Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	E. Browne, J. K. Tuli	NDS 110,507 (2009)	1-Oct-2008

Q(β^-)=5319 *15*; S(n)=3820 *12*; S(p)=1.153×10^4 *3*; Q(α)=−1744 *9* 2012Wa38
Note: Current evaluation has used the following Q record 5.57E+3 11 3720 *70* 11430 *80*−1510 *120* 2003Au03.
Additional information 1.

^{145}Ba Levels

Cross Reference (XREF) Flags

A ^{145}Cs β^- decay
B ^{248}Cm SF decay
C ^{252}Cf SF decay

E(level)‡	Jπ†	$T_{1/2}$	XREF	Comments
0.0#	5/2$^-$	4.31 s *16*	ABC	%β^-=100 μ=−0.285 *7* (1988We07,2005St24) Q=+1.224 *21* (1988We07,2005St24) Jπ: Hyperfine Structure (1983Mu12,1988We07), analysis of μ. μ: Other: −0.272 *36* (1983Mu12,2005St24). Q: Other: +1.15 *10* (1983Mu12,1989Ra17,2005St24). $T_{1/2}$: from 1978Wo09. Others: 3.85 s *12* (1979En02), 4.0 s *5* (1978Pf02), 3.79 s *19* (1976AmZW), 4.2 s *5* (1974Gr29).
112.64# *1*	(7/2)$^-$	0.220 ns *12*	ABC	μ=−1.4 *10* (2014StZZ,1999Sm05) $T_{1/2}$: From ^{252}Cf SF decay. Jπ: 112γ M1+E2 to 5/2$^-$; $\gamma\gamma(\theta)$ in ^{248}Cm SF decay. log *ft*=6.4 from 145Cs (3/2$^+$) is not consistent with this J^π assignment, suggesting that the β^- feeding is not accurate.
175.28	(1/2)$^-$		A	Jπ: $\gamma\gamma(\theta)$, 175γ E2 to 5/2$^-$.
198.69 *1*	(5/2)$^-$		A	Jπ: $\gamma\gamma(\theta)$, 86γ M1 to 7/2$^-$, log *ft*=6.1 from 3/2$^+$.
277.28# *1*	(9/2)$^-$		ABC	Jπ: 164γ M1+E2 to (7/2)$^-$.
319.72 *1*	(5/2)$^+$		A	Jπ: 207γ E1 to (7/2)$^-$, log *ft*=7.1 from 3/2$^+$.
416.46 *1*	(5/2)$^-$		A	Jπ: 241γ E2 to 1/2$^-$, $\gamma\gamma(\theta)$.
435.69 *1*	3/2$^+$		A	Jπ: 436γ E1 to 5/2$^-$, 260γ to 1/2$^-$.
454.63 *1*	(3/2)$^-$		A	Jπ: 455γ to 5/2$^-$ is (M1); strong 279γ to 1/2$^-$.
462.75# *14*	(11/2)$^-$		BC	Jπ: 185γ M1+E2 to (9/2)$^-$.
492.12 *1*			A	
507.75 *13*	(11/2)$^-$		BC	Jπ: 395γ E2 to (7/2)$^-$.
547.09 *1*	(5/2)$^+$		A	Jπ: 547γ E1 to (5/2)$^-$, 435γ to (7/2)$^-$.
566.72 *11*	(5/2$^-$)		A	Jπ: $\gamma\gamma(\theta)$, 391γ to 1/2$^-$, 454γ to 7/2$^-$.
611.07 *1*	(5/2$^-$)		A	Jπ: $\gamma\gamma(\theta)$, 436γ to 1/2$^-$.
617.34& *17*	(13/2)$^+$		BC	Jπ: 109γ E1 to (11/2)$^-$.
627.11 *1*			A	
641.43# *15*	(13/2)$^-$		BC	Jπ: 179γ M1+E2 to (11/2)$^-$, 364γ E2 to (9/2)$^-$.
663.30 *1*			A	
670.8@ *8*	(11/2$^+$)		C	
672.53 *1*			A	
724.40	(5/2$^-$)		A	Jπ: $\gamma\gamma(\theta)$, 549γ to (1/2)$^-$.
753.36 *1*	(1/2,5/2$^-$)		A	Jπ: $\gamma\gamma(\theta)$, 578γ to (1/2)$^-$.
785.25 *1*	$^+$		A	Jπ: 238γ M1, E2 to (5/2)$^+$.
795.89 *1*			A	
819.78 *1*			A	
836.20 *1*			A	

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{145}Ba Levels (continued)

E(level)‡	Jπ†	XREF	Comments
851.44 *1*		A	
866.0& *2*	(17/2)+	BC	Jπ: 249γ E2 to (13/2)+.
872.37 *1*		A	
900.33# *17*	(15/2)−	BC	Jπ: 259γ M1+E2 to (13/2)−, 438γ E2 to (11/2)−.
971.8@ *7*	(15/2+)	C	
1050.29 *2*		A	
1098.27# *19*	(17/2)−	BC	Jπ: 198γ M1+E2 to (15/2)−, 457γ E2 to (13/2)−.
1116.75? *2*		A	
1137.62 *1*		A	
1155.14 *1*		A	
1240.3& *3*	(21/2)+	BC	Jπ: 374γ E2 to (17/2)+.
1240.52 *1*		A C	
1299.68 *2*		A	
1353.52 *1*		A	
1383.9@ *7*	(19/2+)	C	Jπ: 286γ to (17/2)−, 412γ to (15/2+).
1394.0# *2*	(19/2−)	B	Jπ: 494γ to (15/2)−, 528γ to (17/2)+.
1461.9a *8*	(19/2−)	C	
1640.2# *2*	(21/2)−	B	Jπ: 542γ E2 to (17/2)−.
1718.6& *3*	(25/2)+	C	Jπ: 478γ E2 to (21/2)+.
1812.4a *7*	(23/2−)	C	
1889.7@ *8*	(23/2+)	C	
1940# *1*	23/2−	C	
2206.5# *10*	25/2−	C	
2234.4a *7*	(27/2−)	C	
2282.8& *4*	(29/2)+	BC	Jπ: 564γ E2 to (25/2)+.
2429?@ *1*	(27/2+)	C	
2725.0a *9*	(31/2−)	C	
2923& *1*	(33/2)+	BC	Jπ: 640γ E2 to (29/2+.
3289.0a *15*	(35/2−)	C	
3629.5& *15*	(37/2+)	C	
3921.6a *18*	(39/2−)	C	
4623a *2*	(43/2−)	C	

† From rotational structure and γ-ray multipolarities determined by conversion-electron and γγ(θ) measurements. Arguments are given for individual levels.
‡ Deduced by evaluator from least-squares fit to adopted γ-ray energies.
# Band(A): g.s. rotational band.
@ Band(B): rotational band based on 11/2+.
& Band(C): rotational band based on 13/2+.
a Band(D): rotational band based on 17/2−.

Adopted Levels, Gammas (continued)

$\gamma(^{145}Ba)$

E_i(level)	J_i^π	E_γ	I_γ	E_f	J_f^π	Mult.[†]	δ	α[‡]	Comments
112.64	$(7/2)^-$	112.46 *2*	100	0.0	$5/2^-$	M1+E2	0.13 *+7−6*	0.716 *16*	α(K)=0.609; α(L)=0.085; α(M)=0.0177; α(N+..)=0.0038 B(M1)(W.u.)=0.0403 *+22−25*; B(E2)(W.u.)=31 *+39−21*
175.28	$(1/2)^-$	175.36 *2*	100	0.0	$5/2^-$	E2		0.272	α(K)=0.2058; α(L)=0.0519; α(M)=0.01106; α(N+..)=0.00288 Mult.: α(K)exp=0.169 *16*, α(M)exp=0.0074 *8* (1986Ro17); α(K)exp=0.170 *51*, α(L)exp=0.026 *8* (1982Ra13).
198.69	$(5/2)^-$	86.26 *6*	10.6 *2*	112.64	$(7/2)^-$	M1		1.531	α(K)=1.310; α(L)=0.1756; α(M)=0.0360; α(N+..)=0.00979 Mult.: K/L=5.71 (1982Ra13).
		198.93 *2*	100 *16*	0.0	$5/2^-$	M1		0.1465	α(K)=0.1256; α(L)=0.01659; α(M)=0.00340; α(N+..)=0.00093 Mult.: α(K)exp=0.107 *20*, α(L)exp=0.014 *4* (1986Ro17); α(K)exp=0.130 *39*, α(L)exp=0.020 *6* (1982Ra13).
277.28	$(9/2)^-$	164.64 *2*	100 *8*	112.64	$(7/2)^-$	M1+E2	−0.31 *+24−27*		
		277.12 *2*	28.5 *11*	0.0	$5/2^-$				
319.72	$(5/2)^+$	121.01 *2*	2.5 *12*	198.69	$(5/2)^-$				
		207.12 *2*	100.0 *25*	112.64	$(7/2)^-$	E1		0.0306	α(K)=0.0263; α(L)=0.00340; α(M)=0.00069; α(N+..)=0.00018 Mult.: α(K)exp=0.053 *20* (1986Ro17).
		319.84 *2*	46.9 *13*	0.0	$5/2^-$				
416.46	$(5/2)^-$	240.97 *2*	100.0 *10*	175.28	$(1/2)^-$	E2		0.0926	α(K)=0.0737; α(L)=0.01498; α(M)=0.00316; α(N+..)=0.00083 Mult.: α(K)exp=0.088 *12*, α(L)exp=0.008 *1* (1986Ro17), α(K)exp=0.095 *28* (1982Ra13).
		304.5 *1*	8.3 *7*	112.64	$(7/2)^-$				
		416.52 *2*	18 *3*	0.0	$5/2^-$				
435.69	$3/2^+$	260.29 *2*	3.1 *7*	175.28	$(1/2)^-$				
		323.34 *2*	17.9 *10*	112.64	$(7/2)^-$				
		435.63 *2*	100.0 *10*	0.0	$5/2^-$	E1		0.00450	α(K)=0.00389; α(L)=0.00049 Mult.: α(K)exp=0.0011 *12* (1986Ro17).
454.63	$(3/2)^-$	38.24 *6*	17 *4*	416.46	$(5/2)^-$	[M1+E2]	≤0.27	6.0 *22*	Mult.,δ: mult from level scheme, δ assumed in balances of I(γ+ce).
		255.94 *2*	23.6 *10*	198.69	$(5/2)^-$				
		279.46 *2*	38 *5*	175.28	$(1/2)^-$				
		341.74 *2*	5.7 *9*	112.64	$(7/2)^-$				
		454.77 *2*	100 *6*	0.0	$5/2^-$	(M1)		0.01686	α(K)=0.01451; α(L)=0.00187; α(M)=0.00038; α(N+..)=0.00010 Mult.: α(K)exp=0.0011 *12*.
462.75	$(11/2)^-$	185.4 *2*	100	277.28	$(9/2)^-$	M1+E2	+0.18 *+10−7*		
492.12		214.52 *2*	8.5 *14*	277.28	$(9/2)^-$				
		293.2 *1*	15.6 *7*	198.69	$(5/2)^-$				
		492.08 *2*	100 *4*	0.0	$5/2^-$				
507.75	$(11/2)^-$	230.6 *2*	30	277.28	$(9/2)^-$				
		394.9 *2*	100	112.64	$(7/2)^-$	E2			
547.09	$(5/2)^+$	227.36 *2*	14.4 *13*	319.72	$(5/2)^+$				
		348.21 *2*	4.7 *9*	198.69	$(5/2)^-$				
		434.71 *2*	24.2 *17*	112.64	$(7/2)^-$				

$^{145}_{56}Ba_{89}$-3

Adopted Levels, Gammas (continued)

γ(^{145}Ba) (continued)

E_i(level)	J_i^π	E_γ	I_γ	E_f	J_f^π	Mult.[†]	α[‡]	Comments
547.09	(5/2)$^+$	547.06 *2*	100.0 *17*	0.0	5/2$^-$	E1	0.00267	α(K)=0.00229; α(L)=0.00029 Mult.: ce(K) was not observed and is not expected for M1 or E2.
566.72	(5/2$^-$)	246.92 *2*	30.8 *8*	319.72	(5/2)$^+$			
		367.71 *2*	66 *3*	198.69	(5/2)$^-$			
		391.15 *2*	14 *4*	175.28	(1/2)$^-$			
		454.28 *2*	100 *6*	112.64	(7/2)$^-$			
		566.7 *1*	46 *3*	0.0	5/2$^-$			
611.07	(5/2$^-$)	156.34 *2*	24 *3*	454.63	(3/2)$^-$			
		194.56 *2*	33 *4*	416.46	(5/2)$^-$			
		435.72 *2*	100 *9*	175.28	(1/2)$^-$			
		611.16 *2*	54 *3*	0.0	5/2$^-$			
617.34	(13/2)$^+$	109.5 *2*	22 *4*	507.75	(11/2)$^-$	E1		
		154.6 *2*	100 *10*	462.75	(11/2)$^-$	E1		
627.11		171.97 *2*	49 *3*	454.63	(3/2)$^-$			
		429.07 *2*	15 *5*	198.69	(5/2)$^-$			
		452.03 *2*	100 *6*	175.28	(1/2)$^-$			
641.43	(13/2)$^-$	178.6 *2*	58 *17*	462.75	(11/2)$^-$	M1+E2		
		364.3 *2*	100 *25*	277.28	(9/2)$^-$	E2		
663.30		343.44 *2*	61 *3*	319.72	(5/2)$^+$			
		464.82 *2*	14 *3*	198.69	(5/2)$^-$			
		487.18 *2*	100 *3*	175.28	(1/2)$^-$			
		663.49 *2*	29 *3*	0.0	5/2$^-$			
670.8	(11/2$^+$)	393.5		277.28	(9/2)$^-$			
672.53		105.94 *2*	14.1 *16*	566.72	(5/2$^-$)			
		395.14 *2*	100 *11*	277.28	(9/2)$^-$			
		559.86 *2*	80 *2*	112.64	(7/2)$^-$			
724.40	(5/2$^-$)	231.92 *2*	22.2 *25*	492.12				
		307.95 *2*	24.4 *11*	416.46	(5/2)$^-$			
		525.83 *2*	45.7 *25*	198.69	(5/2)$^-$			
		548.99 *2*	71 *11*	175.28	(1/2)$^-$			
		724.26 *2*	100 *38*	0.0	5/2$^-$			
753.36	(1/2,5/2$^-$)	317.63 *2*	26.8 *18*	435.69	3/2$^+$			
		554.73 *2*	46 *2*	198.69	(5/2)$^-$			
		578.13 *2*	68 *21*	175.28	(1/2)$^-$			
		753.26 *2*	100 *3*	0.0	5/2$^-$			
785.25	$^+$	217.72 *2*	<13	566.72	(5/2$^-$)			
		238.41 *2*	100 *10*	547.09	(5/2)$^+$	M1,E2		Mult.: α(K)exp=0.126 *30* (1986Ro17), α(K)exp=0.111 *33* (1982Ra13).
		369.18 *2*	11 *1*	416.46	(5/2)$^-$			
		586.61 *2*	23 *4*	198.69	(5/2)$^-$			
		785.33 *2*	4.7 *8*	0.0	5/2$^-$			
795.89		360.34 *2*	11.6 *23*	435.69	3/2$^+$			
		378.93 *2*	100 *3*	416.46	(5/2)$^-$			

$^{145}_{56}Ba_{89}$-4

Adopted Levels, Gammas (continued)

γ(^{145}Ba) (continued)

E_i(level)	J_i^π	E_γ	I_γ	E_f	J_f^π	Mult.[†]	δ
795.89		476.26 *2*	20 *2*	319.72	$(5/2)^+$		
		597.48 *2*	16.3 *35*	198.69	$(5/2)^-$		
		620.61 *2*	30 *5*	175.28	$(1/2)^-$		
		795.9 *1*	15.1 *12*	0.0	$5/2^-$		
819.78		500.35 *2*	100 *7*	319.72	$(5/2)^+$		
		620.61 *2*	45 *13*	198.69	$(5/2)^-$		
		645.28 *2*	81 *16*	175.28	$(1/2)^-$		
		706.63 *2*	68 *6*	112.64	$(7/2)^-$		
		819.68 *2*	58 *6*	0.0	$5/2^-$		
836.20		289.2 *1*	12.8 *13*	547.09	$(5/2)^+$		
		419.74 *2*	12.8 *26*	416.46	$(5/2)^-$		
		637.46 *2*	100 *4*	198.69	$(5/2)^-$		
		660.89 *2*	24.4 *13*	175.28	$(1/2)^-$		
851.44		574.05 *2*	54 *15*	277.28	$(9/2)^-$		
		652.63 *2*	100 *23*	198.69	$(5/2)^-$		
		851.68 *2*	192 *15*	0.0	$5/2^-$		
866.0	$(17/2)^+$	248.6 *2*	100	617.34	$(13/2)^+$	E2	
872.37		552.92 *2*	67 *17*	319.72	$(5/2)^+$		
		595.46 *2*	≈42	277.28	$(9/2)^-$		
		759.51 *2*	100 *8*	112.64	$(7/2)^-$		
		872.13 *2*	71 *13*	0.0	$5/2^-$		
900.33	$(15/2)^-$	259.0 *2*	50 *15*	641.43	$(13/2)^-$	M1+E2	
		437.6 *2*	100 *25*	462.75	$(11/2)^-$	E2	
971.8	$(15/2^+)$	301.0	29	670.8	$(11/2^+)$		
		330.3	100	641.43	$(13/2)^-$		
1050.29		439.6 *1*	100 *24*	611.07	$(5/2^-)$		
		503.17 *2*	29 *4*	547.09	$(5/2)^+$		
		875.03 *2*	27 *4*	175.28	$(1/2)^-$		
1098.27	$(17/2)^-$	198.1 *2*	40	900.33	$(15/2)^-$	M1+E2	0.13 *1*
		456.8 *2*	100	641.43	$(13/2)^-$	E2	
1116.75?		444.22 *2*	100	672.53			
1137.62		383.8 *1*	11 *1*	753.36	$(1/2,5/2^-)$		
		473.76 *2*	13 *3*	663.30			
		571.06 *2*	100 *4*	566.72	$(5/2^-)$		
		683.44 *2*	81 *5*	454.63	$(3/2)^-$		
		721.13 *2*	65 *4*	416.46	$(5/2)^-$		
1155.14		430.27 *2*	67 *2*	724.40	$(5/2^-)$		
		528.38 *2*	100 *1*	627.11			
		700.62 *2*	45 *3*	454.63	$(3/2)^-$		
		739.1 *1*	53 *2*	416.46	$(5/2)^-$		
1240.3	$(21/2)^+$	374.3 *2*	100	866.0	$(17/2)^+$	E2	
1240.52		455.23 *2*	44 *13*	785.25	$^+$		

$^{145}_{56}Ba_{89}$-5

Adopted Levels, Gammas (continued)

γ(^{145}Ba) (continued)

E_i(level)	J_i^π	E_γ	I_γ	E_f	J_f^π	Mult.[†]
1240.52		693.09 *2*	50 *6*	547.09	$(5/2)^+$	
		920.25 *2*	28 *3*	319.72	$(5/2)^+$	
		1066.38 *2*	100 *6*	175.28	$(1/2)^-$	
		1240.30 *2*	34 *1*	0.0	$5/2^-$	
1299.68		688.48 *2*	100 *8*	611.07	$(5/2^-)$	
		1101.12 *2*	75 *17*	198.69	$(5/2)^-$	
1353.52		481.34 *2*	30 *3*	872.37		
		517.24 *2*	27 *3*	836.20		
		806.58 *2*	100 *8*	547.09	$(5/2)^+$	
		898.92 *2*	32 *11*	454.63	$(3/2)^-$	
		1034.02 *2*	73 *5*	319.72	$(5/2)^+$	
		1177.70 *2*	49 *16*	175.28	$(1/2)^-$	
1383.9	$(19/2^+)$	285.6	100	1098.27	$(17/2)^-$	
		412.1	63	971.8	$(15/2^+)$	
1394.0	$(19/2^-)$	295.8 *2*	100 *10*	1098.27	$(17/2)^-$	
		493.6 *2*	100 *30*	900.33	$(15/2)^-$	
		527.9 *2*	70 *14*	866.0	$(17/2)^+$	
1461.9	$(19/2^-)$	595.8	100	866.0	$(17/2)^+$	
1640.2	$(21/2)^-$	246.2 *2*	25 *8*	1394.0	$(19/2^-)$	
		542.0 *2*	100 *30*	1098.27	$(17/2)^-$	E2
1718.6	$(25/2)^+$	478.3 *2*	100	1240.3	$(21/2)^+$	E2
1812.4	$(23/2^-)$	350.5		1461.9	$(19/2^-)$	
		572.1	100	1240.3	$(21/2)^+$	
1889.7	$(23/2^+)$	249.5		1640.2	$(21/2)^-$	
		505.7		1383.9	$(19/2^+)$	
1940	$23/2^-$	546.1	100	1394.0	$(19/2^-)$	
2206.5	$25/2^-$	566.3	100	1640.2	$(21/2)^-$	
2234.4	$(27/2^-)$	422.1	28	1812.4	$(23/2^-)$	
		515.8	100	1718.6	$(25/2)^+$	
2282.8	$(29/2)^+$	564.2 *2*	100	1718.6	$(25/2)^+$	E2
2429?	$(27/2^+)$	539[#]	100	1889.7	$(23/2^+)$	
2725.0	$(31/2^-)$	442.1	100	2282.8	$(29/2)^+$	
		490.7	75	2234.4	$(27/2^-)$	
2923	$(33/2)^+$	640.1	100	2282.8	$(29/2)^+$	E2
3289.0	$(35/2^-)$	366.1	<10	2923	$(33/2)^+$	
		564.0	100	2725.0	$(31/2^-)$	
3629.5	$(37/2^+)$	706.6	100	2923	$(33/2)^+$	
3921.6	$(39/2^-)$	632.6	100	3289.0	$(35/2^-)$	
4623	$(43/2^-)$	701.8	100	3921.6	$(39/2^-)$	

[†] From conversion-electron measurements and $\gamma\gamma(\theta)$ in ^{145}Cs β^- decay. Also from DCO values deduced from $\gamma\gamma(\theta)$ and $\gamma\gamma\gamma(\theta)$ in ^{248}Cm SF 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.

$^{145}_{56}Ba_{89}$-6

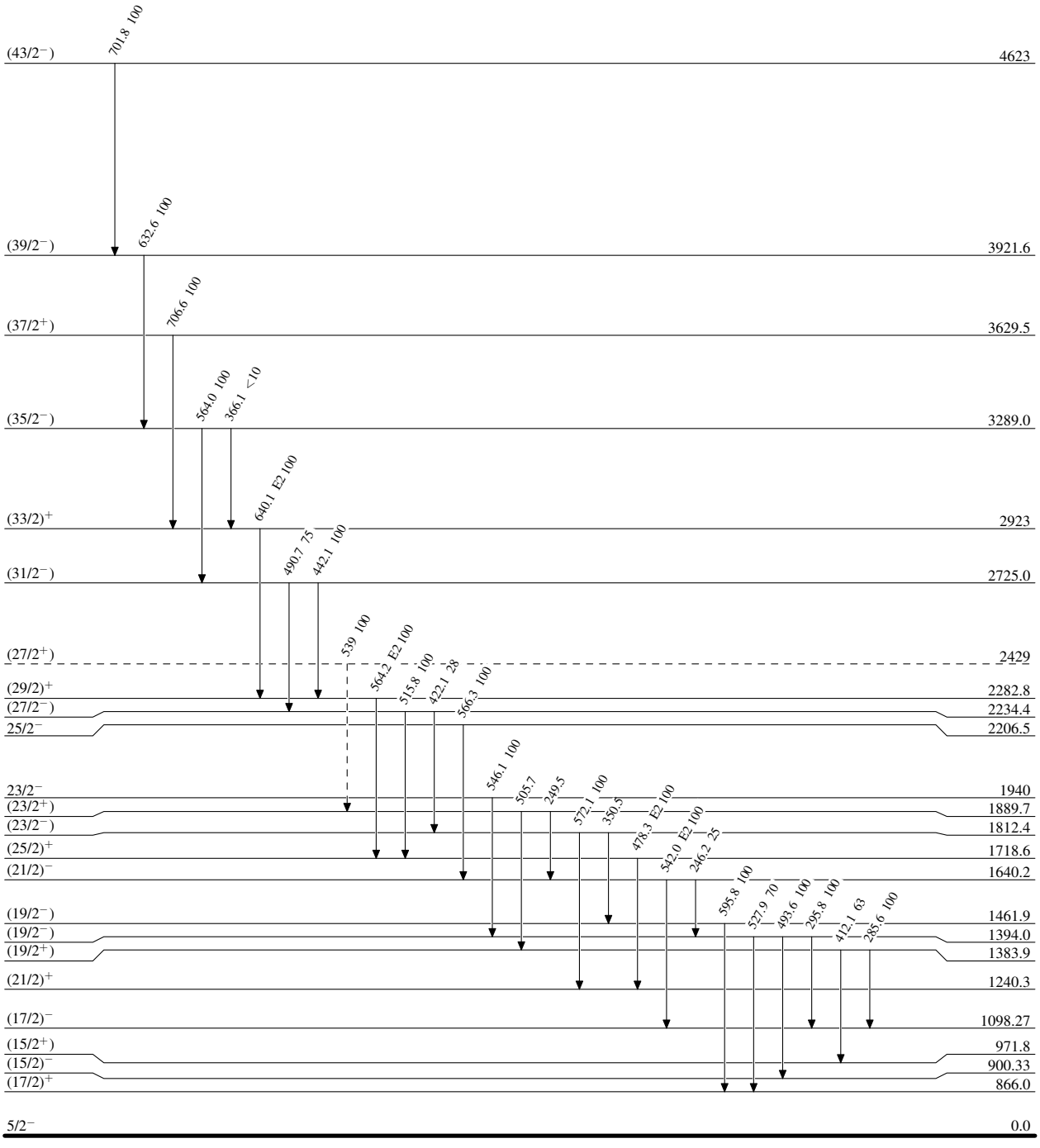
Adopted Levels, Gammas

Legend

Level Scheme

Intensities: Relative photon branching from each level

γ Decay (Uncertain)

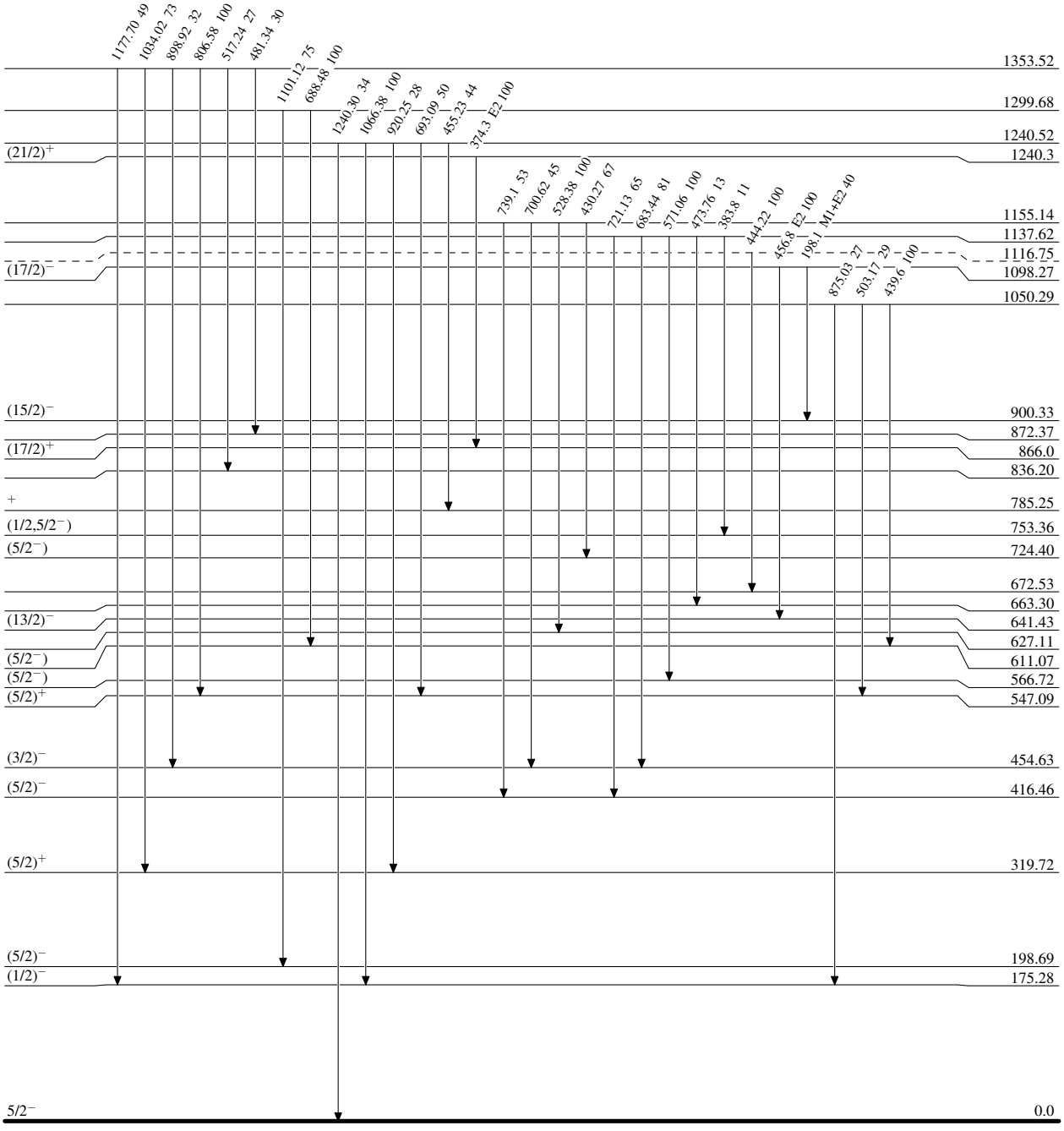


$^{145}_{56}Ba_{89}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

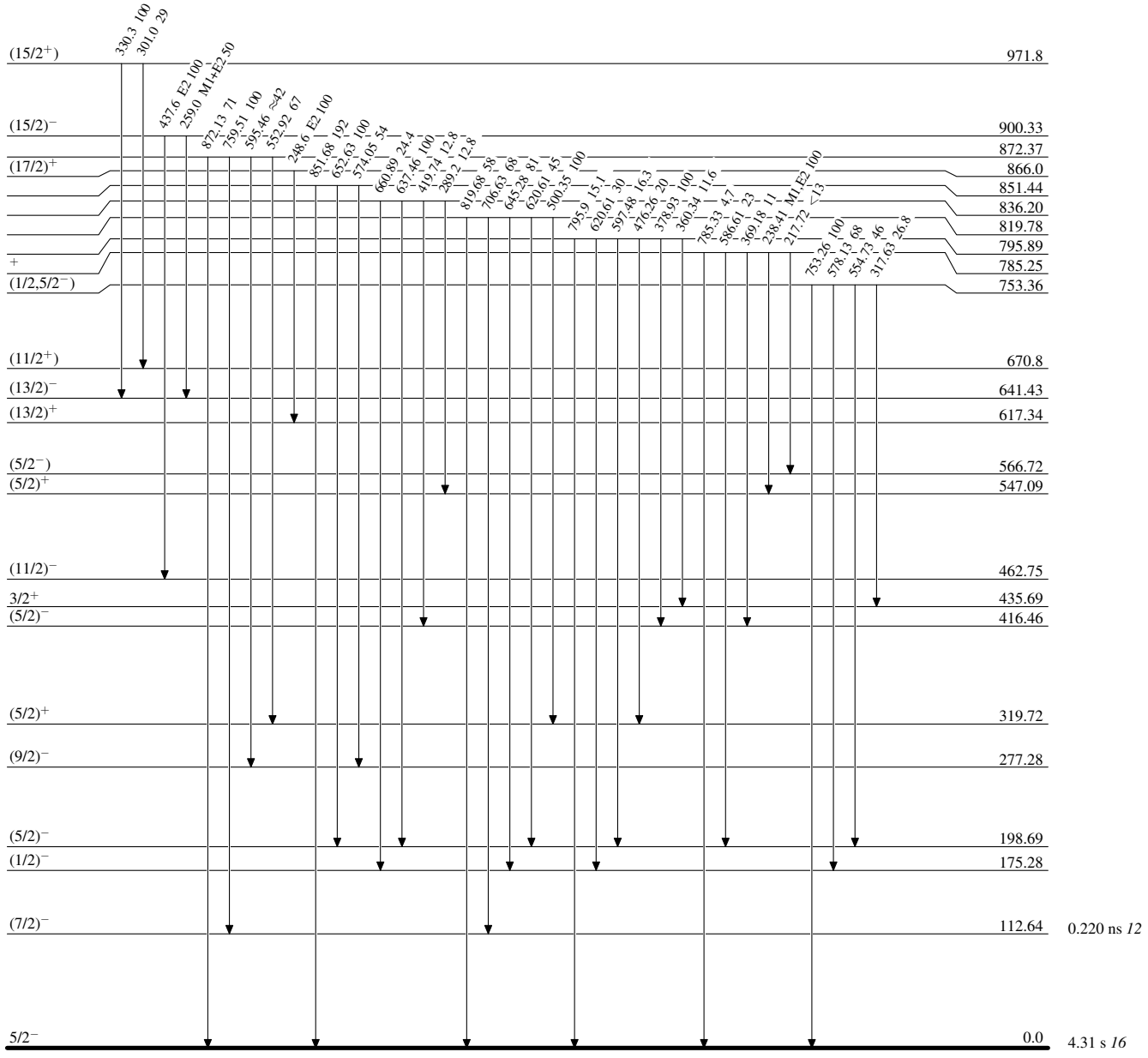


$^{145}_{56}Ba_{89}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

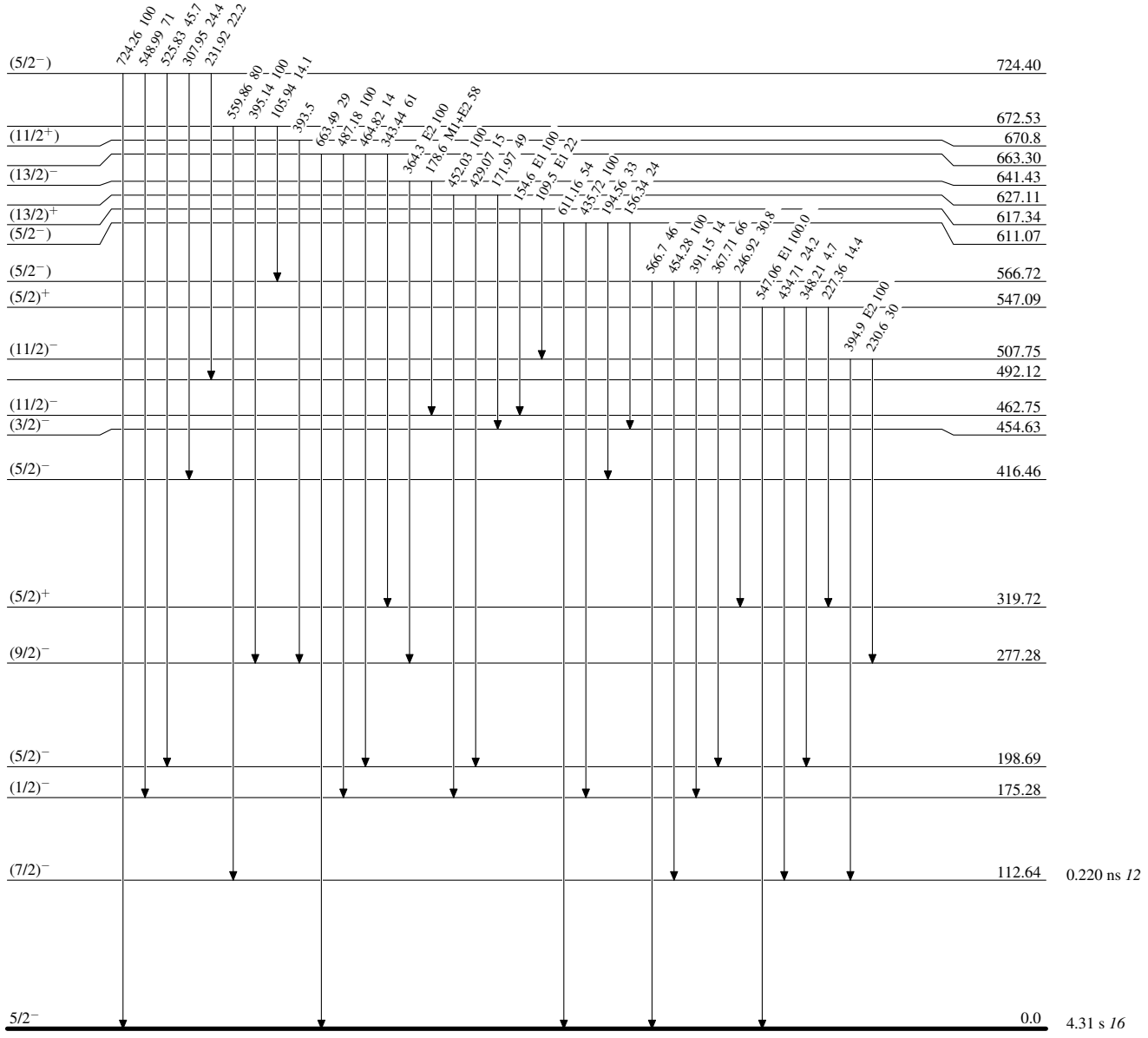


$^{145}_{56}Ba_{89}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

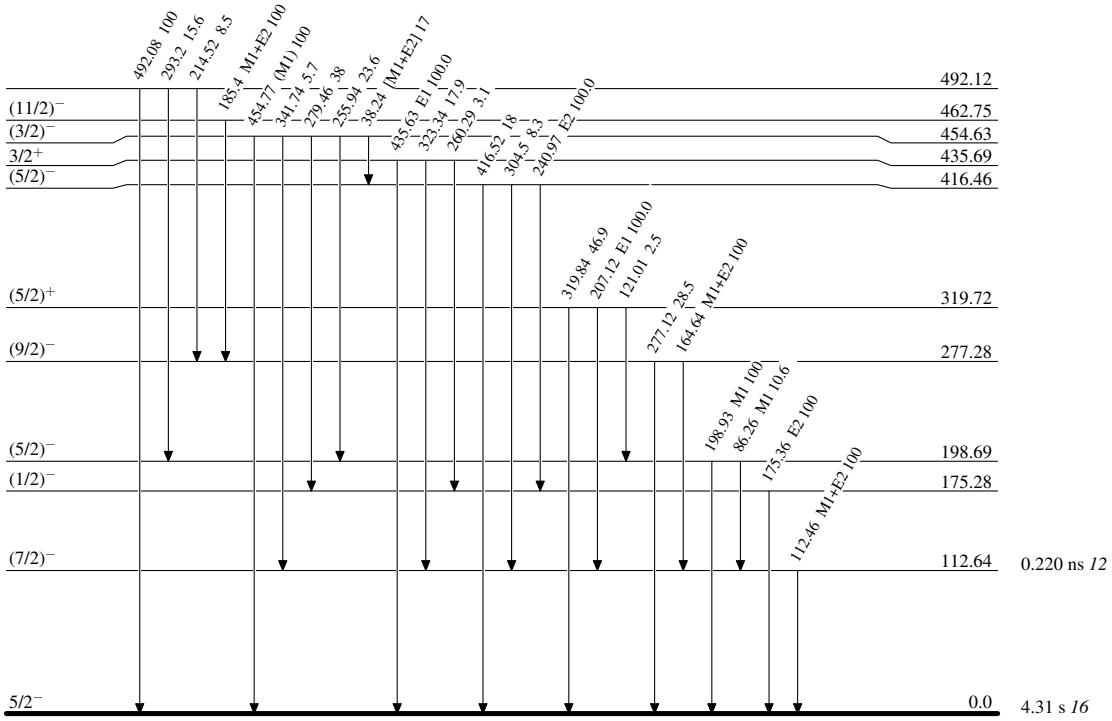


$^{145}_{56}Ba_{89}$

Adopted Levels, Gammas

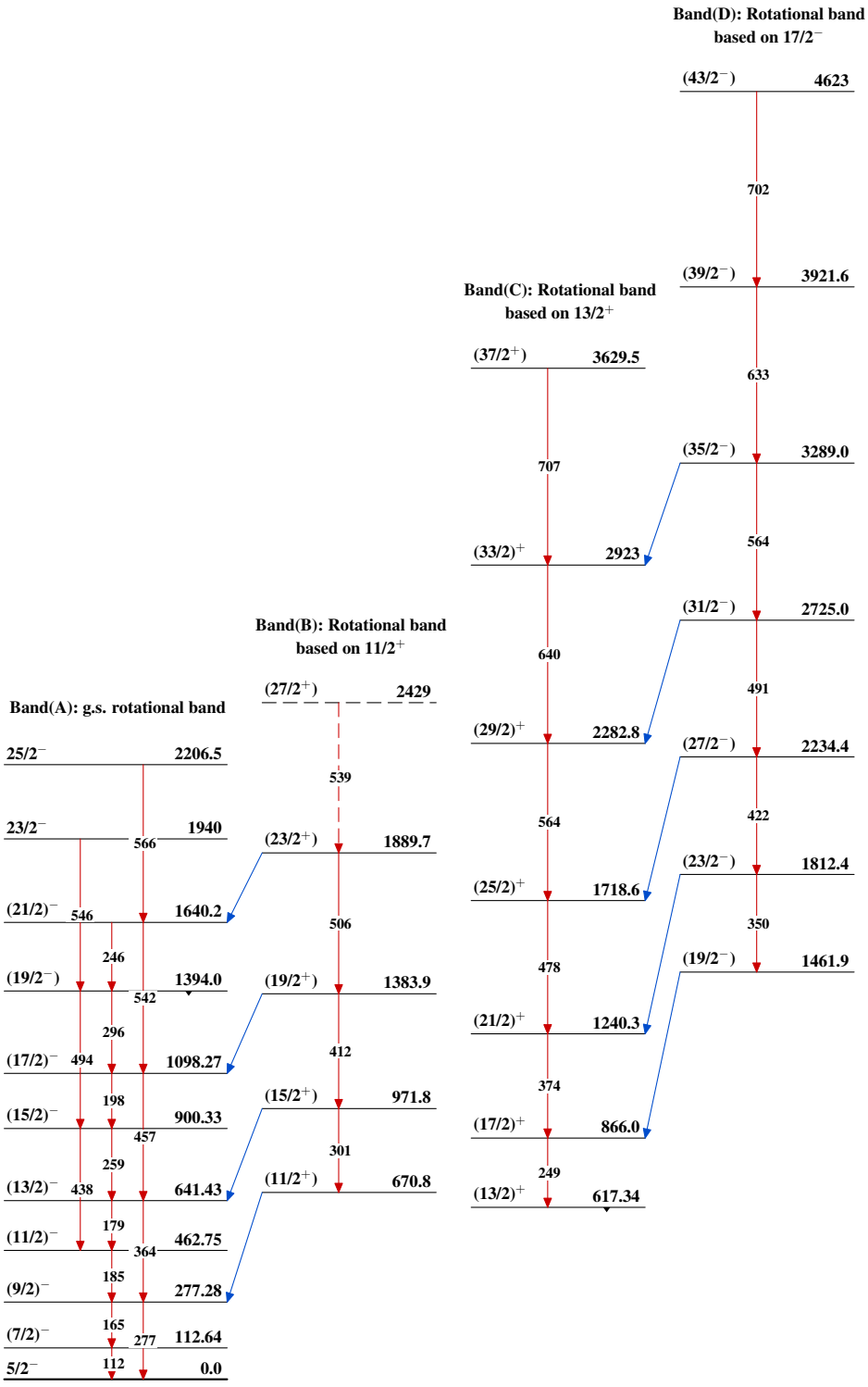
Level Scheme (continued)

Intensities: Relative photon branching from each level



$^{145}_{56}Ba_{89}$

Adopted Levels, Gammas



$^{145}_{56}Ba_{89}$