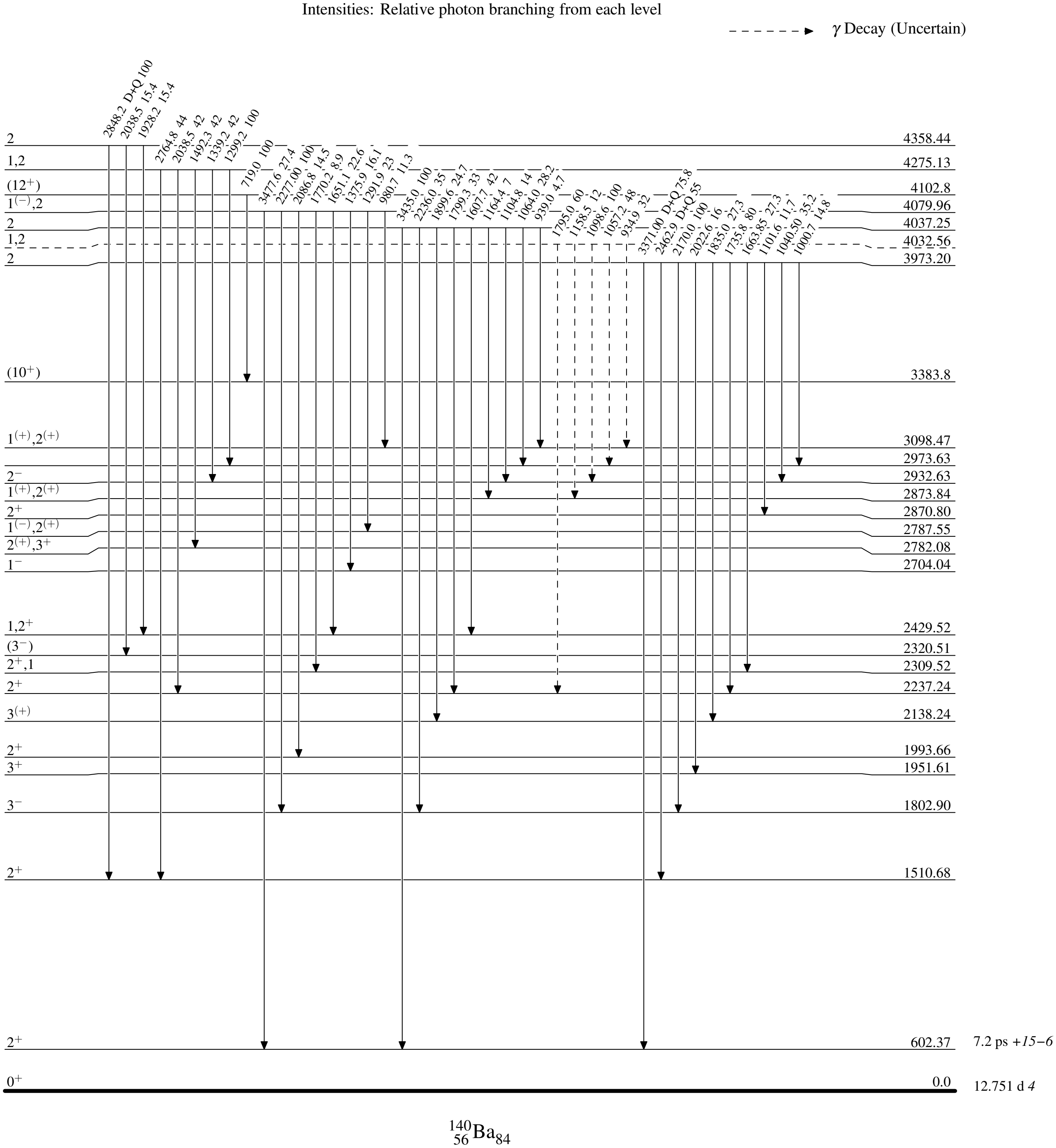


$^{140}_{56}Ba_{84}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



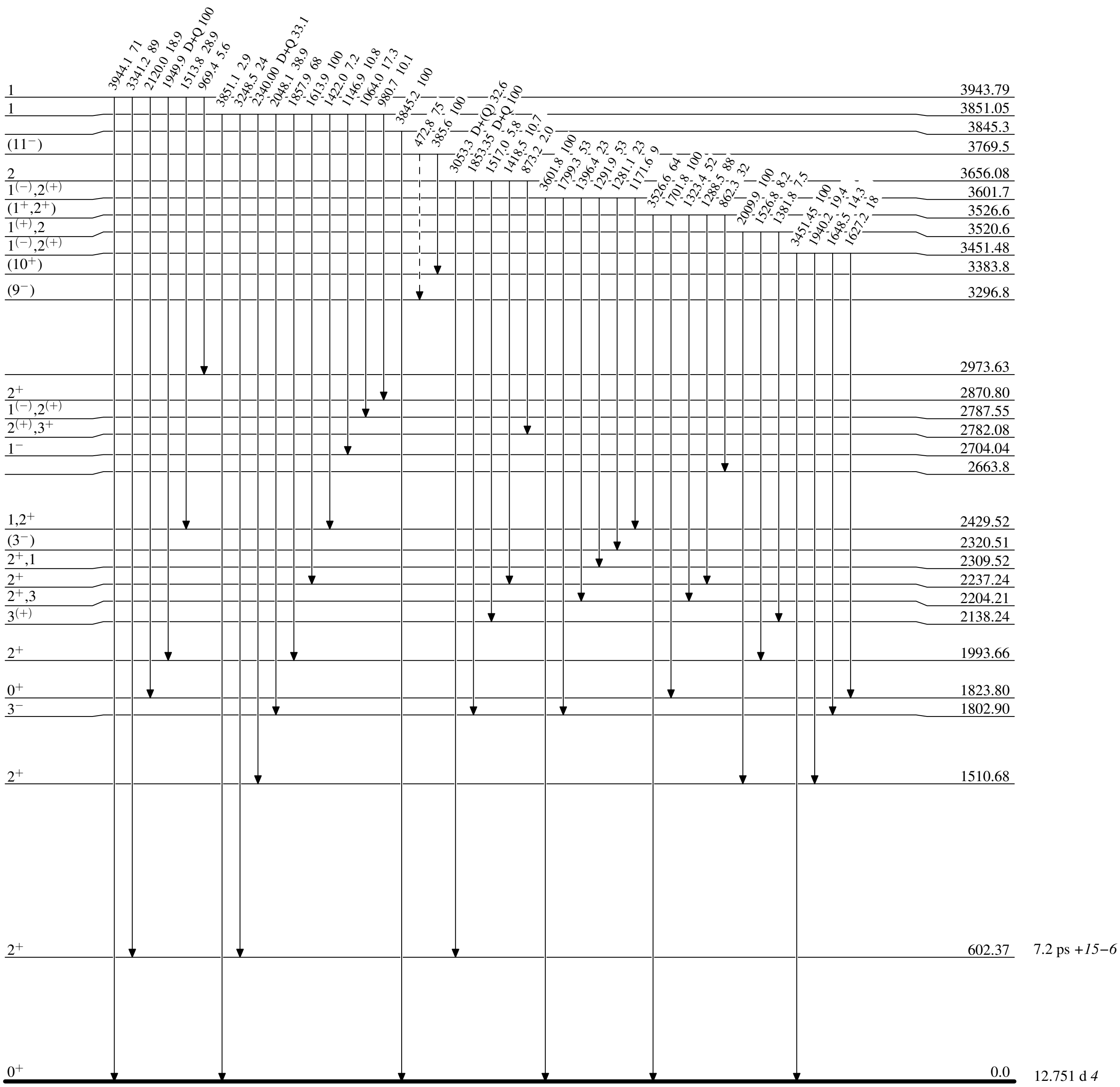
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

γ Decay (Uncertain)



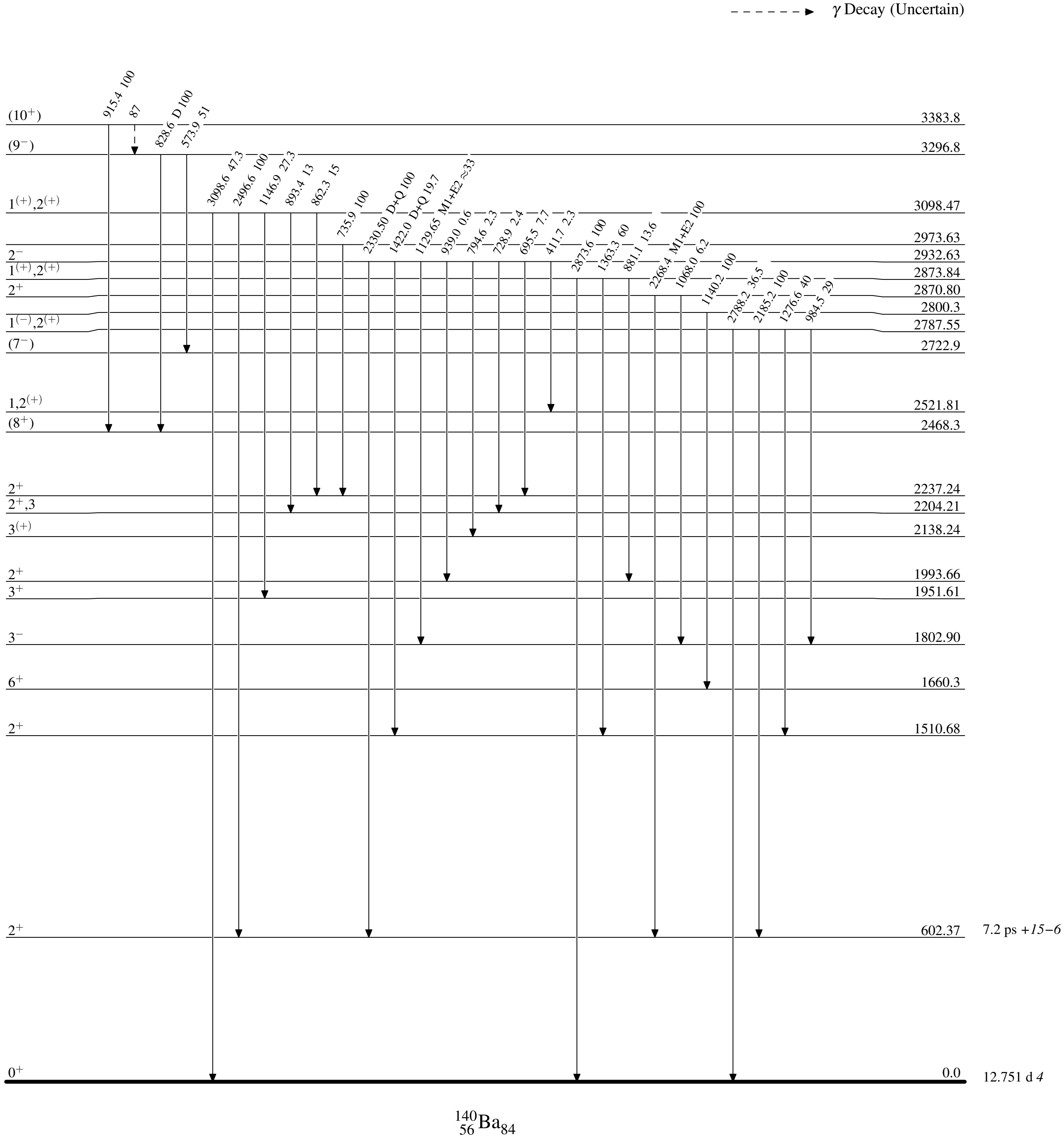
$^{140}_{56}Ba_{84}$

Adopted Levels, Gammas

Legend

Level Scheme (continued)

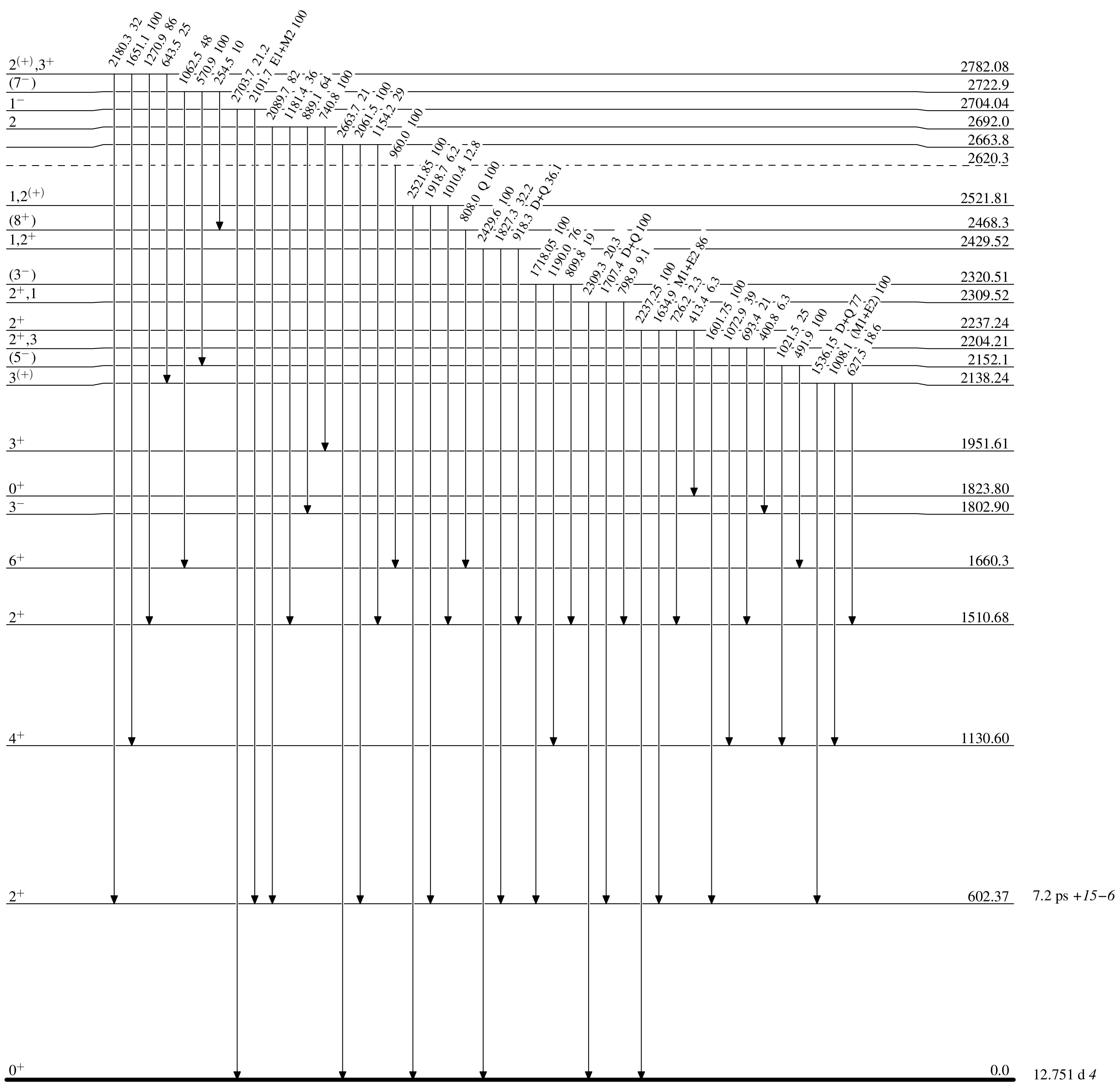
Intensities: Relative photon branching from each level



Adopted Levels, Gammas

Level Scheme (continued)

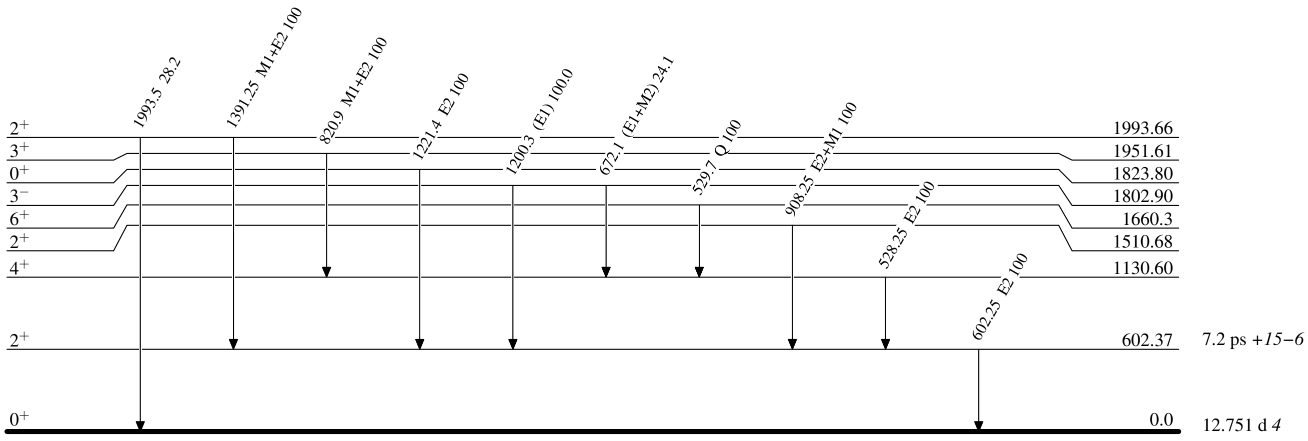
Intensities: Relative photon branching from each level



Adopted Levels, Gammas

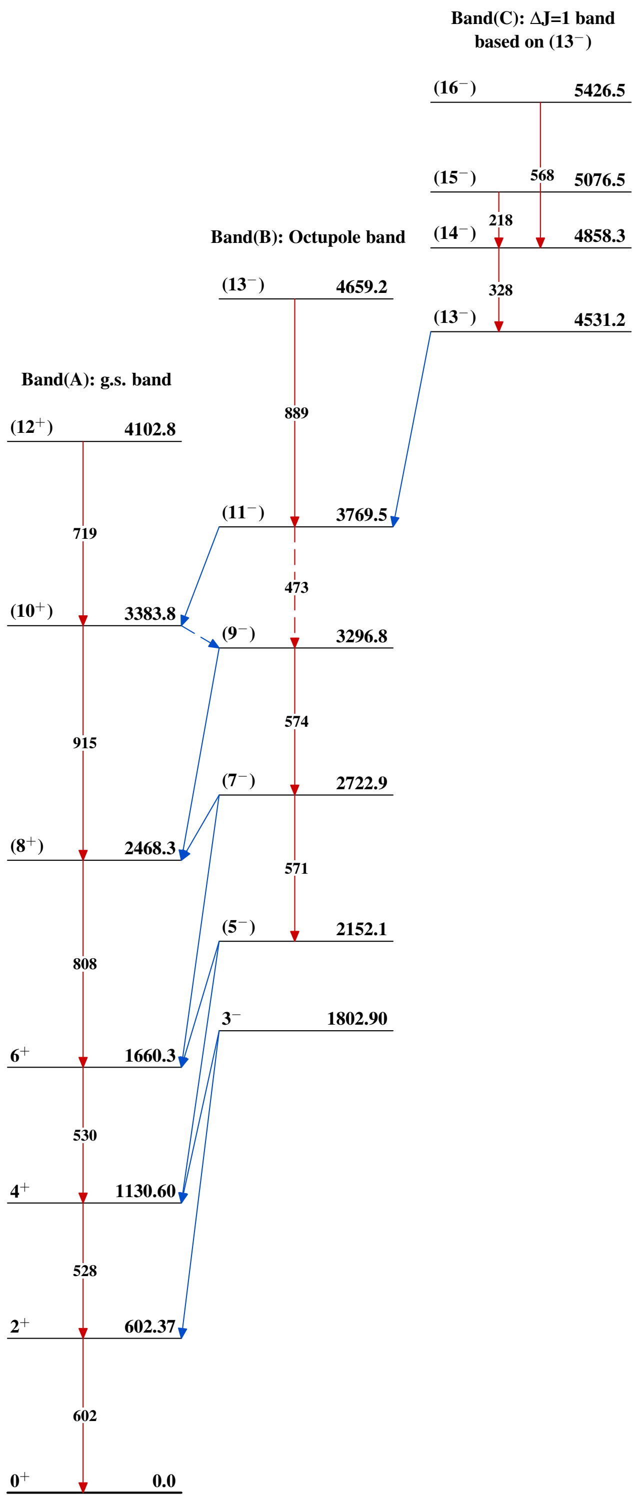
Level Scheme (continued)

Intensities: Relative photon branching from each level



$^{140}_{56}Ba_{84}$

Adopted Levels, Gammas



$^{140}_{56}Ba_{84}$

Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	T. D. Johnson, D. Symochko(a), M. Fadil(b), and J. K. Tuli	NDS 112,1949 (2011)	1-Jun-2010

Q(β^-)=2181 *9*; S(n)=6181 *8*; S(p)=10655 *11*; Q(α)=−295 *7* 2012Wa38
Note: Current evaluation has used the following Q record 2177 96183 810654 12-295 7 2011AuZZ.
Q(β^-n)=−2982 *8*, Q(εp)=−16937 *7* 2011AuZZ.
Values in 2003Au03: Q(β^-)=2212 *5*, S(n)=6169 *10*, S(p)=10635 *12*, Q(α)=−100 *4*, Q(β^-n)=−2956 *7*, Q(εp)=−16790 *9*.
Optical isotope shift: 1997Co26 (with respect to ^{140}Ba,^{144}Ba).
Nuclear structure, calculations, theory: 2007Ji05, 1997Sa16, 1995Hi10, 1995Ba45 (also 1992Eg01,1991Eg01,1990Eg01), 1992Wo11, 1992Na07.

^{142}Ba Levels

Cross Reference (XREF) Flags

A ^{142}Cs β^- decay
B ^{248}Cm SF decay

E(level)[†]	J$^\pi$[‡]	$T_{1/2}$	XREF	Comments
0.0[@]	0$^+$	10.6 min *2*	AB	%β^-=100 $T_{1/2}$: weighted average: 10.65 min *12* (1969Ca03), 10.80 min *16* (1972Eh02), 10.3 min *1* (1974Gr29). HFS, isomer shift (1988We07,1985Ne09,1983Mu12,1981Ne06), mass (1986Au02).
359.596[@] *14*	2$^+$	65[#] ps *2*	AB	μ=+0.852 *10* (2005St24,1988Wo03,1986Gi14) $T_{1/2}$: from 1990Ma25. Other values: 82 ps *8* (2005Bi02), 79 ps *6* (1980ChZM), 0.07 ns *4* (1974JaYY), 58 ps *6* (1983MaYT), 64 ps *7* (1988MaZH). See also: 1989Ma38, 1989Mo06. J$^\pi$: γ to 0$^+$ is E2 (β decay).
834.81[@] *9*	4$^+$	12.5 ps *8*	AB	$T_{1/2}$: weighted average: 11.9 ps *9* (1990Ma25) and 17.3 ps *25* (2005Bi02). J$^\pi$: from DCO ratio, polarization and band placement.
1292.20[&] *14*	(3$^-$)		AB	J$^\pi$: based on systematics.
1326.48 *5*	1$^-$	10[#] ps *5*	A	J$^\pi$: 1 or 3 from $\gamma\gamma(\theta)$ in β decay of ^{142}Cs; γ to 0$^+$ excludes 3. Allowed β^- from 0$^-$.
1424.06 *6*	2$^+$	<9[#] ps	A	J$^\pi$: $\gamma\gamma(\theta)$ in β decay of ^{142}Cs, γ to 2$^+$ is E2 (δ>10).
1465.98[@] *24*	6$^+$	7.2 ps *13*	B	J$^\pi$: from DCO ratio, polarization and band placement. $T_{1/2}$: from ^{252}Cf SF decay (1983MaYT).
1535.53 *7*	0$^+$	9[#] ps *7*	A	J$^\pi$: $\gamma\gamma(\theta)$ in β decay of ^{142}Cs, γ to 2$^+$.
1541.57[&] *23*	5$^-$		B	J$^\pi$: from DCO ratio and polarization.
1639.60 *10*	0$^+$	<16[#] ps	A	J$^\pi$: $\gamma\gamma(\theta)$ in β decay of ^{142}Cs, syst for even-even nuclei.
1693.0? *3*	2$^+$		A	J$^\pi$: $\gamma\gamma(\theta)$ in β decay of ^{142}Cs, γ to 2$^+$ is M1+E2.
1747.40[b] *23*	5$^{(+)}$		B	J$^\pi$: from DCO ratio and polarization.
1781.50 *10*			A	
1848.41[a] *21*	6$^+$		B	J$^\pi$: from DCO ratio and polarization.
1952.7[&] *4*	7$^-$		B	J$^\pi$: from DCO ratio and polarization.
2070.1[b] *3*	7$^{(+)}$		B	J$^\pi$: from DCO ratio and band placement.
2127.9 *3*	0$^+$		A	J$^\pi$: $\gamma\gamma(\theta)$ in β decay of ^{142}Cs, γ to 2$^+$.
2159.4[@] *4*	8$^+$		B	J$^\pi$: from DCO ratios and polarization.
2229.3[a] *3*	8$^{(+)}$		B	J$^\pi$: from DCO ratio.
2341.77 *10*	1		A	J$^\pi$: J=3 or 1 from $\gamma\gamma(\theta)$, γ to 0$^+$ excludes 3.
2513.8[&] *4*	9$^-$		B	J$^\pi$: from DCO ratio and polarization.
2569.78 *11*			A	

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{142}Ba Levels (continued)

E(level)†	Jπ‡	XREF	Comments
2680.1[b] 4	(9+)	B	
2814.9[a] 4	(10+)	B	
2882.57 16	(1,2+)	A	Jπ: γ to 0+.
2925.9[@] 4	(10+)	B	Jπ: from band assignment.
3144.38 23	(1)	A	Jπ: γ to 0+,2+; β from 0−.
3153.9[&] 5	(11−)	B	
3261.7 4	(1)	A	Jπ: γ to 0+,2+; β from 0−.
3283.29 19	(1)	A	Jπ: γ to 0+,2+; β from 0−.
3343.0[b] 5		B	
3507.3[a] 5		B	
3573.08 24	(1)	A	Jπ: γ to 0+; β from 0−.
3794.9[@] 5		B	
3932.9[&] 6		B	
4369.3 4	(1)	A	Jπ: γ to 0+, β from 0−.
4517.4?[@] 6		B	
5280.4 4		A	

† Least-squares fit to data from ^{142}Ce β^- decay and ^{248}Cm SF decay. Some levels from ^{252}Cf resulting in γ placement not consistent with ^{248}Cm SF decay were not adopted.

‡ From angular correlation and polarization measurements in ^{248}Cm SF decay, except where noted.

From $\beta\gamma\gamma$(t) (1990Ma25).

@ Band(A): g.s. band. Levels 3795 and 4517 have been assigned to octupole band by 1995Zh34.

& Band(B): octupole band.

a Band(C): possible rotational band-1.

b Band(D): possible rotational band-2.

Adopted Levels, Gammas (continued)

$\gamma(^{142}$Ba)

E_i(level)	J^π_i	E_γ‡	I_γ‡	E_f	J^π_f	Mult.	δ	α†	Comments
359.596	2^+	359.598 *14*	100	0.0	0^+	E2		0.0257	B(E2)(W.u.)=32.1 *10* α(K)=0.0212 *3*; α(L)=0.00356 *5*; α(M)=0.000748 *11*; α(N+..)=0.000183 *3* α(N)=0.0001589 *23*; α(O)=2.31×10^{-5} *4*; α(P)=1.232×10^{-6} *18*
834.81	4^+	475.17 *9*	100	359.596	2^+	E2		0.01135	B(E2)(W.u.)=45 *4* α(K)=0.00952 *14*; α(L)=0.001455 *21*; α(M)=0.000303 *5*; α(N+..)=7.49×10^{-5} *11* α(N)=6.48×10^{-5} *9*; α(O)=9.57×10^{-6} *14*; α(P)=5.70×10^{-7} *8* Mult.: compatible with $\gamma\gamma(\theta)$.
1292.20	(3^-)	457.26 *15*	20 *2*	834.81	4^+				
		932.82 *20*	100 *15*	359.596	2^+	D+Q			
1326.48	1^-	966.89 *7*	69 *6*	359.596	2^+	D+(Q)	−0.013 *8*		
		1326.46 *7*	100.0 *15*	0.0	0^+				
1424.06	2^+	1064.54 *7*	87 *18*	359.596	2^+	E2+(M1)	>10	0.001586 *23*	B(E2)(W.u.)>0.48 α(K)=0.001363 *20*; α(L)=0.0001773 *25*; α(M)=3.64×10^{-5} *6*; α(N+..)=9.12×10^{-6} α(N)=7.84×10^{-6} *11*; α(O)=1.194×10^{-6} *17*; α(P)=8.46×10^{-8} *12* Mult.: from $\gamma\gamma(\theta)$.
		1423.9 *1*	100 *5*	0.0	0^+	Q			
1465.98	6^+	631.1 *3*	100	834.81	4^+	E2		0.00532 *8*	B(E2)(W.u.)=18 *4* α(K)=0.00451 *7*; α(L)=0.000641 *9*; α(M)=0.0001329 *19*; α(N+..)=3.30×10^{-5} *5* α(N)=2.85×10^{-5} *4*; α(O)=4.26×10^{-6} *6*; α(P)=2.76×10^{-7} *4*
1535.53	0^+	209.1 *5*	3.3 *3*	1326.48	1^-				
		1175.93 *6*	100 *2*	359.596	2^+	Q			
1541.57	5^-	249.2		1292.20	(3^-)				
		706.8 *3*	100	834.81	4^+	E1		0.001519 *22*	α(K)=0.001314 *19*; α(L)=0.0001632 *23*; α(M)=3.34×10^{-5} *5*; α(N+..)=8.36×10^{-6} α(N)=7.18×10^{-6} *10*; α(O)=1.097×10^{-6} *16*; α(P)=7.96×10^{-8} *12*
1639.60	0^+	1280.0 *1*	100	359.596	2^+	Q			
1693.0?	2^+	1333.4 *3*	100	359.596	2^+	D+Q	−0.94 *29*		
1747.40	$5^{(+)}$	205.8 *3*	37 *9*	1541.57	5^-				
		912.6 *3*	100 *14*	834.81	4^+	(M1)			
1781.50		1421.9 *1*	100	359.596	2^+	D+(Q)			
1848.41	6^+	101.0 *3*	38 *13*	1747.40	$5^{(+)}$	[D+Q]			
		306.9 *3*	100 *10*	1541.57	5^-	[E1]			
		382.4 *3*	25 *13*	1465.98	6^+				I_γ: 88 in ^{252}Cf SF decay.

From ENSDF

Adopted Levels, Gammas (continued)

$\gamma(^{142}Ba)$ (continued)

E_i(level)	J^π_i	E_γ‡	I_γ‡	E_f	J^π_f	Mult.	δ	Comments
1848.41	6^+	1013.6 3	73 10	834.81	4^+	E2		I_γ: 48 in ^{252}Cf SF decay.
1952.7	7^-	411.8 2	13 2	1541.57	5^-	[E2]		
		487.0 3	100 11	1465.98	6^+	E1		
2070.1	$7^{(+)}$	222.0 2	37 8	1848.41	6^+	[D+Q]		
		323.2 2	25 5	1747.40	$5^{(+)}$	[E2]		
		603.8 3	100 17	1465.98	6^+	(M1)		
2127.9	0^+	1768.3 3	100	359.596	2^+	Q		
2159.4	8^+	206.6 2	2.3 8	1952.7	7^-	[E1]		
		693.4 3	100	1465.98	6^+	E2		
2229.3	$8^{(+)}$	159.0 3	46 9	2070.1	$7^{(+)}$	[D+Q]		
		276.8 3	35 5	1952.7	7^-	[E1]		
		380.9 3	100 12	1848.41	6^+	(E2)		
		763.4 3	69 8	1465.98	6^+	(E2)		
2341.77	1	1015.3 1	15.9 11	1326.48	1^-			
		1982.1 2	100 7	359.596	2^+	D+(Q)	+0.09 5	
		2341.7 5	15.9 25	0.0	0^+			
2513.8	9^-	284 1	14 6	2229.3	$8^{(+)}$	[D+Q]		
		354.3 3	100 8	2159.4	8^+	E1		
		560.9 2	88 8	1952.7	7^-	(E2)		
2569.78		1243.3 1	100	1326.48	1^-			
2680.1	(9^+)	451.0 3	100 11	2229.3	$8^{(+)}$	[D+Q]		
		609.8 3	84 18	2070.1	$7^{(+)}$	[E2]		
2814.9	(10^+)	301.1 3	22 6	2513.8	9^-	[D]		
		585.7 3	100 9	2229.3	$8^{(+)}$	[E2]		
		655.4 3	24 6	2159.4	8^+	[Q]		
2882.57	$(1,2^+)$	1101.1 2	74 22	1781.50				
		2522.9 4	66 10	359.596	2^+			
		2882.5 3	100 9	0.0	0^+			
2925.9	(10^+)	412.1 3	43 9	2513.8	9^-	[D]		
		766.5 3	100 13	2159.4	8^+	[E2]		
3144.38	(1)	1818.0 3	100 11	1326.48	1^-			
		2784.6 5	39 9	359.596	2^+			
		3144.2 5	46 10	0.0	0^+			
3153.9	(11^-)	228.0 3	42 8	2925.9	(10^+)	[D]		
		640.1 3	100 20	2513.8	9^-	[E2]		
3261.7	(1)	1935.2 4	100 11	1326.48	1^-			
		3261.6 5	49 8	0.0	0^+			
3283.29	(1)	1956.8 4	45 8	1326.48	1^-			
		2923.5 3	83 8	359.596	2^+			
		3283.4 3	100 10	0.0	0^+			
3343.0		662.9 3	100	2680.1	(9^+)			

$^{142}_{56}Ba_{86}$-4

$\gamma(^{142}\mathrm{Ba})$ (continued)

E_i(level)	J_i^π	E_γ‡	I_γ‡	E_f	J_f^π
3507.3		692.4 *3*	100	2814.9	(10^+)
3573.08	(1)	2246.1 *4*	60 *7*	1326.48	1^-
		3573.3 *3*	100 *7*	0.0	0^+
3794.9		641.0 *3*	100 *50*	3153.9	(11^-)
		869 *1*	25 *15*	2925.9	(10^+)
3932.9		779.0 *3*	100	3153.9	(11^-)
4369.3	(1)	4009.3 *7*	25 *7*	359.596	2^+
		4369.3 *4*	100 *9*	0.0	0^+
4517.4?		722.5 *3*	100	3794.9	
5280.4		2397.8 *4*	100 *9*	2882.57	$(1,2^+)$
		2938.6 *5*	17 *4*	2341.77	1

† Additional information 1.

‡ Taken from ^{142}Cs β^- decay, if present. Otherwise, from ^{248}Cm SF decay.

$^{142}_{56}\mathrm{Ba}_{86}$-5

Adopted Levels, Gammas

Level Scheme

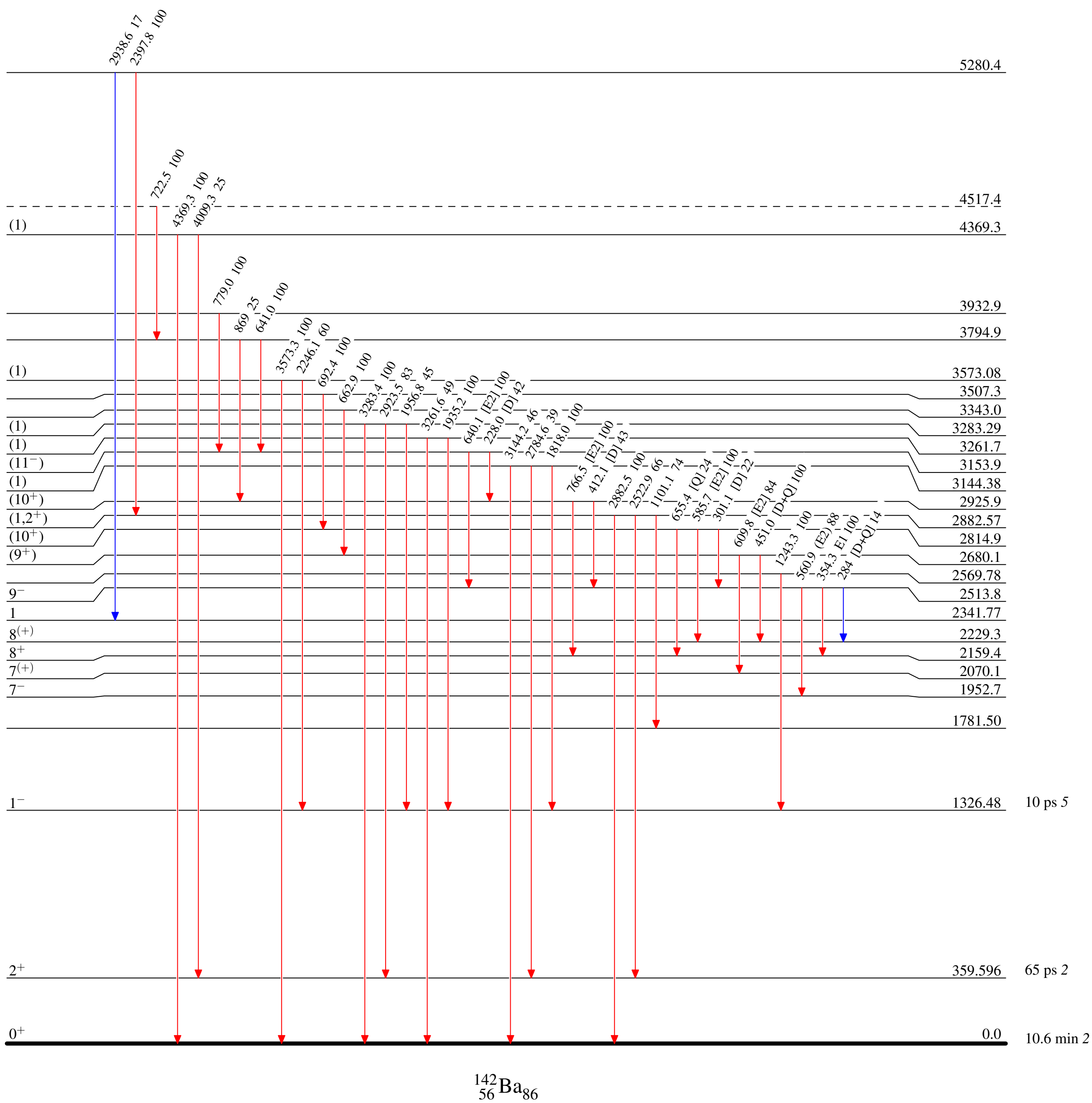
Intensities: Type not specified

Legend

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

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

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

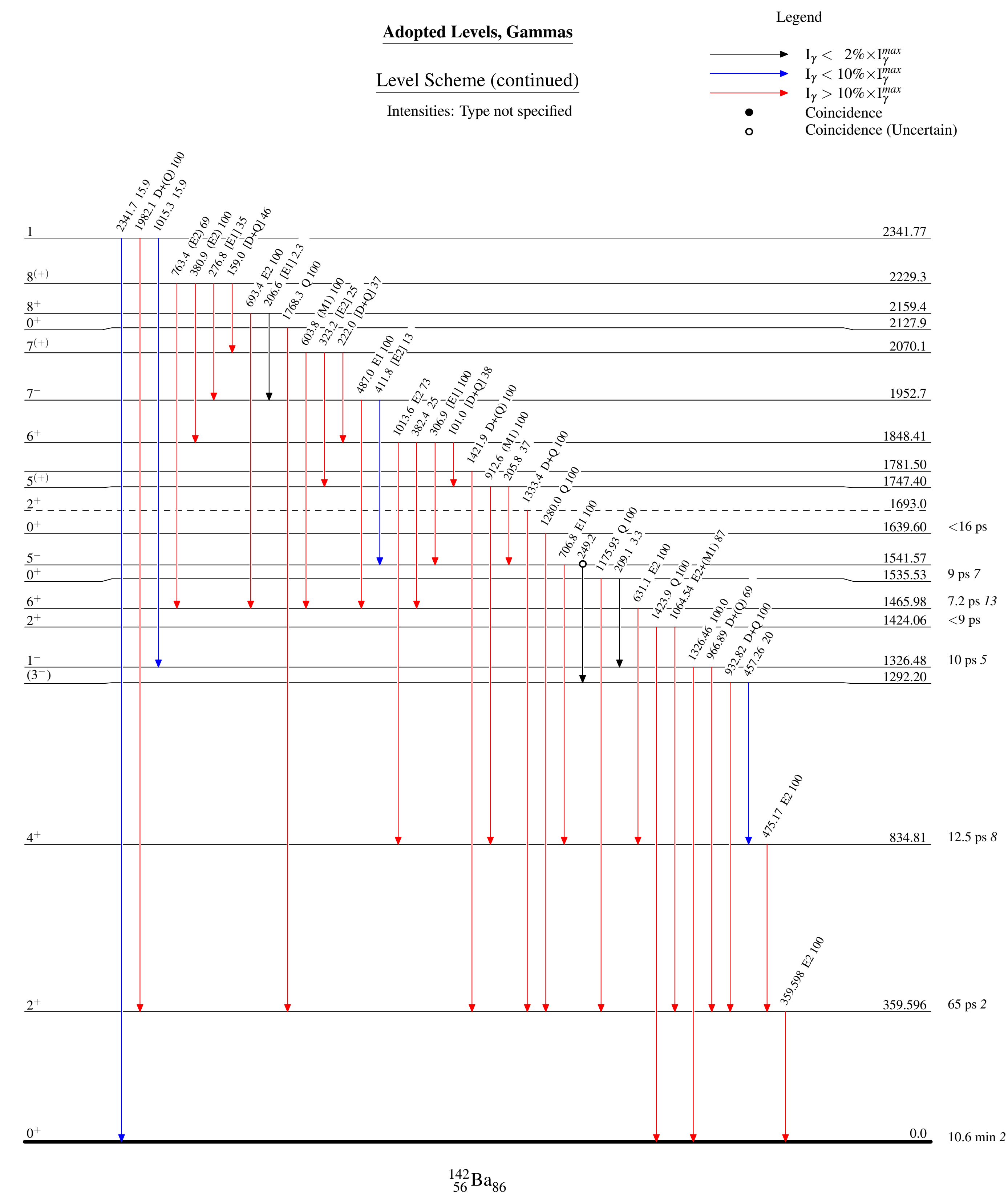


$^{142}_{56}Ba_{86}$

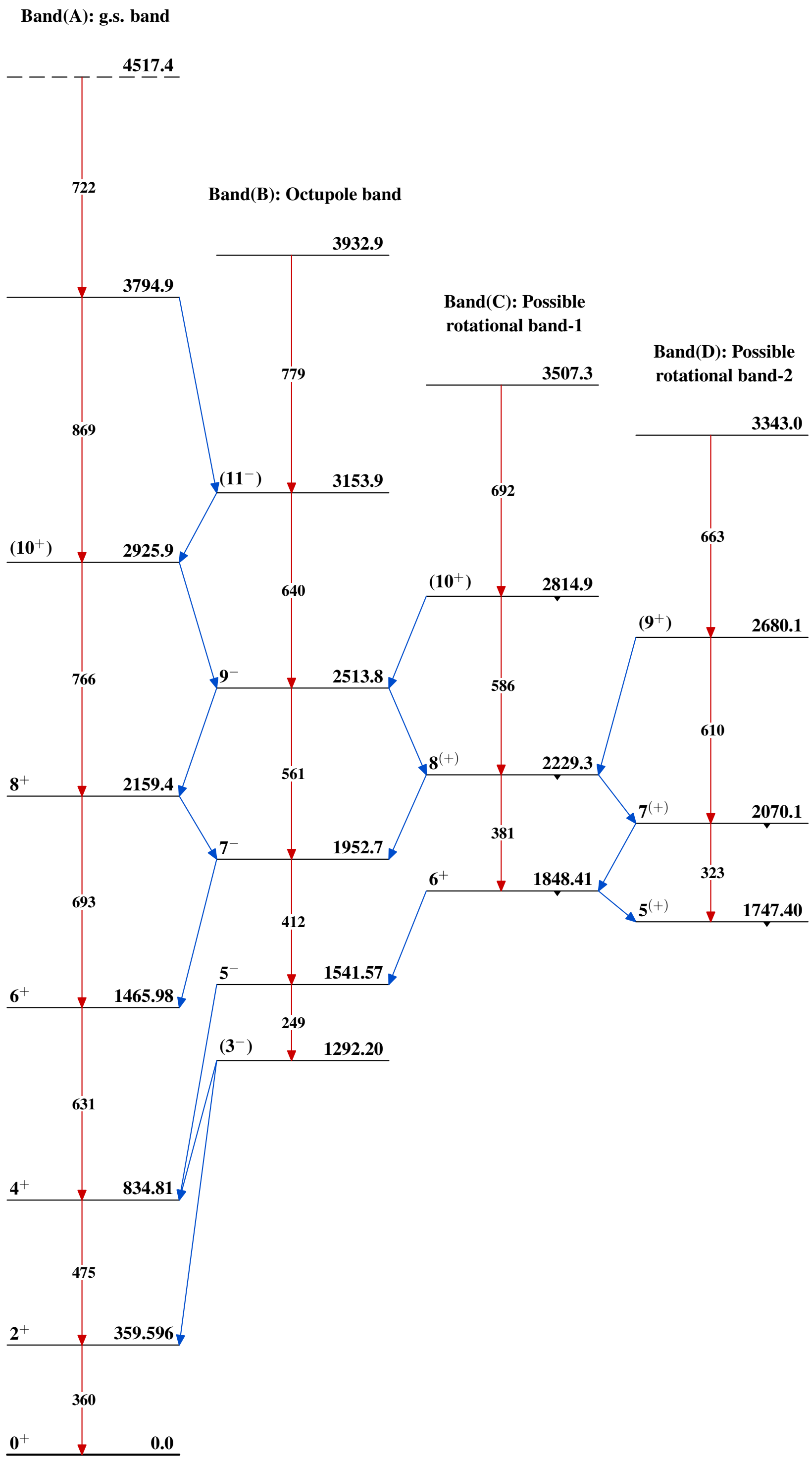
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Type not specified



Adopted Levels, Gammas



$^{142}_{56}Ba_{86}$

Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	A. A. Sonzogni	NDS 93,599 (2001)	1-Dec-2000

Q(β^-)=3083 *15*; S(n)=5901 *10*; S(p)=11382 *23*; Q(α)=−1206 *8* 2012Wa38
Note: Current evaluation has used the following Q record 3119 565907 1811378 25 −1210 *62* 1995Au04.
Isotope shift, $\Delta<r^2>$: 1988We07, 1985Ne09, 1983Mu12, 1997Co26.
Theory, calculations, systematics: 1998Ga15, 1997Sa61, 1997Ga27, 1995Jo11, 1995Hi10, 1995Go14, 1995De13, 1995Ba45, 1994Za01, 1994Se15, 1994Li43, 1993Li32, 1992Wo11, 1992Na07, 1992Eg01, 1992De46, 1991Sk01, 1991Eg01, 1990Eg01, 1989Ku17, 1989De11, 1988So08, 1988Sh40.
Fission yields: 1987GuZX, 1986Ha18, 1985Ch40, 1984Ch39, 1982Go17, 1981Di02, 1981Di01.

^{144}Ba Levels

Cross Reference (XREF) Flags

A ^{144}Cs β^- decay
B ^{252}Cf SF decay
C ^{248}Cm SF decay

E(level)[†]	J$^\pi$	T$_{1/2}$	XREF	Comments
0.0[‡]	0$^+$	11.5 s *2*	ABC	%β^-=100 T$_{1/2}$: from 1982Ch22. Others: 12.0 s *4* (1979En02), 12.3 s *4* (1978Wo09), 11.9 s *6* (1976AmZW), 11.1 s *5* (1974Gr29), 12.1 s *10* (1973Ta13), 12.3 s *2* (1969WiZX), 11.9 s *3* (1969Ru14), 11.4 s *25* (1967Am01).
199.326[‡] *6*	2$^+$	0.71 ns *2*	ABC	μ=0.68 *10* (1983Wo05) J$^\pi$: 199γ is E2. T$_{1/2}$: weighted average of 0.70 ns *3* (1974JaZN) and 0.71 ns *3* (1990Ma25). Others: 0.67 ns *11* (1983MaYT), 0.85 ns *15* (1976MoZB), 1.0 ns *2* (1970Wa05), 0.70 ns *7* (1980ChZM).
530.19[‡] *7*	4$^+$	34 ps *5*	ABC	T$_{1/2}$: from 1990Ma25. J$^\pi$: stretched E2 to 2$^+$, g.s. band member.
758.94[#] *4*	1$^{(-)}$	<24 ps	AB	T$_{1/2}$: from 1990Ma25. J$^\pi$: 559γ-199$\gamma(\theta)$ gives J=1,3 but J=3 ruled out by strong 759γ to 0$^+$. Member of π=− band.
838.37[#] *5*	3$^{(-)}$	<10 ps	ABC	T$_{1/2}$: from 1990Ma25. J$^\pi$: $\gamma\gamma(\theta)$ consistent only with J=3. Member of π=− band.
961.53[‡] *11*	6$^+$		BC	J$^\pi$: stretched E2 to 4$^+$, g.s. band member.
1020.03 *7*	0$^+$		A	J$^\pi$: (820γ)(199γ)(θ) consistent only with 0(Q)2(Q)0.
1038.83[#] *11*	5$^{(-)}$		BC	J$^\pi$: stretched D to 4$^+$. Member π=− band.
1315.64 *8*	(2)		A	J$^\pi$: 1116γ-199$\gamma(\theta)$ is closest to that for J=2 in β^- decay.
1355.24[#] *13*	7$^{(-)}$		BC	J$^\pi$: stretched E2 to 5$^-$, π=− band member.
1470.84[‡] *14*	8$^+$		BC	J$^\pi$: stretched E2 to 6$^+$, g.s. band member.
1772.95[#] *14*	9$^{(-)}$		BC	J$^\pi$: stretched E2 to 7$^+$, π=− band member.
1837.58 *21*			A	
1848.16 *9*	2$^{(+)}$		A	J$^\pi$: γ's to 1$^-$ and 3$^-$. D+Q to 2$^+$. $\gamma\gamma(\theta)$ consistent with J=2 with large δ(1649γ).
1864.25 *8*	2$^+$		A	J$^\pi$: level decays to 0$^+$, 4$^+$ levels. $\gamma\gamma(\theta)$ confirms 2.
1880.98[&] *24*	(5$^+$)		C	
1991.46[@] *18*	(6$^-$)		BC	
2044.32[‡] *16*	10$^+$		BC	J$^\pi$: stretched E2 to 8$^+$, g.s. band member.
2159.26[&] *18*	(7$^+$)		BC	
2212.42 *8*	(2$^+$)		A	J$^\pi$: 348γ to 2$^+$ is M1,E2. Decays to 1$^-$ and 4$^+$ levels. J=3 unlikely from

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{144}Ba Levels (continued)

E(level)[†]	J^π	XREF	Comments
			1374γ-239γ-199γ(θ).
2279.07[#] *16*	$11^{(-)}$	BC	J^π: stretched E2 to 9^-, g.s. band member.
2362.94[@] *21*	(8^-)	BC	
2375.39 *25*	$(1^+,2^+)$	A	J^π: 2176γ-199γ(θ) is consistent with 1 and possibly 2. 2176γ is D+23% Q for J=1. γ to 0^+ makes $J^\pi=2^-$ unlikely.
2664.0[&] *3*		BC	
2667.07[‡] *19*	12^+	BC	J^π: stretched E2 to 10^+, g.s. band member.
2863.68[#] *18*	$13^{(-)}$	BC	J^π: stretched E2 to 11^-, $\pi=-$ band member.
2903.66[@] *23*		C	
3320.72[‡] *22*	(14^+)	BC	J^π: member of g.s. rotational band.
3519.00[#] *24*	(15^-)	BC	J^π: stretched E2 to 13^-, $\pi=-$ band member.
3991.5[‡] *3*	(16^+)	BC	J^π: member of g.s. rotational band.
4242.1[#] *4*	(17^-)	BC	
5027.6[#] *11*	(19^-)	B	

† From a least-squares fit to Eγ data.
‡ Band(A): g.s. band.
# Band(B): octupole band.
@ Band(C): rotational band 1.
& Band(D): rotational band 2.

$\gamma(^{144}Ba)$

E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f	Mult.‡	δ#	α@	Comments
199.326	2^+	199.326 *6*	100	0.0	0^+	E2		0.175	B(E2)(W.u.)=48.1 *14* α(K)=0.136 *4*; α(L)=0.0311 *10*; α(M)=0.00660 *20*; α(N+..)=0.00172 *6*
530.19	4^+	330.88 *9*	100	199.326	2^+	E2		0.0333	B(E2)(W.u.)=91 *14* α(K)=0.0273 *9*; α(L)=0.00475 *15*; α(M)=0.00099 *3*; α(N+..)=0.00026 *1*
758.94	$1^{(-)}$	559.57 *5*	98.1 *25*	199.326	2^+	D(+Q)	−0.005 *10*		
		758.96 *5*	100 *3*	0.0	0^+				
838.37	$3^{(-)}$	308.23 *9*	14.6 *7*	530.19	4^+	D(+Q)	+0.06 *5*		Seen only in β-decay studies.
		638.99 *5*	100.0 *19*	199.326	2^+	D(+Q)	−0.09 *2*		
961.53	6^+	431.3 *1*	100	530.19	4^+	E2		0.0150	α(K)=0.0125 *4*; α(L)=0.00197 *6*; α(M)=0.00041 *1*; α(N+..)=0.00011
1020.03	0^+	261.0 *3*	13.2 *25*	758.94	$1^{(-)}$				
		820.71 *7*	100 *11*	199.326	2^+	Q			
1038.83	$5^{(-)}$	199.1		838.37	$3^{(-)}$				Not seen by 1997Ur01.
		508.7 *1*	100	530.19	4^+				
1315.64	(2)	477.21 *11*	31 *4*	838.37	$3^{(-)}$	D+Q	+0.23 *15*		
		556.4 *3*	29 *6*	758.94	$1^{(-)}$				
		785.1 *5*	11 *3*	530.19	4^+				
		1116.42 *10*	100 *12*	199.326	2^+	D+Q	+7 *+19−3*		
1355.24	$7^{(-)}$	316.5 *2*	22 *3*	1038.83	$5^{(-)}$	E2		0.0383	α(K)=0.0313 *10*; α(L)=0.00555 *17*; α(M)=0.00116 *4*; α(N+..)=0.00031 *1*
		393.7 *1*	100 *8*	961.53	6^+	E1		0.00575	α(K)=0.00496 *15*; α(L)=0.00063 *2*; α(M)=0.00013
1470.84	8^+	115.6 *2*	6.0 *7*	1355.24	$7^{(-)}$	E1		0.153	α(K)=0.131 *4*; α(L)=0.0175 *6*; α(M)=0.00356 *11*; α(N+..)=0.00093 *3*
		509.3 *1*	100 *11*	961.53	6^+	E2		0.0095	α(K)=0.00789 *24*; α(L)=0.00118 *4*
1772.95	$9^{(-)}$	302.1 *1*	100 *9*	1470.84	8^+	E1		0.0112	α(K)=0.0097 *3*; α(L)=0.00123 *4*; α(M)=0.00025 *1*
		417.7 *1*	61 *4*	1355.24	$7^{(-)}$	E2		0.0164	α(K)=0.0137 *5*; α(L)=0.00218 *7*; α(M)=0.00045 *1*; α(N+..)=0.00012
1837.58		1078.63 *20*	100	758.94	$1^{(-)}$				
1848.16	$2^{(+)}$	1009.73 *13*	62 *7*	838.37	$3^{(-)}$				
		1089.08 *15*	100 *12*	758.94	$1^{(-)}$				
		1649.07 *17*	65 *9*	199.326	2^+	Q+D	−3.2 *+18−69*		
1864.25	2^+	1025.73 *11*	100 *11*	838.37	$3^{(-)}$				
		1105.3 *4*	50 *11*	758.94	$1^{(-)}$				
		1333.9 *6*	7.1 *21*	530.19	4^+				
		1664.98 *16*	100 *11*	199.326	2^+	Q+D	−2.8 *+11−31*		
		1864.24 *24*	43 *4*	0.0	0^+				
1880.98	(5^+)	1350.8 *2*	100	530.19	4^+				
1991.46	(6^-)	952.8 *3*	100 *25*	1038.83	$5^{(-)}$				

$\gamma(^{144}Ba)$ (continued)

E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f	Mult.‡	δ#	α@	Comments
1991.46	(6−)	1029.8 *3*	100 *25*	961.53	6+				
2044.32	10+	271.4 *2*	35 *4*	1772.95	9(−)	E1		0.0149	α(K)=0.0128 *4*; α(L)=0.00163 *5*; α(M)=0.00033 *1*
		573.5 *1*	100 *8*	1470.84	8+	E2		0.00688	α(K)=0.00577 *18*; α(L)=0.00084 *3*
2159.26	(7+)	167.8 *2*	69 *19*	1991.46	(6−)				
		278.3 *3*	56 *13*	1880.98	(5+)				Seen by 1997Ur01 only.
		1197.7 *2*	100 *19*	961.53	6+				
2212.42	(2+)	348.06 *11*	100 *8*	1864.25	2+	M1,E2		0.031 *3*	α(K)=0.026 *3*; α(L)=0.00386 *14*; α(M)=0.00080 *4*; α(N+..)=0.00021 *1*
		897.1 *4*	15 *3*	1315.64	(2)				
		1374.12 *12*	83 *10*	838.37	3(−)	D+Q	+1.03 *8*		
		1453.46 *24*	60 *10*	758.94	1(−)				
		1682.10 *22*	38 *5*	530.19	4+				
		2013.34 *22*	98 *4*	199.326	2+	D(+Q)	+0.04 *13*		
2279.07	11(−)	234.8 *2*	37 *5*	2044.32	10+	E1		0.0218	α(K)=0.0188 *6*; α(L)=0.00241 *8*; α(M)=0.00049 *2*; α(N+..)=0.00013
		506.1 *1*	100 *11*	1772.95	9(−)	E2		0.0096	α(K)=0.00802 *24*; α(L)=0.00120 *4*
2362.94	(8−)	203.3& *3*	≤33	2159.26	(7+)				Seen by 1997Ur01 only.
		371.5 *3*	67 *22*	1991.46	(6−)				
		892.0 *3*	100 *22*	1470.84	8+				
		1007.8 *3*	44 *22*	1355.24	7(−)				
2375.39	(1+,2+)	1355.3 *6*	5.1 *15*	1020.03	0+				
		1616.7 *6*	15 *6*	758.94	1(−)				
		2176.0 *3*	100 *13*	199.326	2+	D+Q			δ: −0.72 +*17*−*33* if J(2375)=1.
2664.0		301.1 *3*	86 *29*	2362.94	(8−)				
		504.7 *3*	100 *43*	2159.26	(7+)				
2667.07	12+	388.0 *2*	70 *13*	2279.07	11(−)	E1		0.00596	α(K)=0.00514 *16*; α(L)=0.00065 *2*; α(M)=0.00013
		622.8 *2*	100 *17*	2044.32	10+	E2		0.00556	α(K)=0.00467 *14*; α(L)=0.00067 *2*
2863.68	13(−)	196.6 *2*	16 *4*	2667.07	12+	E1		0.0352	α(K)=0.0303 *9*; α(L)=0.00393 *12*; α(M)=0.00080 *2*; α(N+..)=0.00021 *1*
		584.6 *1*	100 *10*	2279.07	11(−)	E2		0.00654	α(K)=0.00549 *17*; α(L)=0.00079 *2*
2903.66		541.0& *3*	≤8	2362.94	(8−)				
		624.6 *2*	100 *17*	2279.07	11(−)				
		859.3 *3*	21 *8*	2044.32	10+				
3320.72	(14+)	457.0 *2*	57 *14*	2863.68	13(−)				
		653.7 *2*	100 *19*	2667.07	12+				
3519.00	(15−)	198.3 *3*	10 *3*	3320.72	(14+)				
		655.3 *2*	100 *16*	2863.68	13(−)			0.00488	α(K)=0.00411 *13*; α(L)=0.00058 *2*
3991.5	(16+)	472.5 *3*	67 *22*	3519.00	(15−)				
		670.8 *3*	100 *22*	3320.72	(14+)				
4242.1	(17−)	250.4& *3*	≤25	3991.5	(16+)				Seen only by 1997Ur01.

$^{144}_{56}Ba_{88}$-4

$\gamma(^{144}Ba)$ (continued)

E_i(level)	J_i^π	E_γ †	I_γ †	E_f	J_f^π
4242.1	(17^-)	723.1 *2*	100 *25*	3519.00	(15^-)
5027.6	(19^-)	785.5	100	4242.1	(17^-)

† From weighted average of ^{248}Cm SF decay (1997Ur01) and ^{144}Cs β^- decay (1980Sc16) values.

‡ From SF decay or $\gamma\gamma(\theta)$ and α(K)exp in β^- decay.

From $\gamma\gamma(\theta)$ in β^- decay.

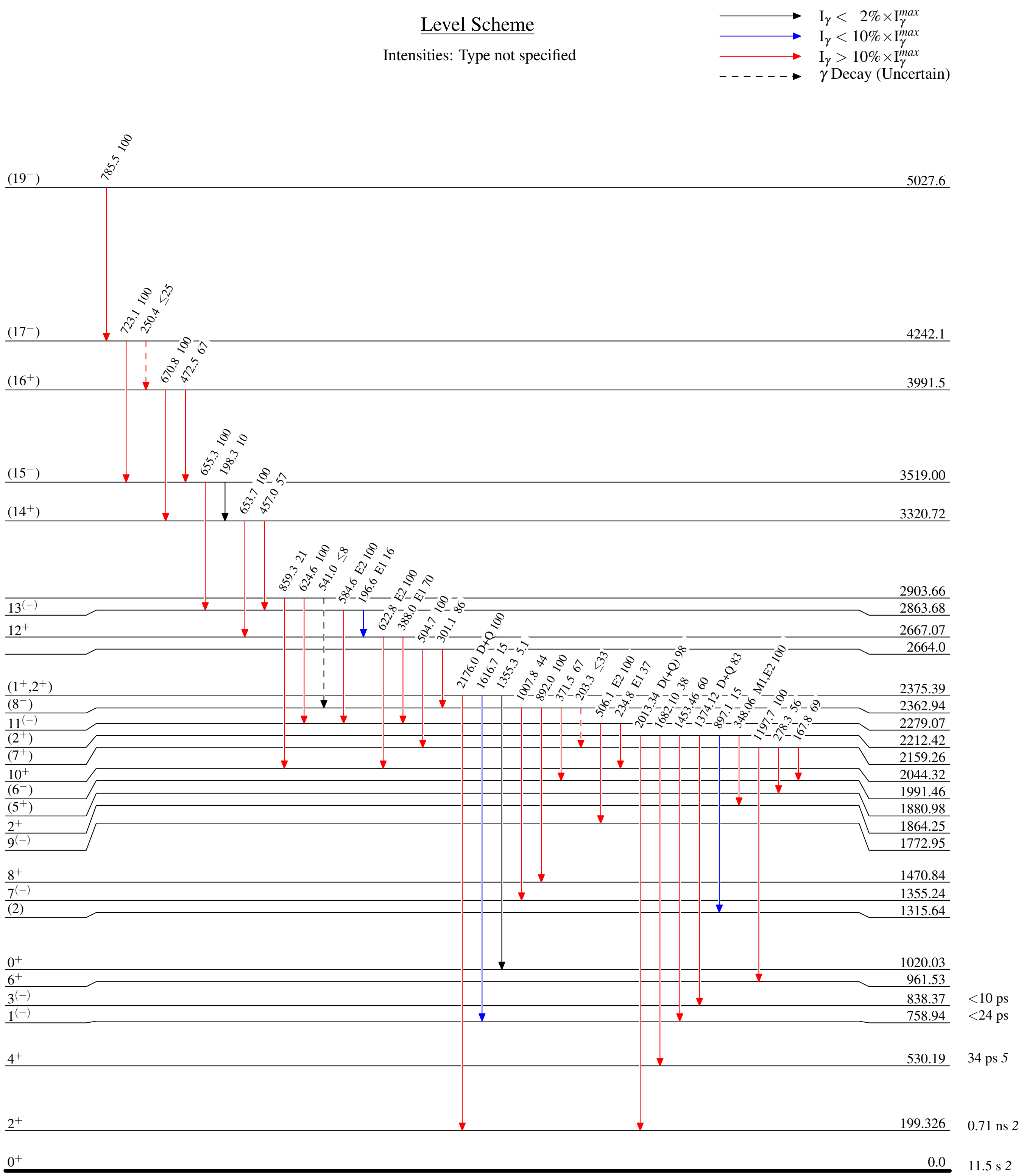
@ Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.

& Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas

Level Scheme

Intensities: Type not specified

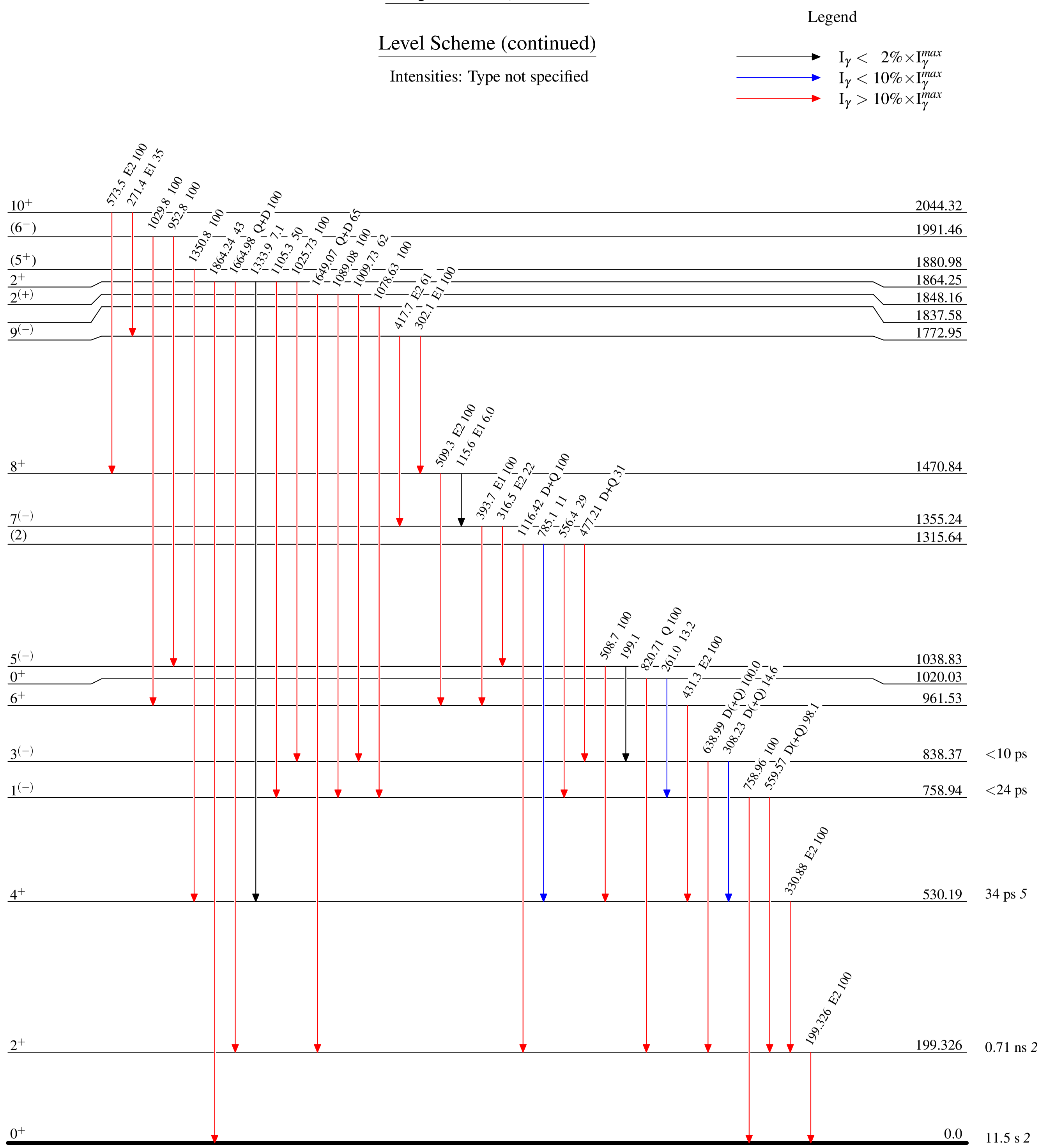


$^{144}_{56}Ba_{88}$

Adopted Levels, Gammas

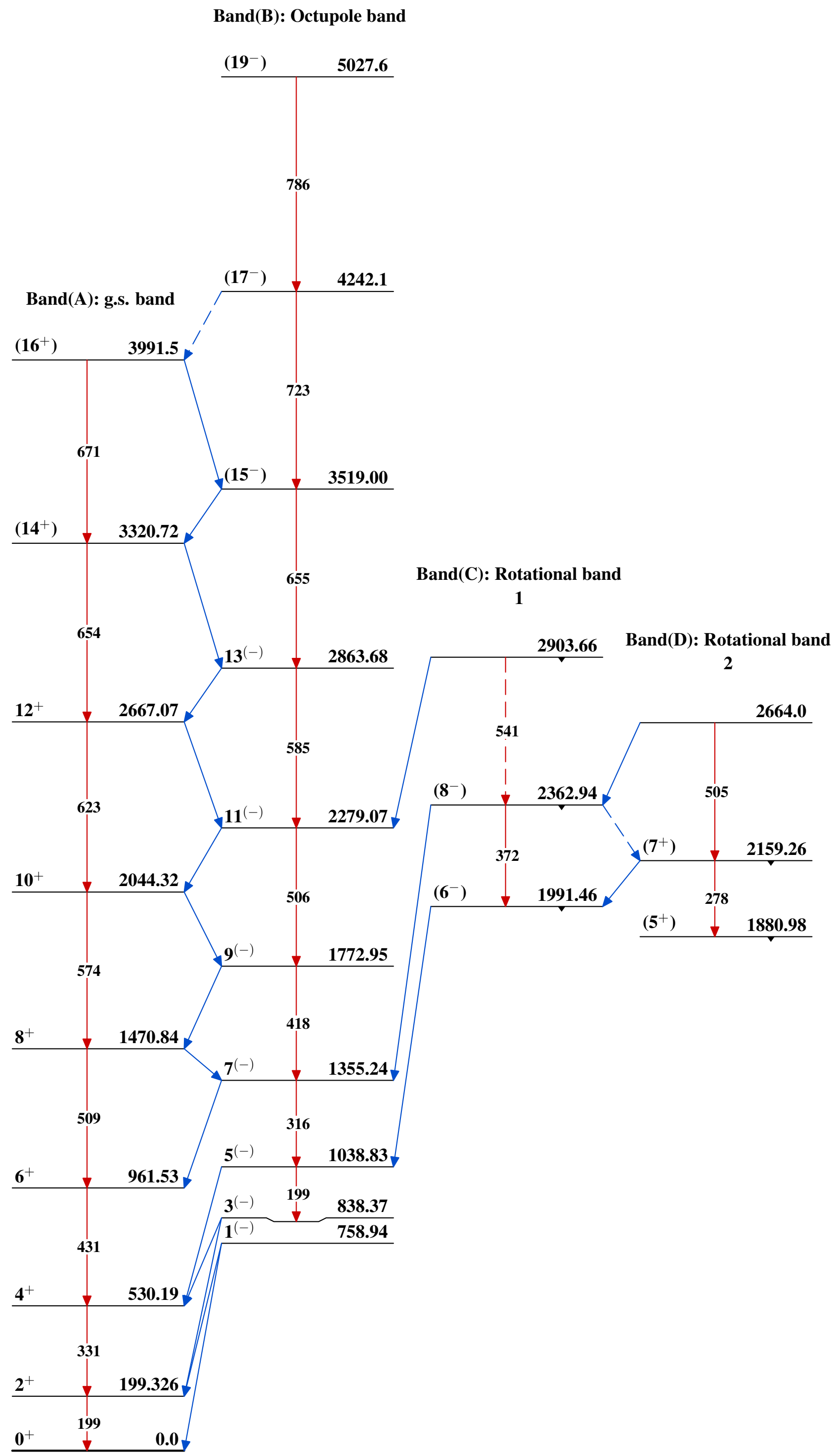
Level Scheme (continued)

Intensities: Type not specified



$^{144}_{56}Ba_{88}$

Adopted Levels, Gammas



$^{144}_{56}Ba_{88}$

Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Yu. Khazov, A. Rodionov and G. Shulyak	NDS 136, 163 (2016)	14-Jul-2016

Q(β^-)=4110 *30*; S(n)=5495 *22*; S(p)=12173 *23*; Q(α)=−2136 *21* 2012Wa38
Produced and identified by 1970Wi16 (1970WiZN,1969WiZX) in the products of the ^{252}Cf SF.
^{146}Ba β^-n decay measured by 1983Re10: %β^-n<0.02.

^{146}Ba Levels

Assignment spins and parities to levels of the bands with bandheads of the 1974, 2029 and 2097 keV based on the observed branching ratios and decay pattern in 1997Ur01. Evaluators found these level structures as having not enough strong arguments for the construction of bands.

Cross Reference (XREF) Flags

A	^{146}Cs β^- decay
B	^{248}Cm SF decay
C	^{252}Cf SF decay
D	^{235}U(n,Fγ) E=th

E(level)[#]	J$^\pi$[†]	T$_{1/2}$	XREF	Comments
0.0[@]	0$^+$	2.21 s *6*	ABCD	%β^-=100 T$_{1/2}$: weighted average from γ(t) of 2.22 s *7* (1985Ch16), 2.2 s *3* (1979En02), 2.18 s *11* (1978Wo09), 2.14 s *37* (1976AmZW). Other: 1.70 s *9* (1969WiZX).
181.04[@] *5*	2$^+$	0.859 ns *26*	ABCD	J$^\pi$: 181.1γ E2 to g.s., 0$^+$. μ: +0.52 *10*: weighted average of +0.56 *14* (IPAC 1983Wo05), +0.54 *18* (IPAC 2009Go09) and +0.40 *20* (IMPAC 1999Sm05). Systematics and theory give a good indication on positive sign of μ. T$_{1/2}$: weighted average of 0.859 ns *29* ($\beta^-\gamma\gamma$(t) 1990Ma25), 0.86 ns *6*, ($\gamma\gamma$(t) 1974JaYY, 1974JaZN); other: 0.92 ns *12* ($\gamma\gamma$(t) 1980ChZM).
513.66[@] *8*	4$^+$	18 ps *15*	ABCD	J$^\pi$: stretched 332.4γ E2 to 2$^+$ and band assignment. T$_{1/2}$: from $\beta^-\gamma\gamma$(t) 1990Ma25.
738.82[&] *9*	1$^-$	160 ps *10*	A C	J$^\pi$: 557.7γ E1+M2 from $\gamma\gamma(\theta)$ to 2$^+$, 82.2γ E2 from 3$^-$; syst. T$_{1/2}$: from $\beta^-\gamma\gamma$(t) 1990Ma25.
821.10[&] *8*	3$^-$	237 ps *8*	ABCD	J$^\pi$: 307.4γ E1+M2 from $\gamma\gamma(\theta)$ to 4$^+$, 640.1γ E1+M2 from $\gamma\gamma(\theta)$ to 2$^+$. T$_{1/2}$: from $\beta^-\gamma\gamma$(t) 1990Ma25.
958.37[@] *11*	6$^+$		BCD	J$^\pi$: stretched 444.7γ E2 to 4$^+$, band assignment.
1024.53[&] *10*	5$^-$		BCD	
1052.37 *17*	0$^+$	<26 ps	A	J$^\pi$: from $\gamma\gamma(\theta)$ of 871.5γ(E2)−181.1γ(E2) cascade. T$_{1/2}$: from $\beta^-\gamma\gamma$(t) 1990Ma25.
1115.21 *9*	(1,2)$^+$		A	J$^\pi$: 934.1γ to 2$^+$, 1115.2γ to 0$^+$; no transitions to the negative parity states.
1157.68? *17*			A	Introduced by 1980MoZA, supported by 1980Sc16 coin with 181γ, not supported in 2016Mi02. Evaluators treat this level as doubtful.
1256.25 *9*	(1,2)$^+$		A	J$^\pi$: 1075.3γ to 2$^+$, 1256.2γ to 0$^+$; no transitions to the negative parity states.
1309.25 *13*	3$^+$		A	J$^\pi$: 795.55γ to 4$^+$, 1128.58γ to 2$^+$; no observed direct feeding to 0$^+$, no transitions to the negative parity states.
1341.97 *11*	(0$^+$)		A	J$^\pi$: the only 1160.9γ to the 2$^+$ state, transitions to other states were not observed but should be if not 0$^+$.
1349.06[&] *11*	7$^-$		BCD	J$^\pi$: octupole band assignment (1997Ur01).
1398.65 *19*	2$^+$		A	J$^\pi$: 1217.8γ to 2$^+$, 1397.8γ to 0$^+$; no transitions to the negative parity states.
1410.62 *20*			A	

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{146}Ba Levels (continued)

E(level)[#]	Jπ[†]	XREF	Comments
1482.63[@] *11*	8^+	BCD	Jπ: stretched 524.3γ E2 to 6^+, band assignment.
1511.06 *12*	1^-	A	Jπ: strong decay to other low-spin (J=0,1,2) levels both positive and negative parity; main branch to the $J^\pi=1^-$ level.
1527.70 *13*	(3)	A	Jπ: decay to 1^- and 2^+ levels, no decay to g.s.; main branch to the $J^\pi=2^+$ level favors J=3.
1566.41 *12*	(2^+)	A	Jπ: strong β-feeding; 1566.8γ to 0^+, 1052.6γ to 4^+.
1632.3 *3*		A	
1637.63 *24*		A	
1656.37 *24*	$(1,2^+)$	A	Jπ: 917.5γ to 1^-, 1656.5γ to 0^+.
1668.87? *20*		A	
1682.86 *16*		A	
1715.29 *9*	$(1,2^+)$	A	Jπ: 1533.8γ to 2^+, 1715.8γ to 0^+.
1777.60[&] *11*	9^-	BCD	Jπ: octupole band assignment (1997Ur01).
1780.0 *3*		A	
1874.72[b] *14*	6^-	BC	Jπ: 916.3γ E1 (J=0) to 6^+; band assignment.
1932.9 *4*		A	
1944.77[a] *15*	7^-	BC	
1968.51 *16*	$(1,2^+)$	A	Jπ: 1787.3γ to 2^+, 1968.5γ to 0^+.
1974.4[c] *4*		B	
1979.9 *4*		A	
1996.25 *23*	$(1,2^+)$	A	Jπ: 1813.5γ to 2^+, 1995.6γ to 0^+.
2029.37[e] *21*	(8^+)[‡]	B	
2037.6 *4*		A	
2052.01[@] *11*	10^+	BC	Jπ: stretched 569.4γ E2 to 8^+, band assignment.
2060.1 *4*		A	
2090.46[b] *14*	8^-	BC	
2096.89[d] *22*	(7^-)[‡]	B	
2134.9 *4*		A	
2162.1 *5*		A	
2171.4 *5*		A	
2191.24[a] *14*	9^-	BC	
2209.0 *4*		A	
2213.04[c] *22*	$(8,9^-)$[‡]	B	
2292.59[&] *17*	11^-	BC	Jπ: octupole band assignment (1997Ur01).
2343.9 *5*	$(1,2^+)$	A	Jπ: 2162.8γ to 2^+, 2344γ to 0^+.
2349.91[d] *19*	(9^-)[‡]	B	
2389.27[b] *17*	(10^-)	BC	Jπ: 198.2γ to 9^-, 298.7γ to 8^-.
2442.96[e] *19*	(10^+)[‡]	B	
2516.05[a] *14*	11^-	BC	Jπ: 324.8γ to 9^-, 738.5γ to 9^-, band assignment (1997Ur01).
2530.0[c] *3*	$(10,11^-)$[‡]	B	
2632.31[@] *18*	12^+	BC	Jπ: stretched 580.3γ E2 to 10^+, band assignment.
2710.2[d] *3*		B	
2790.83[b] *22*	(12^-)	BC	
2876.44[&] *20*	13^-	BC	Jπ: 583.7γ to 11^-, octupole band assignment (1997Ur01).
2938.74[a] *18*	13^-	BC	Jπ: 422.8γ to 11^-, 646.1γ to 11^-, band assignment (1997Ur01).
2953.5[c] *4*		B	
3192.66[@] *23*	14^+	BC	Jπ: stretched 560.4γ E2 to 12^+, band assignment.
3297.7[b] *3*	(14^-)	BC	
3452.39[a] *21*	(15^-)	BC	Jπ: 513.8γ to 13^-, 575.8γ to 13^-, band assignment (1997Ur01).
3523.94 *25*		BC	

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{146}Ba Levels (continued)

E(level)[#]	J^{π}[†]	XREF	Comments
3737.2[@] *3*	(16$^+$)	BC	J^{π}: stretched 544.6γ (E2) to 14$^+$, band assignment.
4071.9[a] *4*	(17$^-$)	B	

† Based on deduced γ-ray transition multipolarities using triple-γ angular correlation, direction-polarization correlation measurements and band structure in ^{248}Cm (1997Ur01) and ^{252}Cf (2001Ha14) SF decay, unless indicated otherwise.

‡ Assignment of spins and parities to levels of the side bands of 3, 4, 5 is based on the observed branching ratios and decay pattern in 1997Ur01.

From a least-squares fit to Eγ, normalized χ^2=0.92.

@ Band(A): g.s. band.

& Band(B): octupole band.

a Band(C): side band 1.

b Band(D): side band 2.

c Band(E): side band 3 based on 1974 level.

d Band(F): side band 4 based on 2097 (7$^-$) level.

e Band(G): side band 5 based on 2029 (8$^+$) level.

Adopted Levels, Gammas (continued)

$\gamma(^{146}Ba)$

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[&]	δ[a]	α[b]	Comments
181.04	2^+	181.04[‡] *5*	100	0.0	0^+	E2		0.242	B(E2)(W.u.)=59.7 *19* E_γ: 180.894 *6*, 1979Bo26, curved cryst.
513.66	4^+	332.44[‡] *13*	100	181.04	2^+	E2		0.0327	B(E2)(W.u.)=1.6×10^2 *14*
738.82	1^-	557.70[#] *17*	100.0[#] *15*	181.04	2^+	E1+M2	−0.024 *21*	0.00256 *6*	B(E1)(W.u.)=6.6×10^{-6} *5*; B(M2)(W.u.)=0.06 *+10−6*
		738.86[#] *12*	32.9[#] *8*	0.0	0^+				
821.10	3^-	82.2[#] *2*	2.2[#] *8*	738.82	1^-	E2		3.89 *7*	B(E2)(W.u.)=1.5×10^2 *6*
		307.42[‡] *6*	94.1[#] *22*	513.66	4^+	E1+M2	+0.12 *6*	0.013 *4*	B(E1)(W.u.)=1.59×10^{-5} *9*; B(M2)(W.u.)=11 *11*
		640.10[‡] *7*	100[#] *3*	181.04	2^+	E1+M2	+0.19 *13*	0.0025 *11*	B(E1)(W.u.)=1.84×10^{-6} *13*; B(M2)(W.u.)=0.7 *+10−7*
		821.1[#] *2*	24	0.0	0^+				
958.37	6^+	444.70[‡] *1*	100.0	513.66	4^+	E2		0.01370	
1024.53	5^-	203.41[‡] *10*	100 *10*	821.10	3^-				
		510.90[‡] *7*	90 *5*	513.66	4^+	E1		0.00310	
1052.37	0^+	871.49[#] *17*	100[#]	181.04	2^+	E2		0.00245	B(E2)(W.u.)>0.94
1115.21	$(1,2)^+$	934.07[#] *16*	100[#] *5*	181.04	2^+				
		1115.24[#] *10*	77[#] *6*	0.0	0^+				
1157.68?		976.63[#] *16*	100[#]	181.04	2^+				possible placement of this γ: from 1714.9 keV level (2016Mi02).
1256.25	$(1,2)^+$	1075.31[#] *13*	58[#] *7*	181.04	2^+				
		1256.17[#] *11*	100[#] *10*	0.0	0^+				
1309.25	3^+	795.55[#] *14*	74[#] *30*	513.66	4^+				
		1128.58[#] *24*	100[#]	181.04	2^+				
		1310[#] *1*	<7[#]	0.0	0^+				
1341.97	(0^+)	1160.9[#] *1*	100[#]	181.04	2^+				
		1342[#] *2*	<16[#]	0.0	0^+				
1349.06	7^-	324.60[‡] *9*	100 *8*	1024.53	5^-				
		390.48[‡] *11*	7.7 *15*	958.37	6^+	D			
1398.65	2^+	1217.8[#] *2*	55[#] *50*	181.04	2^+				
		1397.8[#] *4*	100[#]	0.0	0^+				
1410.62		1229.5[#] *2*	100[#]	181.04	2^+				
		1412[#] *1*	<40[#]	0.0	0^+				
1482.63	8^+	133.5 *2*	<0.36[@]	1349.06	7^-				
		524.29[‡] *5*	100[@]	958.37	6^+	E2		0.00866	
1511.06	1^-	772.14[#] *12*	100[#]	738.82	1^-				
		1330.4[#] *2*	31[#] *12*	181.04	2^+				
		1510 *1*	17 *9*	0.0	0^+				

From ENSDF

γ(^{146}Ba) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[&]	α[b]	Comments
1527.70	(3)	788.9[#] *1*	31[#] *13*	738.82	1⁻			
		1348.9[#] *3*	100[#]					E_γ: level energy difference gives 1346.64 keV; this γ was not used for least-square fitting.
		1529[#] *1*	<13[#]	0.0	0⁺			
1566.41	(2⁺)	745.30[#] *17*	36[#] *4*	821.10	3⁻			
		827.80[#] *26*	57[#] *5*	738.82	1⁻			
		1052.6[#] *2*	29[#]	513.66	4⁺			
		1385.32[#] *21*	86[#] *6*	181.04	2⁺			
		1566.8[#] *5*	100[#]	0.0	0⁺			
1632.3		893.41[#] *31*	100[#]	738.82	1⁻			
		1451.6[#] *25*	33[#] *5*	181.04	2⁺			
		1633[#] *1*	<10[#]	0.0	0⁺			
1637.63		816.78[#] *19*	86[#] *40*	821.10	3⁻			
		1456.58[#] *23*	100[#]	181.04	2⁺			
		1638[#] *1*	<16[#]	0.0	0⁺			
1656.37	(1,2⁺)	917.51[#] *26*	63[#]	738.82	1⁻			
		1656.5[#] *5*	100[#]	0.0	0⁺			
1668.87?		1487.8[#] *2*	100[#]	181.04	2⁺			
		1669[#] *1*	<12[#]	0.0	0⁺			
1682.86		943.6[#] *2*	48[#] *6*	738.82	1⁻			
		1502.31[#] *22*	100[#]	181.04	2⁺			
		1684[#] *1*	<10[#]	0.0	0⁺			
1715.29	(1,2⁺)	894.1[#] *1*	8[#] *3*	821.10	3⁻			
		976.7[#] *1*	96[#] *40*	738.82	1⁻			
		1533.8[#] *6*	37[#] *15*	181.04	2⁺			
		1715.8[#] *5*	100[#]	0.0	0⁺			
1777.60	9⁻	295.24[‡] *17*	2.1 *11*	1482.63	8⁺			
		428.54[‡] *5*	100 *6*	1349.06	7⁻			
1780.0		1598.9[#] *3*	100[#]	181.04	2⁺			
		1780.2[#] *8*	40[#] *30*	0.0	0⁺			
1874.72	6⁻	850.1 *2*	54 *12*	1024.53	5⁻			
		916.30[‡] *14*	100 *20*	958.37	6⁺	E1	9.00×10^{-4}	
1932.9		1751.7[#] *4*	100[#]	181.04	2⁺			
		1934[#] *1*	<35[#]	0.0	0⁺			
1944.77	7⁻	986.40[‡] *14*	100	958.37	6⁺	E1	7.82×10^{-4}	

$^{146}_{56}$Ba$_{90}$-5

$\gamma(^{146}Ba)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[&]	α[b]	Comments
1968.51	(1,2^+)	1787.3[#] *5*	28.6[#]	181.04	2^+			
		1968.56[#] *16*	100[#]	0.0	0^+			
1974.4		1016.0 *3*	100	958.37	6^+			
1979.9		1798.3[#] *4*	100[#]	181.04	2^+			
		1980.8[#] *5*	<35[#]	0.0	0^+			Part of Iγ may belong to the transition from 2162.1 keV level.
1996.25	(1,2^+)	944.1[#] *2*	100[#]	1052.37	0^+			
		1813.5[#] *7*	97[#] *30*	181.04	2^+			
		1995.6[#] *5*	34[#]	0.0	0^+			
2029.37	(8^+)	680.3 *3*	100 *40*	1349.06	7^-	E1	1.65×10^{-3}	
		1071.2 *3*	86 *30*	958.37	6^+			
2037.6		1299[#] *1*	53[#] *30*	738.82	1^-			
		1856.6[#] *4*	100[#]	181.04	2^+			
		2037[#] *1*	<20[#]	0.0	0^+			
2052.01	10^+	274.42[‡] *2*	1.4 *7*	1777.60	9^-			
		569.36[‡] *4*	100 *7*	1482.63	8^+	E2	0.00694	
2060.1		1878.9[#] *4*	100[#]	181.04	2^+			
		2061[#] *1*	<30[#]	0.0	0^+			
2090.46	8^-	145.6 *3*	20 *7*	1944.77	7^-			
		215.65[‡] *14*	100 *30*	1874.72	6^-			
		607.90[‡] *14*	100 *17*	1482.63	8^+	E1	0.00210	
		741.30[‡] *17*	13 *7*	1349.06	7^-			
2096.89	(7^-)	1072.0 *4*	8.0×10^1 *4*	1024.53	5^-			
		1138.6 *3*	1.0×10^2 *4*	958.37	6^+			
2134.9		1953.7[#] *4*	100[#]	181.04	2^+			
		2136[#] *1*	<28[#]	0.0	0^+			
2162.1		1981.0[#] *5*	100[#]	181.04	2^+			Part of Iγ may belong to the transition from 1979.9 keV level.
		2162[#] *1*	<15[#]	0.0	0^+			
2171.4		1990.2[#] *5*	100[#] *2*	181.04	2^+			
		2172[#] *1*	<32[#]	0.0	0^+			
2191.24	9^-	246.50[‡] *14*	42 *8*	1944.77	7^-			
		708.70[‡] *14*	100 *17*	1482.63	8^+	E1	1.51×10^{-3}	
		842.00[‡] *21*	12 *4*	1349.06	7^-			
2209.0		2027.8[#] *4*	100[#]	181.04	2^+			
		2210[#] *1*	<25[#]	0.0	0^+			
2213.04	(8,9^-)	730.0 *3*	1.0×10^2 *4*	1482.63	8^+			
		864.1 *3*	100 *25*	1349.06	7^-			

$^{146}_{56}Ba_{90}$-6

γ(^{146}Ba) (continued)

E$_i$(level)	J$^\pi_i$	E$_\gamma$[†]	I$_\gamma$[†]	E$_f$	J$^\pi_f$	Mult.[&]	α[b]
2292.59	11^-	514.85[‡] *15*	100	1777.60	9^-		
2343.9	$(1,2^+)$	2162.8[#] *5*	38[#]	181.04	2^+		
		2344[#] *5*	100[#]	0.0	0^+		
2349.91	(9^-)	252.9 *3*	≤23	2096.89	(7^-)		
		867.4 *2*	1.0×10^2 *3*	1482.63	8^+		
		1000.7 *3*	23 *8*	1349.06	7^-		
2389.27	(10^-)	198.20 *17*	10 *5*	2191.24	9^-		
		298.70 *14*	100 *17*	2090.46	8^-		
2442.96	(10^+)	413.8 *3*	44 *17*	2029.37	(8^+)		
		665.2 *2*	100 *22*	1777.60	9^-		
		960.5 *3*	28 *11*	1482.63	8^+		
2516.05	11^-	324.75[‡] *14*	100 *30*	2191.24	9^-		
		464.20[‡] *14*	20 *5*	2052.01	10^+		
		738.50[‡] *17*	13 *5*	1777.60	9^-		
2530.0	$(10,11^-)$	316.7 *3*	1.0×10^2 *5*	2213.04	$(8,9^-)$		
		752.7 *3*	88 *40*	1777.60	9^-		
2632.31	12^+	580.30[‡] *14*	100	2052.01	10^+	E2	0.00660
2710.2		360.3 *2*	100	2349.91	(9^-)		
2790.83	(12^-)	401.55[‡] *14*	100	2389.27	(10^-)		
2876.44	13^-	583.75[‡] *14*	100	2292.59	11^-		
2938.74	13^-	422.87[‡] *17*	100 *23*	2516.05	11^-		
		646.10[‡] *17*	73 *18*	2292.59	11^-		
2953.5		423.5 *3*	100	2530.0	$(10,11^-)$		
3192.66	14^+	560.35[‡] *14*	100	2632.31	12^+	E2	0.00724
3297.7	(14^-)	506.89[‡] *17*	100	2790.83	(12^-)		
3452.39	(15^-)	513.75[‡] *14*	100 *30*	2938.74	13^-		
		575.80[‡] *17*	33 *20*	2876.44	13^-		
3523.94		647.50[‡] *14*	100	2876.44	13^-		
3737.2	(16^+)	544.58 *14*	100	3192.66	14^+	(E2)	0.00781
4071.9	(17^-)	619.5 *3*	100	3452.39	(15^-)		

† From ^{248}Cm SF, except as noted.
‡ Weighted average from ^{146}Cs β^-, ^{248}Cm SF decays data, ^{252}Cf SF decay data when available.
# From ^{146}Cs β^- decay.
@ From ^{252}Cf SF decay.
& From α(exp), $\gamma\gamma(\theta)$, polarization and decay pattern.

$\gamma(^{146}Ba)$ (continued)

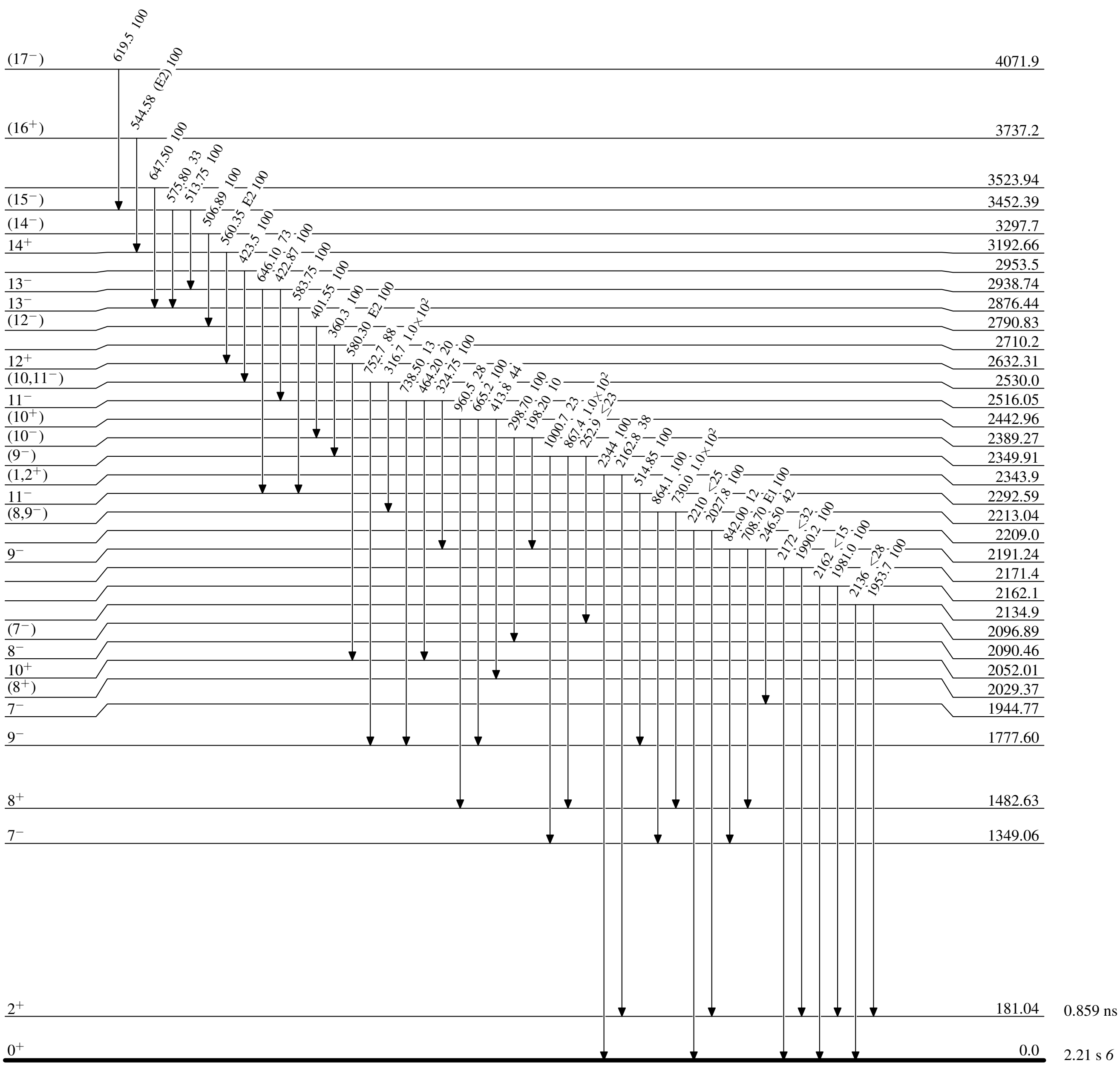
[a] From $\gamma\gamma(\theta)$ in ^{146}Cs β^- decay (1980Sc16).
[b] Additional information 1.

$^{146}_{56}Ba_{90}$-8

Adopted Levels, Gammas

Level Scheme

Intensities: Relative photon branching from each level

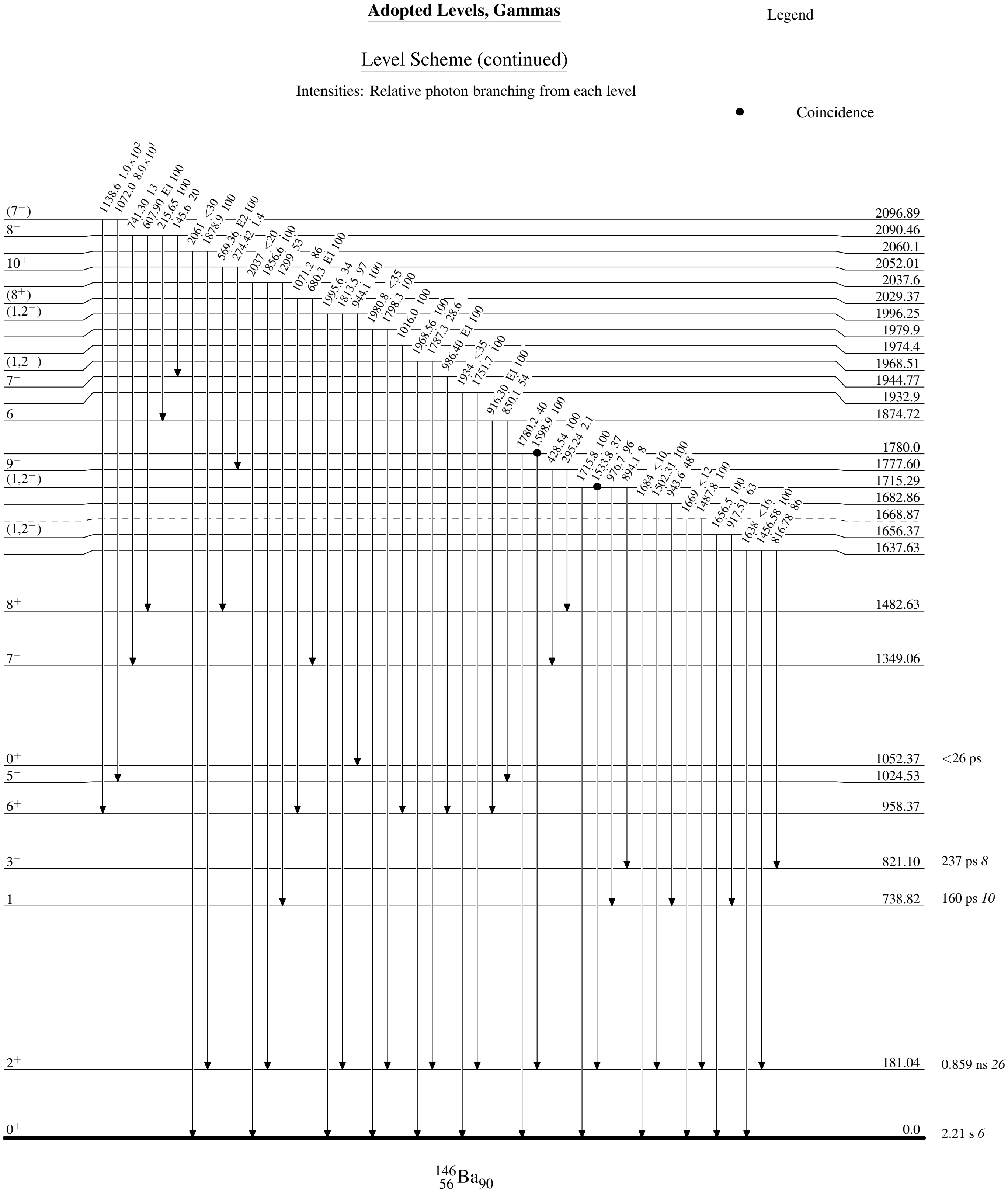


$^{146}_{56}Ba_{90}$

Adopted Levels, Gammas

Level Scheme (continued)

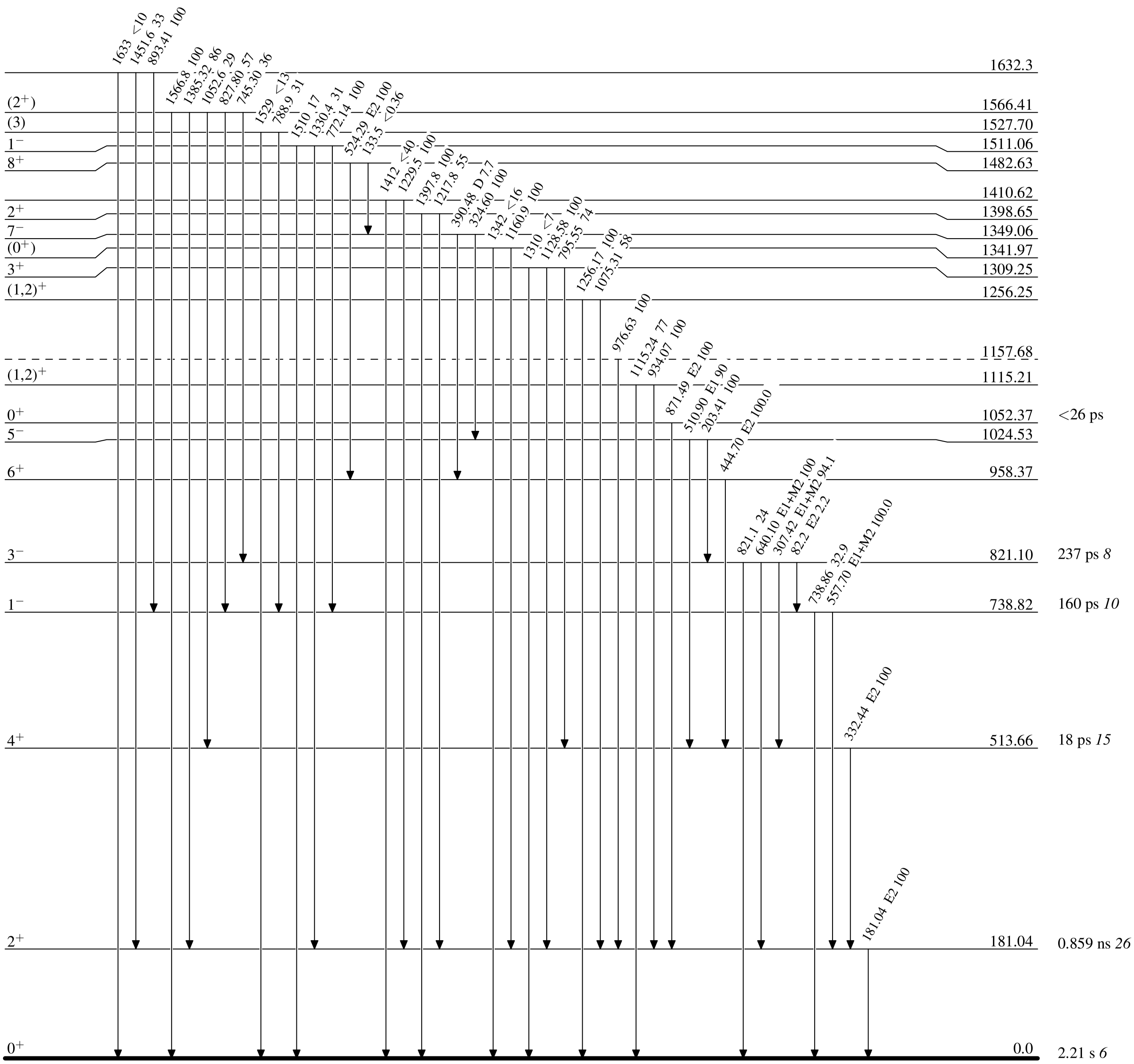
Intensities: Relative photon branching from each level



Adopted Levels, Gammas

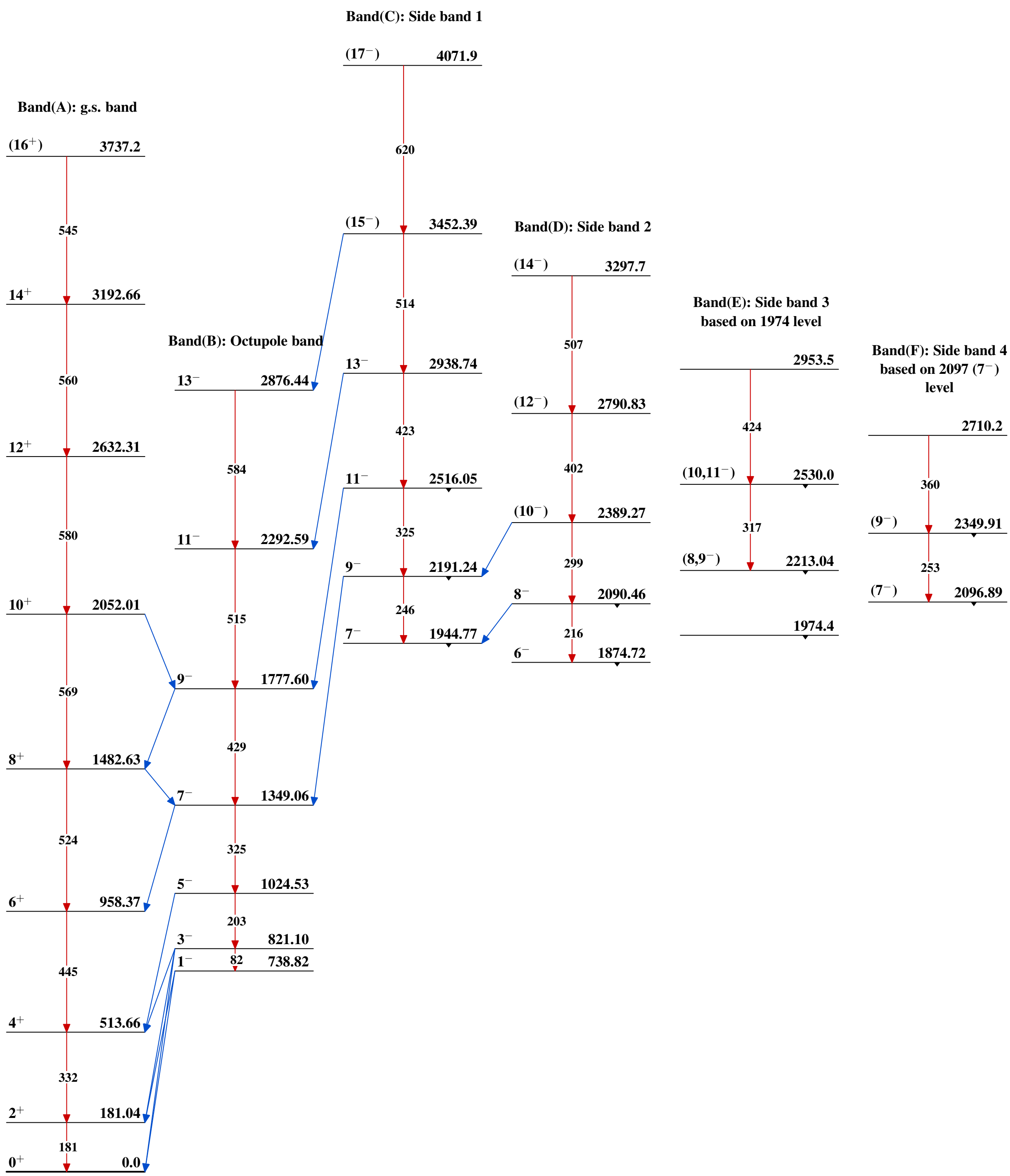
Level Scheme (continued)

Intensities: Relative photon branching from each level



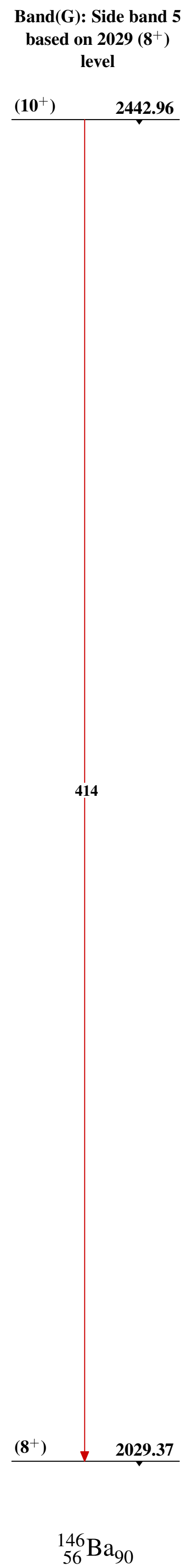
$^{146}_{56}Ba_{90}$

Adopted Levels, Gammas



$^{146}_{56}Ba_{90}$

Adopted Levels, Gammas (continued)



Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	N. Nica	NDS 117, 1 (2014)	1-Oct-2013

Q(β^-)=5110 *60*; S(n)=5400 *70*; S(p)=12860 *80*; Q(α)=−3150 *60* 2012Wa38
Q(β^-n)=1010 *60* (2012Wa38).

^{148}Ba Levels

Cross Reference (XREF) Flags

A	^{148}Cs β^- decay
B	^{248}Cm SF decay
C	^{252}Cf SF decay
D	^{254}Cf SF decay

E(level)	J$^\pi$†	T$_{1/2}$	XREF	Comments
0.0‡	0+	0.612 s *17*	ABCD	%β^-=100; %β^-n=0.4 *3* T$_{1/2}$: unweighted average of 0.607 s *25* (1984Ch02), 0.620 s *5* (1986Wa17), 0.63 s *5* (1982Ga24), 0.55 s *5* (1993Ru01), and 0.653 s *2* (1986ReZR). Others:≈0.7 s (1981ChZX), 0.47 s *3* (1981En05), 0.47 s *20* (1979En02). %β^-n: recommended value of 1993Ru01 based on the following data: 23.9 *21* (1981En05),≤0.01 (1982Ga24),≤0.03 (1983Re10), 0.057 *20* (1986ReZR), and 0.72 *20* (1993Ru01). <r^2>$^{1/2}$=4.9773 fm *168* (2004An14).
141.8‡ *1*	2+		ABCD	
423.10‡ *15*	4+		ABC	
687.2# *7*	1−		A	
775.00# *23*	(3−)		AB	
807.90‡ *18*	6+		BC	
963.20# *25*	(5−)		BC	
1049.2	2+		A	
1255.70# *20*	7−		BC	
1264.70‡ *20*	8+		BC	
1644.92# *21*	9−		BC	
1767.78‡ *22*	10+		BC	
2117.30# *25*	(11−)		BC	
2303.5‡ *3*	(12+)		BC	
2659.3?# *4*			B	
2867.0?‡ *4*			B	

† From DCO ratios, linear polarization, and $\gamma\gamma\gamma(\theta)$ from ^{248}Cm SF decay data which are in agreement with the $\gamma\gamma(\theta)$, $\gamma\gamma\gamma(\theta)$ from ^{252}Cf SF decay data, and systematics for even-even nuclei with A≈150.
‡ Band(A): g.s. band.
# Band(B): octupole band.

Adopted Levels, Gammas (continued)

$\gamma(^{148}Ba)$

E_i(level)	J^π_i	E_γ	I_γ	E_f	J^π_f	Mult.†	α‡	Comments
141.8	2^+	141.8 *1*	100	0.0	0^+			
423.10	4^+	281.3 *1*	100	141.8	2^+	E2		
687.2	1^-	545.5	87	141.8	2^+			
		687.2	100	0.0	0^+			
775.00	(3^-)	351.9	21	423.10	4^+			
		633.2 *2*	100	141.8	2^+			
807.90	6^+	384.8 *1*	100	423.10	4^+	E2	0.0209	α(K)=0.01735 *25*; α(L)=0.00284 *4*; α(M)=0.000596 *9* α(N)=0.0001267 *18*; α(O)=1.85×10^{-5} *3*; α(P)=1.017×10^{-6} *15*
963.20	(5^-)	540.1 *2*	100	423.10	4^+	D		
1049.2	2^+	626.1	21	423.10	4^+			
		907.5	86	141.8	2^+			
		1049.1	100	0.0	0^+			
1255.70	7^-	293.0# *3*	<6	963.20	(5^-)			
		447.8 *1*	100 *13*	807.90	6^+	E1	0.00421	α(K)=0.00364 *5*; α(L)=0.000459 *7*; α(M)=9.40×10^{-5} *14* α(N)=2.02×10^{-5} *3*; α(O)=3.07×10^{-6} *5*; α(P)=2.17×10^{-7} *3*
1264.70	8^+	456.8 *1*	100	807.90	6^+	E2	0.01269	α(K)=0.01062 *15*; α(L)=0.001643 *23*; α(M)=0.000343 *5* α(N)=7.31×10^{-5} *11*; α(O)=1.079×10^{-5} *16*; α(P)=6.34×10^{-7} *9*
1644.92	9^-	380.2 *1*	100 *14*	1264.70	8^+	E1	0.00626	α(K)=0.00540 *8*; α(L)=0.000686 *10*; α(M)=0.0001405 *20* α(N)=3.02×10^{-5} *5*; α(O)=4.58×10^{-6} *7*; α(P)=3.20×10^{-7} *5*
		389.2 *2*	43 *14*	1255.70	7^-			
1767.78	10^+	503.1 *1*	100	1264.70	8^+	E2	0.00969	α(K)=0.00814 *12*; α(L)=0.001225 *18*; α(M)=0.000255 *4* α(N)=5.45×10^{-5} *8*; α(O)=8.08×10^{-6} *12*; α(P)=4.90×10^{-7} *7*
2117.30	(11^-)	349.5 *2*	75 *25*	1767.78	10^+	D		
		472.4 *2*	100 *25*	1644.92	9^-			
2303.5	(12^+)	535.7 *2*	100	1767.78	10^+	E2		
2659.3?		542.0 *2*	100	2117.30	(11^-)			
2867.0?		563.5 *2*	100	2303.5	(12^+)			

† From ^{248}Cm SF decay dataset based on DCO and linear polarization measurements.

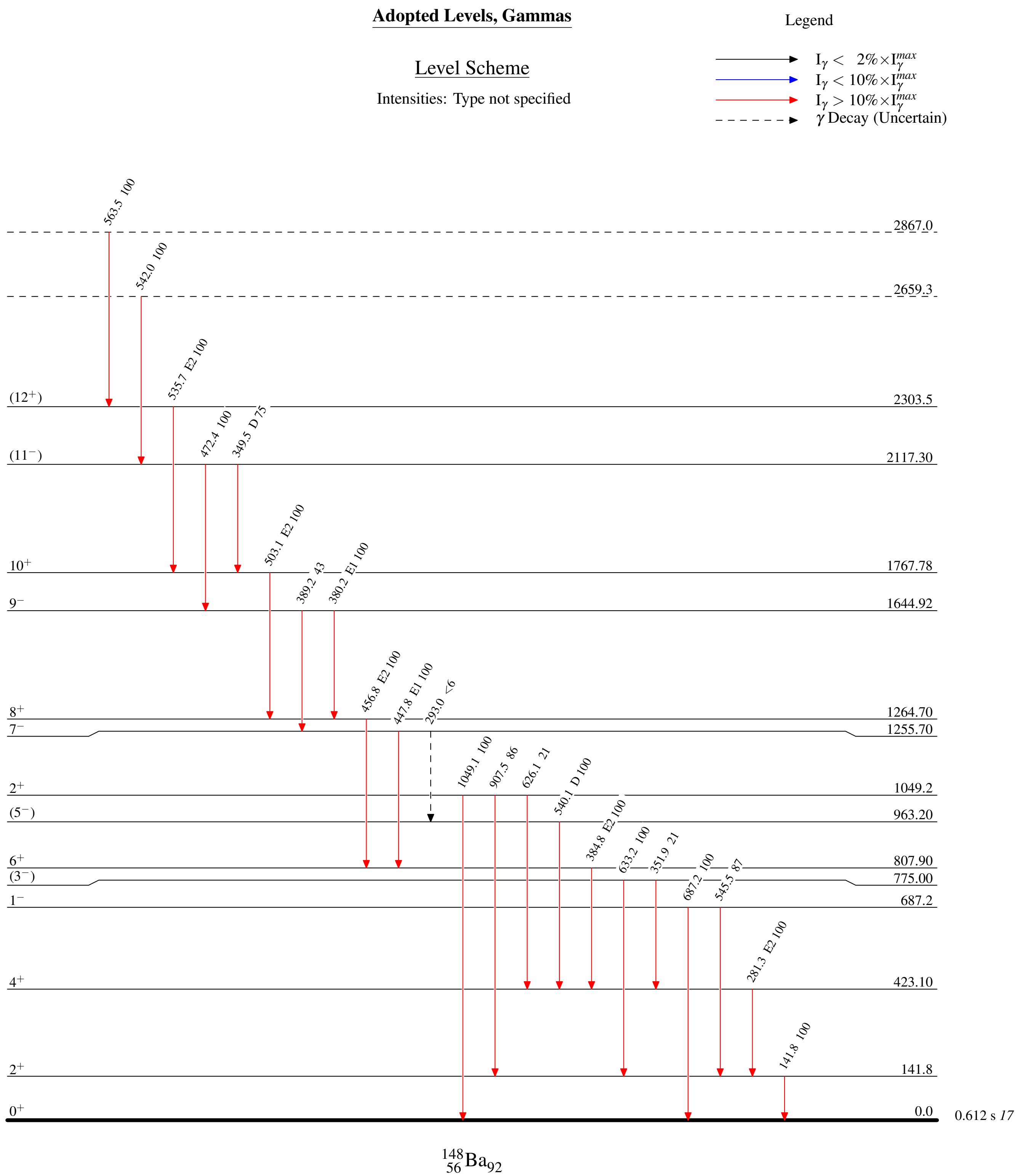
‡ Additional information 1.

\# Placement of transition in the level scheme is uncertain.

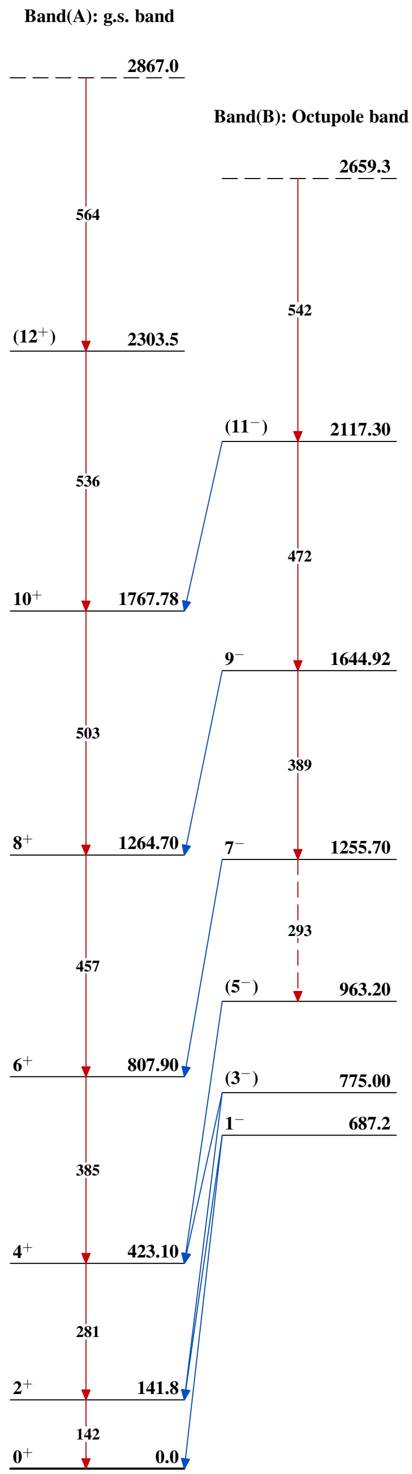
Adopted Levels, Gammas

Level Scheme

Intensities: Type not specified



Adopted Levels, Gammas



$^{148}_{56}Ba_{92}$