^{145}Cs β^- decay 1986Ro17,1987RoZW

History

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

Parent: ^{145}Cs: E=0.0; J$^\pi$=3/2$^+$; $T_{1/2}$=0.587 s *5*; Q(β^-)=7865 *50*; %β^- decay=100.0

Additional information 1.

Measured: γ, $\gamma\gamma$ (1986Ro17,1983DeZI,1982DeZX,1978ScYY), γ (1982Ra13,1979Bo26,1973Wu03), ce (1986Ro17,1982Ra13), $\gamma\gamma(\theta)$ (1986Ro17), delayed neutrons (1981En05,1980Lu04,1979Ri09,1977Re05, 1977Re06).

Delayed neutron emission probability=14.7% *9*, from Adopted Levels.

Average delayed neutron energy=460 *30* (1977Re06).

^{145}Ba Levels

E(level)[†]	J$^\pi$[‡]	$T_{1/2}$	Comments
0.0	5/2$^-$	4.31 s *16*	
112.64 *1*	(7/2)$^-$	0.220 ns *12*	J$^\pi$: Not consistent with log *ft*=6.4 from ^{145}Cs (3/2$^+$). β^- feeding may not be accurate. $T_{1/2}$: From Adopted Levels.
175.28 *1*	(1/2)$^-$		
198.69 *1*	(5/2)$^-$		
277.28 *1*	(9/2)$^-$		
319.72 *1*	(5/2)$^+$		
416.46 *1*	(5/2)$^-$		
435.69 *1*	3/2$^+$		
454.63 *1*	(3/2)$^-$		
492.12 *1*			
547.09 *1*	(5/2)$^+$		
566.72 *1*	(5/2$^-$)		
611.07 *1*	(5/2$^-$)		
627.10 *1*			
663.30 *1*			
672.53 *1*			
724.40 *1*	(5/2$^-$)		
753.36 *1*	(1/2,5/2$^-$)		
785.25 *1*	+		
795.90 *1*			
819.78 *1*			
836.20 *1*			
851.44 *1*			
872.37 *1*			
1050.29 *2*			
1116.75? *2*			
1137.63 *1*			
1155.14 *1*			
1240.52 *1*			
1299.68 *2*			
1353.52 *1*			

† Deduced by evaluators from least-squares fit to γ-ray energies.

‡ From Adopted Levels.

^{145}Cs β^- decay 1986Ro17,1987RoZW (continued)

β^- radiations

E(decay)†	E(level)	Iβ^-‡@	Log *ft*	Comments
(6.51×10^3 *5*)	1353.52	2.3 *4*	6.30 *8*	av Eβ=2875 *24*
(6.57×10^3 *5*)	1299.68	0.4 *1*	7.08 *11*	av Eβ=2901 *24*
(6.62×10^3 *5*)	1240.52	1.6 *2*	6.49 *6*	av Eβ=2928 *24*
(6.71×10^3 *5*)	1155.14	4.6 *6*	6.06 *6*	av Eβ=2968 *24*
(6.73×10^3 *5*)	1137.63	4.2 *6*	6.10 *7*	av Eβ=2977 *24*
(6.75×10^3& *5*)	1116.75?	0.12 *2*	7.65 *8*	av Eβ=2986 *24*
(6.81×10^3 *5*)	1050.29	1.4 *3*	6.61 *10*	av Eβ=3018 *24*
(6.99×10^3 *5*)	872.37	1.1 *2*	6.76 *8*	av Eβ=3101 *24*
(7.01×10^3 *5*)	851.44	0.6 *1*	7.03 *8*	av Eβ=3111 *24*
(7.03×10^3 *5*)	836.20	2.1 *3*	6.49 *7*	av Eβ=3118 *24*
(7.05×10^3 *5*)	819.78	2.2 *3*	6.47 *7*	av Eβ=3126 *24*
(7.07×10^3 *5*)	795.90	3.3 *5*	6.30 *7*	av Eβ=3137 *24*
(7.08×10^3 *5*)	785.25	2.1 *4*	6.50 *9*	av Eβ=3142 *24*
7.17×10^3 *17*	753.36	5.2 *8*	6.12 *7*	av Eβ=3157 *24*
7.21×10^3 *17*	724.40	3.1 *8*	6.35 *12*	av Eβ=3170 *24*
(7.19×10^3 *5*)	672.53	2.0 *3*	6.55 *7*	av Eβ=3194 *24*
(7.20×10^3 *5*)	663.30	2.6 *4*	6.44 *7*	av Eβ=3199 *24*
(7.24×10^3 *5*)	627.10	1.1 *2*	6.83 *8*	av Eβ=3216 *24*
(7.25×10^3 *5*)	611.07	3.1 *5*	6.38 *8*	av Eβ=3223 *24*
(7.30×10^3 *5*)	566.72	2.3 *4*	6.52 *8*	av Eβ=3244 *24*
7.35×10^3 *17*	547.09	3.5 *5*	6.34 *7*	av Eβ=3253 *24*
(7.37×10^3 *5*)	492.12	2.9 *4*	6.44 *7*	av Eβ=3279 *24*
7.51×10^3 *15*	454.63	2.5 *11*	6.52 *20*	av Eβ=3296 *24*
7.51×10^3 *15*	435.69	6.2 *1*	6.126 *18*	av Eβ=3305 *24*
7.65×10^3 *22*	416.46	<1.4	>6.8	av Eβ=3314 *24*
(7.55×10^3 *5*)	319.72	0.9 *2*	6.99 *10*	av Eβ=3360 *24*
(7.59×10^3 *5*)	277.28	0.2 *2*	7.7 *5*	av Eβ=3379 *24*
7.77×10^3 *22*	198.69	8.5 *24*	6.05 *13*	av Eβ=3416 *24* From 1982Pa24. Other: 6944 *180* (1981De25).
(7.69×10^3 *5*)	175.28	7.3 *11*	6.12 *7*	av Eβ=3427 *24*
(7.75×10^3 *5*)	112.64	4.3 *8*	6.37 *9*	av Eβ=3456 *24*
(7.87×10^3 *5*)	0.0	≈3#	≈6.6	av Eβ=3509 *24* E(decay): qb=7358 keV 70 (1981De25) disagrees with qb=7930 keV 75, value adopted in 1986Gr11. Iβ⁻: From sum Iγ(1+α) to g.s. =100 − 14.7% *9*=85.3% *9*. β⁻n=14.7 % 9.

† From βγ (1982Pa24). Others: 7410 *120* (single), 6944 *180* (coin 175γ), 6687 *250* (coin 112γ), 6159 *300* (coin 756γ) (1981De25); 5900 *500* βγ (1974Wu02).

‡ Weak β(g.s.) branch (1986Ro17,1982Ra13) disagrees with the results of a comparison between single β-spectra and β-spectra from βγ (1981De25).

\# From imbalance of I(γ+ce) (1986Ro17), 3.2% *20* in 1982Ra13.

@ Absolute intensity per 100 decays.

& Existence of this branch is questionable.

$\gamma(^{145}$Ba)

Iγ normalization: I(175.4γ)=19.8% *24* (1986Ro17) based on Iγ relative to I(723γ in ^{145}Ce decay)=0.59 *7* (1978Pf02).

E_γ [†]	I_γ [†#]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[‡]	δ	α [@]	Comments
38.24 *6*	1.8 *4*	454.63	(3/2)$^-$	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).
^{x}84.74 *6*	7.7 *2*								
86.26 *6*	5.8 *1*	198.69	(5/2)$^-$	112.64	(7/2)$^-$	M1+E2	<0.65	1.8 *3*	α(K)=1.38 *9*; α(L)=0.31 *14*; α(M)=0.07 *3*; α(N+..)=0.016 *7* α(N)=0.014 *7*; α(O)=0.0020 *8*; α(P)=8.49×10^{-5} *12* Mult.: K/L=5.71 (1982Ra13).
^{x}87.34 *6*	2.28 *4*								
105.94 *2*	0.79 *9*	672.53		566.72	(5/2$^-$)				
112.46 *2*	54.1 *7*	112.64	(7/2)$^-$	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 Mult.,δ: From Adopted Gammas. Mult.: α(K)exp=0.92 *12*, α(L)exp=0.128 *12* (1986Ro17); α(K)exp=0.79 *24* α(L)exp=0.14 *4*, α(M)exp=0.033 *10* (1982Ra13). Note that δ=2.0 *3* (from α(K)exp) is inconsistent with K/L data.
121.01 *2*	0.4 *2*	319.72	(5/2)$^+$	198.69	(5/2)$^-$				
156.34 *2*	2.4 *3*	611.07	(5/2$^-$)	454.63	(3/2)$^-$				
164.64 *2*	7.5 *6*	277.28	(9/2)$^-$	112.64	(7/2)$^-$				
171.97 *2*	4.3 *3*	627.10		454.63	(3/2)$^-$				
175.36 *2*	100.0	175.28	(1/2)$^-$	0.0	5/2$^-$	E2		0.270	%Iγ=19.8 *24* (1986Ro17) α(K)=0.204 *3*; α(L)=0.0516 *8*; α(M)=0.01108 *16*; α(N+..)=0.00265 *4* α(N)=0.00232 *4*; α(O)=0.000320 *5*; α(P)=1.056×10^{-5} *15* Mult.: from $\gamma\gamma(\theta)$, 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). I_γ: if I(723γ,^{145}Ce β decay)=59% *7*.
194.56 *2*	3.4 *4*	611.07	(5/2$^-$)	416.46	(5/2)$^-$				
198.93 *2*	55 *9*	198.69	(5/2)$^-$	0.0	5/2$^-$	M1+E2		0.160 *16*	α(K)=0.130 *6*; α(L)=0.024 *8*; α(M)=0.0050 *17*; α(N+..)=0.0012 *4* α(N)=0.0011 *4*; α(O)=0.00015 *5*; α(P)=7.7×10^{-6} *5* 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).
207.12 *2*	16.2 *4*	319.72	(5/2)$^+$	112.64	(7/2)$^-$	E1		0.0305	α(K)=0.0262 *4*; α(L)=0.00340 *5*; α(M)=0.000697 *10*; α(N+..)=0.0001730 *25* α(N)=0.0001492 *21*; α(O)=2.24×10^{-5} *4*; α(P)=1.481×10^{-6} *21* Mult.: α(K)exp=0.053 *20* (1986Ro17).
214.52 *2*	1.2 *2*	492.12		277.28	(9/2)$^-$				
217.72 *2*	<1	785.25	+	566.72	(5/2$^-$)				
227.36 *2*	3.4 *3*	547.09	(5/2)$^+$	319.72	(5/2)$^+$				

γ(^{145}Ba) (continued)

E_γ[†]	I_γ[†#]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	α[@]	Comments
231.92 *2*	1.8 *2*	724.40	(5/2⁻)	492.12				
238.41 *2*	7.9 *8*	785.25	+	547.09	(5/2)⁺	M1,E2	0.092 *4*	α(K)=0.0761 *11*; α(L)=0.013 *3*; α(M)=0.0027 *7*; α(N+..)=0.00066 *14* α(N)=0.00057 *13*; α(O)=8.3×10^{-5} *15*; α(P)=4.6×10^{-6} *5* Mult.: α(K)exp=0.126 *30* (1986Ro17), α(K)exp=0.111 *33* (1982Ra13).
240.97 *2*	28.9 *3*	416.46	(5/2)⁻	175.28	(1/2)⁻	E2	0.0921	α(K)=0.0733 *11*; α(L)=0.01490 *21*; α(M)=0.00317 *5*; α(N+..)=0.000766 *11* α(N)=0.000668 *10*; α(O)=9.44×10^{-5} *14*; α(P)=4.02×10^{-6} *6* Mult.: from $\gamma\gamma(\theta)$, ce data are consistent with E2: α(K)exp=0.088 *12*, α(L)exp=0.008 *1* (1986Ro17), α(K)exp=0.095 *28* (1982Ra13).
246.92 *2*	2.46 *6*	566.72	(5/2⁻)	319.72	(5/2)⁺			
255.94 *2*	2.5 *1*	454.63	(3/2)⁻	198.69	(5/2)⁻			
260.29 *2*	0.9 *2*	435.69	3/2⁺	175.28	(1/2)⁻			
277.12 *2*	2.14 *8*	277.28	(9/2)⁻	0.0	5/2⁻			
279.46 *2*	4.0 *5*	454.63	(3/2)⁻	175.28	(1/2)⁻			
289.2 *1*	1.0 *1*	836.20		547.09	(5/2)⁺			
293.2 *1*	2.2 *1*	492.12		198.69	(5/2)⁻			
304.5 *1*	2.4 *2*	416.46	(5/2)⁻	112.64	(7/2)⁻			
307.95 *2*	1.98 *9*	724.40	(5/2⁻)	416.46	(5/2)⁻			
317.63 *2*	3.0 *2*	753.36	(1/2,5/2⁻)	435.69	3/2⁺			
319.84 *2*	7.6 *2*	319.72	(5/2)⁺	0.0	5/2⁻			
323.34 *2*	5.2 *3*	435.69	3/2⁺	112.64	(7/2)⁻			
[x]328.85 *2*	1.9 *2*							
341.74 *2*	0.6 *1*	454.63	(3/2)⁻	112.64	(7/2)⁻			
343.44 *2*	4.2 *2*	663.30		319.72	(5/2)⁺			
348.21 *2*	1.1 *2*	547.09	(5/2)⁺	198.69	(5/2)⁻			
360.34 *2*	1.0 *2*	795.90		435.69	3/2⁺			
367.71 *2*	5.3 *2*	566.72	(5/2⁻)	198.69	(5/2)⁻			
369.18 *2*	0.87 *9*	785.25	+	416.46	(5/2)⁻			
378.93 *2*	8.6 *3*	795.90		416.46	(5/2)⁻			
383.8 *1*	0.85 *8*	1137.63		753.36	(1/2,5/2⁻)			
391.15 *2*	1.1 *3*	566.72	(5/2⁻)	175.28	(1/2)⁻			
395.14 *2*	5.6 *6*	672.53		277.28	(9/2)⁻			
416.52 *2*	5.1 *8*	416.46	(5/2)⁻	0.0	5/2⁻			
419.74 *2*	1.0 *2*	836.20		416.46	(5/2)⁻			
429.07 *2*	1.3 *4*	627.10		198.69	(5/2)⁻			
430.27 *2*	5.8 *2*	1155.14		724.40	(5/2⁻)			
434.71 *2*	5.7 *4*	547.09	(5/2)⁺	112.64	(7/2)⁻			
435.63 *2*	29.0 *4*	435.69	3/2⁺	0.0	5/2⁻	E1	0.00450	α(K)=0.00388 *6*; α(L)=0.000491 *7*; α(M)=0.0001005 *14*; α(N+..)=2.51×10^{-5} *4* α(N)=2.16×10^{-5} *3*; α(O)=3.28×10^{-6} *5*; α(P)=2.31×10^{-7} *4* Mult.: α(K)exp=0.0011 *12* (1986Ro17) (if 434.71γ is E2 and 435.72γ is E1).
435.72 *2*	10.2 *9*	611.07	(5/2⁻)	175.28	(1/2)⁻			
439.6 *1*	4.5 *11*	1050.29		611.07	(5/2⁻)			

$\gamma(^{145}$Ba) (continued)

E_γ †	I_γ †#	E_i(level)	J^π_i	E_f	J^π_f	Mult.‡	α @	Comments
444.22 *2*	0.60 *6*	1116.75?		672.53				
452.03 *2*	8.8 *5*	627.10		175.28	(1/2)$^-$			
454.28 *2*	8.0 *5*	566.72	(5/2$^-$)	112.64	(7/2)$^-$			
454.77 *2*	10.6 *6*	454.63	(3/2)$^-$	0.0	5/2$^-$	(M1)	0.01668	α(K)=0.01435 *20*; α(L)=0.00185 *3*; α(M)=0.000381 *6*; α(N+..)=9.58×10^{-5} *14* α(N)=8.22×10^{-5} *12*; α(O)=1.262×10^{-5} *18*; α(P)=9.31×10^{-7} *13* Mult.: α(K)exp=0.011 *12* if 455.23γ and 454.28γ are M1,E2; authors α(K)exp=0.0011 is probably a typo.
455.23 *2*	1.4 *4*	1240.52		785.25	+			
464.82 *2*	1.0 *2*	663.30		198.69	(5/2)$^-$			
473.76 *2*	1.0 *2*	1137.63		663.30				
476.26 *2*	1.7 *2*	795.90		319.72	(5/2)$^+$			
481.34 *2*	1.1 *1*	1353.52		872.37				
487.18 *2*	6.9 *2*	663.30		175.28	(1/2)$^-$			
492.08 *2*	13.1 *4*	492.12		0.0	5/2$^-$			
500.35 *2*	3.1 *3*	819.78		319.72	(5/2)$^+$			
503.17 *2*	1.3 *2*	1050.29		547.09	(5/2)$^+$			
517.24 *2*	1.0 *1*	1353.52		836.20				
525.83 *2*	3.7 *2*	724.40	(5/2$^-$)	198.69	(5/2)$^-$			
528.38 *2*	8.7 *1*	1155.14		627.10				
547.06 *2*	23.6 *4*	547.09	(5/2)$^+$	0.0	5/2$^-$	E1	0.00265	α(K)=0.00229 *4*; α(L)=0.000287 *4*; α(M)=5.87×10^{-5} *9*; α(N+..)=1.470×10^{-5} *21* α(N)=1.264×10^{-5} *18*; α(O)=1.93×10^{-6} *3*; α(P)=1.377×10^{-7} *20* Mult.: ce(K) was not observed and is less than expected for M1 or E2.
548.99 *2*	5.8 *9*	724.40	(5/2$^-$)	175.28	(1/2)$^-$			
552.92 *2*	1.6 *4*	872.37		319.72	(5/2)$^+$			
554.73 *2*	5.2 *2*	753.36	(1/2,5/2$^-$)	198.69	(5/2)$^-$			
559.86 *2*	4.5 *1*	672.53		112.64	(7/2)$^-$			
566.7 *1*	3.7 *2*	566.72	(5/2$^-$)	0.0	5/2$^-$			
571.06 *2*	7.8 *3*	1137.63		566.72	(5/2$^-$)			
574.05 *2*	0.7 *2*	851.44		277.28	(9/2)$^-$			
578.13 *2*	7.6 *24*	753.36	(1/2,5/2$^-$)	175.28	(1/2)$^-$			
586.61 *2*	1.8 *3*	785.25	+	198.69	(5/2)$^-$			
595.46 *2*	≈1	872.37		277.28	(9/2)$^-$			
597.48 *2*	1.4 *3*	795.90		198.69	(5/2)$^-$			
611.16 *2*	5.5 *3*	611.07	(5/2$^-$)	0.0	5/2$^-$			
620.61& *2*	2.6& *4*	795.90		175.28	(1/2)$^-$			
620.61& *2*	1.4& *4*	819.78		198.69	(5/2)$^-$			
637.46 *2*	7.8 *3*	836.20		198.69	(5/2)$^-$			
645.28 *2*	2.5 *5*	819.78		175.28	(1/2)$^-$			
652.63 *2*	1.3 *3*	851.44		198.69	(5/2)$^-$			
660.89 *2*	1.9 *1*	836.20		175.28	(1/2)$^-$			
663.49 *2*	2.0 *2*	663.30		0.0	5/2$^-$			
683.44 *2*	6.3 *4*	1137.63		454.63	(3/2)$^-$			

γ(^{145}Ba) (continued)

E_γ †	I_γ †#	E_i(level)	J^π_i	E_f	J^π_f
688.48 *2*	1.2 *1*	1299.68		611.07	(5/2$^-$)
693.09 *2*	1.6 *2*	1240.52		547.09	(5/2)$^+$
700.62 *2*	3.9 *3*	1155.14		454.63	(3/2)$^-$
706.63 *2*	2.1 *2*	819.78		112.64	(7/2)$^-$
721.13 *2*	5.1 *3*	1137.63		416.46	(5/2)$^-$
724.26 *2*	8 *3*	724.40	(5/2$^-$)	0.0	5/2$^-$
739.1 *1*	4.6 *2*	1155.14		416.46	(5/2)$^-$
753.26 *2*	11.2 *3*	753.36	(1/2,5/2$^-$)	0.0	5/2$^-$
759.51 *2*	2.4 *2*	872.37		112.64	(7/2)$^-$
785.33 *2*	0.37 *6*	785.25	+	0.0	5/2$^-$
795.9 *1*	1.3 *1*	795.90		0.0	5/2$^-$
806.58 *2*	3.7 *3*	1353.52		547.09	(5/2)$^+$
819.68 *2*	1.8 *2*	819.78		0.0	5/2$^-$
851.68 *2*	1.2 *2*	851.44		0.0	5/2$^-$
872.13 *2*	1.7 *3*	872.37		0.0	5/2$^-$
875.03 *2*	1.2 *2*	1050.29		175.28	(1/2)$^-$
898.92 *2*	1.2 *4*	1353.52		454.63	(3/2)$^-$
920.25 *2*	0.9 *1*	1240.52		319.72	(5/2)$^+$
^{x}944.68 *2*	1.1 *3*				
1034.02 *2*	2.7 *2*	1353.52		319.72	(5/2)$^+$
1066.38 *2*	3.2 *2*	1240.52		175.28	(1/2)$^-$
1101.12 *2*	0.9 *2*	1299.68		198.69	(5/2)$^-$
1177.70 *2*	1.8 *6*	1353.52		175.28	(1/2)$^-$
1240.30 *2*	1.08 *2*	1240.52		0.0	5/2$^-$
^{x}1414.45 *2*	1.5 *3*				
^{x}1715.59 *2*	2.8 *4*				
^{x}1976.94 *2*	9.0 *5*				
^{x}2024.33 *2*	3.7 *6*				
^{x}2175.59 *2*	3.0 *4*				

† From 1986Ro17.

‡ From $\gamma\gamma(\theta)$ and experimental conversion coefficients (1986Ro17).

\# For absolute intensity per 100 decays, multiply by 0.198 *24*.

@ 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 with intensity suitably divided.

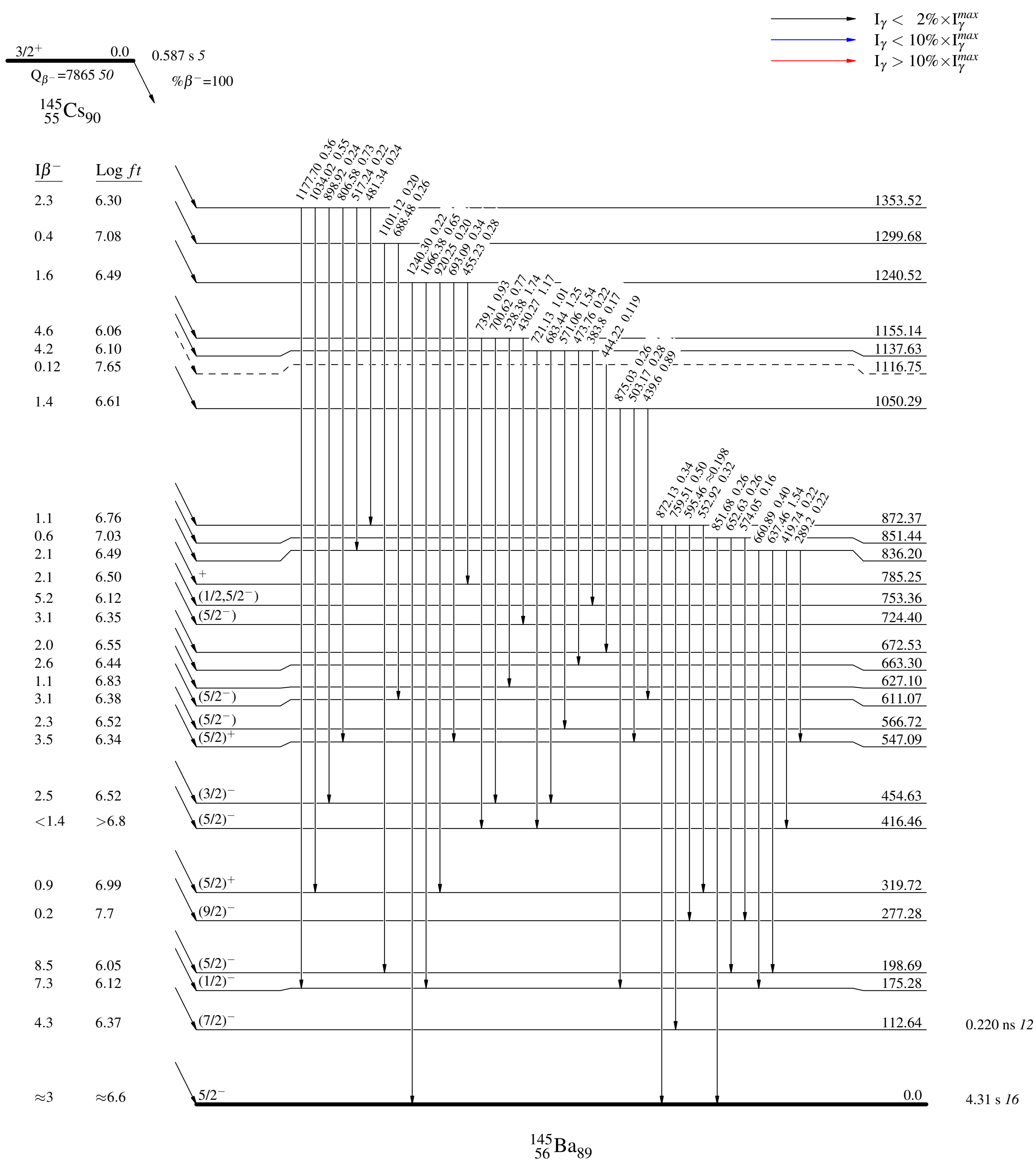
^{x} γ ray not placed in level scheme.

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

^{145}Cs β^- decay 1986Ro17,1987RoZW

Decay Scheme

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays

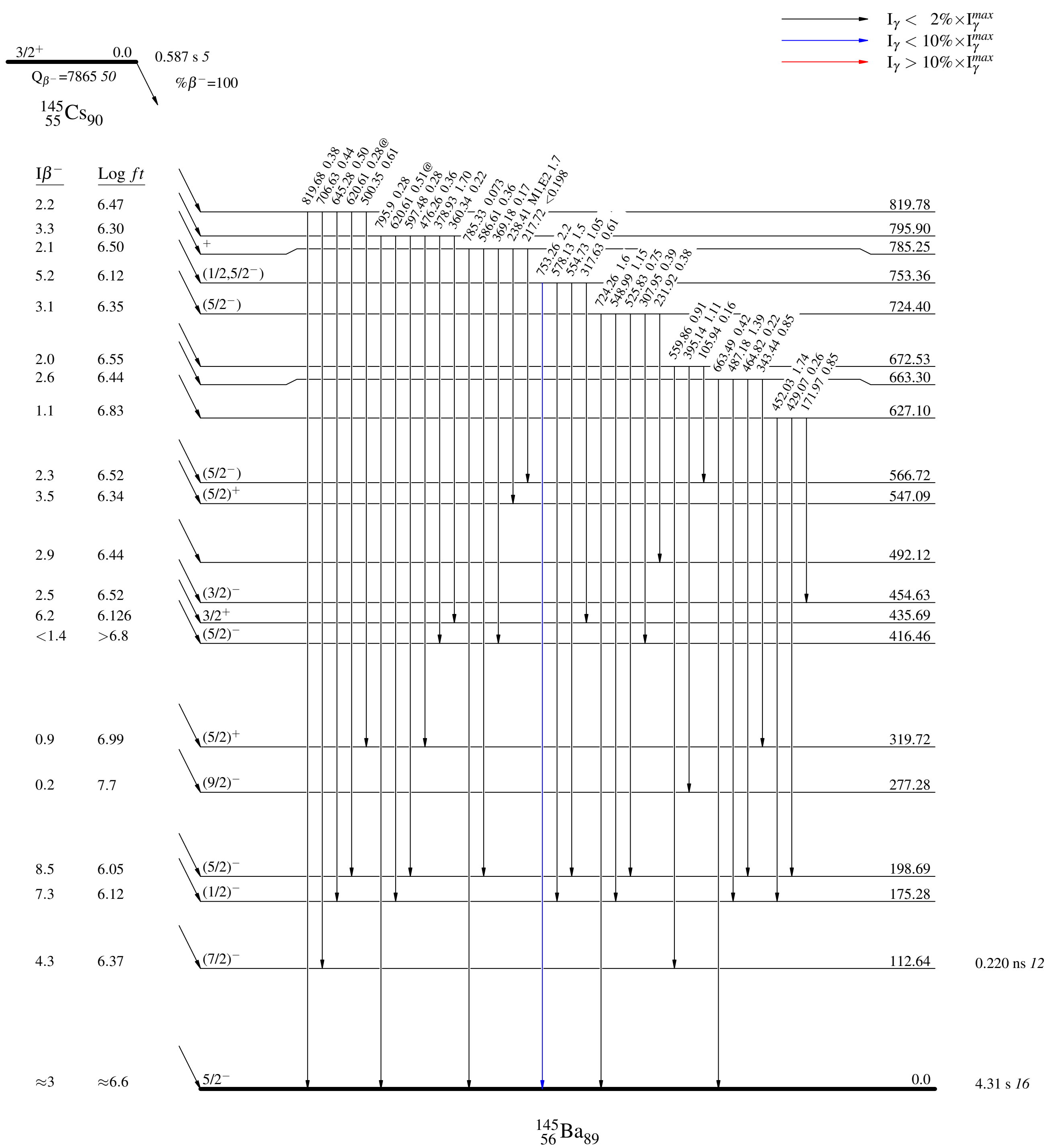


$^{145}Cs\ \beta^-$ decay 1986Ro17,1987RoZW

Decay Scheme (continued)

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays

@ Multiply placed: intensity suitably divided



$^{145}Cs\ \beta^-$ decay 1986Ro17,1987RoZW

Decay Scheme (continued)

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays

@ Multiply placed: intensity suitably divided