^{143}Cs β^- decay 1989Ro20

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	E. Browne, J. K. Tuli	NDS 113, 715 (2012)	31-May-2011

Parent: ^{143}Cs: E=0.0; $J^\pi=3/2^+$; $T_{1/2}$=1.791 s *7*; Q(β^-)=6262 *22*; %β^- decay=100.0

Measured: γ (1979Sc11,1979Bo26,1985Ra20,1984So18,1989Ro20), $\gamma\gamma$, $\gamma\gamma(\theta)$ (1988WaZQ,1989Ro20), ce (1979Sc11,1985Ra20), β^- (1981De25), $\beta\gamma$ (1982Pa24,1981Ke07,1981De25,1978Wu04), β^-n (1981En05,1980Re03,1980Lu04,1979WaZU,1979Ri09,1979En02,1978Gj01, \1978Gj02,1977Re06).

Level scheme is mostly that of 1989Ro20. Iβ, log *ft* values are the upper and lower limits, respectively as 1989Ro20 studied only the lower-lying levels. But other studies also did not observe any Eγ>2 MeV. With Q(β^-) of 6.26 MeV level scheme may not be complete.

Delayed-neutron emission probability=1.62% *10* (evaluated in 1983ReZX). Others: 1.68% *17* (1981En05), 1.54% *9* (1980Lu04), 1.74% *12* (1979Ri09).

Observed delayed neutrons with E(n)=25.9 (strong group), 72, 84.5, 93, 124, 173, 211, 290, 330; for I(n) see 1985Gr15.

E(n)(av)=335 (1980Re03); E(n)(av)=232 (if neutrons with E(n)>800 are neglected).

^{143}Ba Levels

E(level)	J^π†	$T_{1/2}$	E(level)	J^π†
0.0	$5/2^-$	14.5 s *3*	830.85 *8*	
33.29 *3*	$(1/2)^-$		834.09 *4*	3/2,5/2
117.368 *24*	$9/2^-$	3.8 ns *12*	933.69 *7*	
228.83 *3*	$(3/2)^-$		1082.70 *6*	
232.416 *14*	$(3/2,5/2)^-$		1085.12 *6*	
263.386 *13*	$7/2^-$		1100.63 *5*	
306.56 *3*	$(3/2)^-$		1109.97 *7*	
466.67 *3*	$^-$		1153.55 *6*	
534.83 *3*	$5/2^-$		1203.52 *20*	
597.77? *11*			1253.33 *6*	
659.98 *5*			1299.7 *10*	
670.57 *5*			1440.86 *8*	
695.53 *5*	$(^+)$		1452.25 *6*	
729.27 *5*	$5/2^-$		1575.99 *10*	
822.74 *5*			2638.96 *20*	

† From Adopted Levels.

β^- radiations

Measured Eβ (coin γ): 3520 *180* (1978γ), 5545 *120* (661γ), 5515 *150* (627γ), 5395 *180* (571γ), 5500 *150* (527γ), 5575 *180* (467γ), 5810 *180* (307γ), 6075 *130* (232γ), 6090 *150* (195γ) (1982Pa24); 6070 *50* (195γ) (1981De25).

E(decay)	E(level)	Iβ^-†	Log *ft*	Comments
(3623 *22*)	2638.96	2.7 *4*	5.6 *1*	av Eβ=1522 *11*
(4810 *22*)	1452.25	1.7 *3*	6.3 *1*	av Eβ=2077 *11*
(5161 *22*)	1100.63	2.0 *3*	6.4 *1*	av Eβ=2242 *11*
(5177 *22*)	1085.12	2.2 *4*	6.4 *1*	av Eβ=2249 *11*
(5328 *22*)	933.69	0.4 *1*	7.2 *1*	av Eβ=2321 *11*
(5428 *22*)	834.09	7.7 *12*	5.9 *1*	av Eβ=2367 *11*
(5533 *22*)	729.27	1.6 *3*	6.6 *1*	av Eβ=2417 *11*
(5566 *22*)	695.53	4.9 *8*	6.2 *1*	av Eβ=2432 *11*
(5602 *22*)	659.98	5.8 *9*	6.1 *1*	av Eβ=2449 *11*
(5727 *22*)	534.83	1.2 *2*	6.8 *1*	av Eβ=2508 *11*

Continued on next page (footnotes at end of table)

^{143}Cs β^- decay 1989Ro20 (continued)

β^- radiations (continued)

E(decay)	E(level)	Iβ^-[†]	Log *ft*	Comments
(5795 *22*)	466.67	3.3 *6*	6.4 *1*	av Eβ=2540 *11*
(5955 *22*)	306.56	5.8 *10*	6.2 *1*	av Eβ=2615 *11*
(6030 *22*)	232.416	5.6	6.2	av Eβ=2650 *11*
(6033 *22*)	228.83	12 *2*	5.9 *1*	av Eβ=2651 *11*
(6229 *22*)	33.29	11 *4*	6.0 *2*	av Eβ=2743 *11*
(6262 *22*)	0.0	≈25	≈5.7	av Eβ=2759 *11*

[†] Absolute intensity per 100 decays.

$\gamma(^{143}Ba)$

Iγ normalization: From absolute I(195γ)=12.6% *19* (1984So18).
α(K)(exp), α(L)(exp), Mc(exp) presented here have been normalized to α(K)(117γ, E2, theory)=0.741.

E_γ[#]	I_γ[‡b]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[@]	δ	α[†]	Comments
33.46	2.3 *2*	33.29	(1/2)$^-$	0.0	5/2$^-$	E2		125.7	α(L)=98.9 *14*; α(M)=21.8 *3*; α(N+..)=5.05 *7* α(N)=4.48 *7*; α(O)=0.569 *8*; α(P)=0.000631 *9* Mult.: α(L)(exp)=107 *21*, normalized to α(K)(117γ, E2, theory)=0.741. ce(L)/ce(M) (theory)=5. 1985Ra20 reports ce(L)/ce(M)=8.9. However, evaluators have obtained ce(L)/ce(M)≈5 from the electron spectrum given in 1985Ra20.
74.13 *5*	1.2 *1*	306.56	(3/2)$^-$	232.416	(3/2,5/2)$^-$				
77.75 *3*	0.3 *1*	306.56	(3/2)$^-$	228.83	(3/2)$^-$				
117.32 *5*	9.7 *4*	117.368	9/2$^-$	0.0	5/2$^-$	E2		1.094	B(E2)(W.u.)=72 *23* α(K)=0.741 *11*; α(L)=0.278 *4*; α(M)=0.0605 *9*; α(N+..)=0.01432 *21* α(N)=0.01260 *18*; α(O)=0.001686 *24*; α(P)=3.52×10^{-5} *5* Mult.: α(L)exp=0.336 *100*, α(M)exp=0.084 *25*.
146.00 *3*	3.2 *2*	263.386	7/2$^-$	117.368	9/2$^-$	M1,E2		0.42 *9*	α(K)=0.33 *4*; α(L)=0.07 *4*; α(M)=0.016 *8*; α(N+..)=0.0038 *19* α(N)=0.0033 *16*; α(O)=0.00047 *21*; α(P)=1.88×10^{-5} *5* Mult.: α(K)exp=0.34 *11*. Additional information 4.
160.00 *5*	3.5 *2*	466.67	$^-$	306.56	(3/2)$^-$	M1,E2		0.32 *6*	α(K)=0.250 *25*; α(L)=0.053 *23*; α(M)=0.011 *5*; α(N+..)=0.0027 *12* α(N)=0.0024 *11*; α(O)=0.00033 *13*; α(P)=1.44×10^{-5} *5* Mult.: α(K)exp=0.155 *46*. Additional information 8.
195.554[a] *10*	100	228.83	(3/2)$^-$	33.29	(1/2)$^-$	M1,E2		0.169 *17*	α(K)=0.137 *7*; α(L)=0.025 *8*; α(M)=0.0053 *18*; α(N+..)=0.0013 *5* α(N)=0.0011 *4*; α(O)=0.00016 *5*; α(P)=8.1×10^{-6} *5* Mult.: α(K)exp=0.136 *40*, α(L)exp=0.031 *9*. Additional information 1. I_γ: Iγ=12.6% *19* (1984So18).
[x]198.5[&] *5*	<0.5[&]								I_γ: Iγ=0.4 in 1979Sc11.
[x]204.3 *1*	0.6 *1*								E_γ,I_γ: suggested placement from 466 level by 1979Sc11 is not confirmed by 1989Ro20 in coin studies.
228.80 *6*	20 *1*	228.83	(3/2)$^-$	0.0	5/2$^-$	M1+E2	0.6 *14*	0.102 *6*	α(K)=0.0856 *14*; α(L)=0.013 *4*; α(M)=0.0027 *9*; α(N+..)=0.00068 *19* α(N)=0.00058 *17*; α(O)=8.7×10^{-5} *21*; α(P)=5.4×10^{-6} *5* Mult.: α(K)exp=0.082 *30*, α(L)exp=0.014 *4*. Additional information 2.

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$\gamma(^{143}Ba)$ (continued)

E_γ [#]	I_γ [‡ b]	E_i(level)	J_i^π	E_f	J_f^π	Mult. [@]	δ	α [†]	Comments
232.421 [a] *16*	66 *2*	232.416	(3/2,5/2)$^-$	0.0	5/2$^-$	M1,E2		0.100 *5*	α(K)=0.0820 *12*; α(L)=0.014 *4*; α(M)=0.0029 *7*; α(N+..)=0.00072 *16* α(N)=0.00062 *15*; α(O)=9.1×10^{-5} *18*; α(P)=4.9×10^{-6} *5* Mult.: α(K)exp=0.101 *30*. Additional information 3. I_γ: Iγ=10.0% *9* (1984So18).
234.2 *1*	2.0 *2*	466.67	$^-$	232.416	(3/2,5/2)$^-$				
237.93 *4*	3.1 *8*	466.67	$^-$	228.83	(3/2)$^-$				
263.383 [a] *14*	29 *1*	263.386	7/2$^-$	0.0	5/2$^-$	M1,E2		0.0685	α(K)=0.0569 *19*; α(L)=0.0092 *15*; α(M)=0.0019 *4*; α(N+..)=0.00047 *8* α(N)=0.00041 *7*; α(O)=6.0×10^{-5} *8*; α(P)=3.5×10^{-6} *4* Mult.: α(K)exp=0.098 *30*. Additional information 5.
272.656 [a] *90*	34 *1*	306.56	(3/2)$^-$	33.29	(1/2)$^-$	M1,E2		0.0619 *10*	α(K)=0.0515 *21*; α(L)=0.0082 *12*; α(M)=0.0017 *3*; α(N+..)=0.00042 *6* α(N)=0.00037 *6*; α(O)=5.4×10^{-5} *7*; α(P)=3.1×10^{-6} *4* Mult.: α(K)exp=0.044 *13*. Additional information 6. I_γ: Iγ=3.9% *5* (1984So18).
299.33 *5*	6.4 *3*	834.09	3/2,5/2	534.83	5/2$^-$				
302.51 *5*	3.9 *2*	534.83	5/2$^-$	232.416	(3/2,5/2)$^-$				
306.424 [a] *58*	54 *2*	306.56	(3/2)$^-$	0.0	5/2$^-$	M1+E2	1 *5*	0.0441 *19*	α(K)=0.037 *3*; α(L)=0.0057 *6*; α(M)=0.00118 *13*; α(N+..)=0.00029 *3* α(N)=0.000253 *25*; α(O)=3.74×10^{-5} *25*; α(P)=2.3×10^{-6} *3* Mult.: α(K)exp=0.035 *11*. Additional information 7. I_γ: Iγ=6.9% *12* (1984So18).
388.9 *1*	6.0 *3*	695.53	(+)	306.56	(3/2)$^-$				
407.2 *1*	2.6 *2*	670.57		263.386	7/2$^-$				
417.44 *5*	1.1 *1*	534.83	5/2$^-$	117.368	9/2$^-$				
438.1 *1*	0.7 *1*	670.57		232.416	(3/2,5/2)$^-$				
466.69 *5*	24 *1*	466.67	$^-$	0.0	5/2$^-$	(E2)		0.01194	α(K)=0.01001 *14*; α(L)=0.001538 *22*; α(M)=0.000321 *5*; α(N+..)=7.91×10^{-5} *11* α(N)=6.84×10^{-5} *10*; α(O)=1.011×10^{-5} *15*; α(P)=5.98×10^{-7} *9* Mult.: α(K)exp=0.017 *5*, α(K)(E2)=0.0099. E_γ: from level energies.
466.74 *5*	12.9 *8*	695.53	(+)	228.83	(3/2)$^-$	(E1)		0.00382 *6*	α=0.00382 *6*; α(K)=0.00330 *5*; α(L)=0.000416 *6*; α(M)=8.51×10^{-5} *12*; α(N+..)=2.13×10^{-5} *3* α(N)=1.83×10^{-5} *3*; α(O)=2.78×10^{-6} *4*; α(P)=1.97×10^{-7} *3* Mult.: α(K)exp=0.0075 *23*. E_γ: from level energies.
480.4 *1*	1.0 *2*	597.77?		117.368	9/2$^-$				
516.1 *1*	1.1 *2*	822.74		306.56	(3/2)$^-$				

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^{143}Cs β^- decay 1989Ro20 (continued)

$\gamma(^{143}Ba)$ (continued)

E_γ[#]	I_γ[‡b]	E_i(level)	J_i^π	E_f	J_f^π	Comments
524.1 *1*	2 *1*	830.85		306.56	$(3/2)^-$	
527.4 *1*	27 *1*	834.09	3/2,5/2	306.56	$(3/2)^-$	
534.80 *6*	10.7 *5*	534.83	$5/2^-$	0.0	$5/2^-$	I_γ: Iγ=1.2% *2* (1984So18).
553.2 *1*	1.8 *2*	670.57		117.368	$9/2^-$	
559.5 *1*	0.9 *1*	822.74		263.386	$7/2^-$	
570.70 *7*	12.9 *6*	834.09	3/2,5/2	263.386	$7/2^-$	
590.3 *1*	0.9	822.74		232.416	$(3/2,5/2)^-$	
601.6 *1*	0.4 *1*	834.09	3/2,5/2	232.416	$(3/2,5/2)^-$	
602.2 *1*	2.8 *3*	830.85		228.83	$(3/2)^-$	
605.30 *7*	12.3 *5*	834.09	3/2,5/2	228.83	$(3/2)^-$	
611.93 *6*	7.0 *4*	729.27	$5/2^-$	117.368	$9/2^-$	
616.0 *1*	1.2 *8*	1082.70		466.67	$^-$	
618.5 *1*	2.3 *8*	1085.12		466.67	$^-$	
626.58 *6*	23.2 *9*	659.98		33.29	$(1/2)^-$	
660.06 *8*	38 *1*	659.98		0.0	$5/2^-$	I_γ: from 1989Ro20; 52 in 1985Ra20, 37 in 1979Sc11.
662.1 *1*	24 *1*	695.53	$(^+)$	33.29	$(1/2)^-$	
670.2 *1*	1.6 *2*	933.69		263.386	$7/2^-$	
670.6 *1*	2.4 *2*	670.57		0.0	$5/2^-$	
[x]711.5 *1*	0.9 *1*					
729.23 *7*	10.9 *5*	729.27	$5/2^-$	0.0	$5/2^-$	
756.7 *1*	4.1 *2*	1452.25		695.53	$(^+)$	
776.06 *7*	1.6 *4*	1082.70		306.56	$(3/2)^-$	
778.6 *1*	5.1 *6*	1085.12		306.56	$(3/2)^-$	
786.7 *1*	1.5 *4*	1253.33		466.67	$^-$	
792.1 *1*	5.2 *3*	1452.25		659.98		
793.5[&]	<1.0[&]	1100.63		306.56	$(3/2)^-$	
822.7 *1*	4 *2*	822.74		0.0	$5/2^-$	
833 *1*	1.2 *3*	1299.7		466.67	$^-$	
834.0 *1*	5.8 *4*	834.09	3/2,5/2	0.0	$5/2^-$	
837.1 *1*	4.1 *2*	1100.63		263.386	$7/2^-$	
846.55 *8*	1.6 *1*	1109.97		263.386	$7/2^-$	
852.7 *1*	2.2 *3*	1085.12		232.416	$(3/2,5/2)^-$	
856.4 *2*	5.6 *6*	1085.12		228.83	$(3/2)^-$	
868.2 *1*	6.0 *2*	1100.63		232.416	$(3/2,5/2)^-$	
871.8 *1*	4.2 *2*	1100.63		228.83	$(3/2)^-$	
877.6 *1*	2.3 *2*	1109.97		232.416	$(3/2,5/2)^-$	
[x]880.5 *1*	1.0 *1*					
890.0 *1*	1.1 *1*	1153.55		263.386	$7/2^-$	
921.20 *8*	1.6 *3*	1153.55		232.416	$(3/2,5/2)^-$	
933.75 *8*	1.5 *1*	933.69		0.0	$5/2^-$	
971.1 *2*	1.2 *1*	1203.52		232.416	$(3/2,5/2)^-$	
985.7 *1*	1.8 *1*	1452.25		466.67	$^-$	
1020.8 *1*	2.1 *2*	1253.33		232.416	$(3/2,5/2)^-$	

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^{143}Cs β^- decay 1989Ro20 (continued)

$\gamma(^{143}Ba)$ (continued)

E_γ [#]	I_γ [‡ b]	E_i(level)	J_i^π	E_f	J_f^π	E_γ [#]	I_γ [‡ b]	E_i(level)	J_i^π	E_f	J_f^π
1024.5 *1*	1.3 *1*	1253.33		228.83	$(3/2)^-$	1219.9 *1*	2.0 *3*	1452.25		232.416	$(3/2,5/2)^-$
1049.2	0.6 *1*	1082.70		33.29	$(1/2)^-$	1253.4 *1*	0.6 *1*	1253.33		0.0	$5/2^-$
1051.7 *1*	1.9 *1*	1085.12		33.29	$(1/2)^-$	1312.6 *1*	2.6 *1*	1575.99		263.386	$7/2^-$
1083.4 *2*	2.8 *1*	1082.70		0.0	$5/2^-$	1440.9 *1*	0.2 *1*	1440.86		0.0	$5/2^-$
1100.8 *1*	1.0 *1*	1100.63		0.0	$5/2^-$	1805.5[&] *5*	3.7[&]	2638.96		834.09	3/2,5/2
1153.6 *1*	1.0 *1*	1153.55		0.0	$5/2^-$	1909.5[&] *3*	5.3[&]	2638.96		729.27	$5/2^-$
1208.4 *1*	2.0 *3*	1440.86		232.416	$(3/2,5/2)^-$	1978.9[&] *3*	10[&]	2638.96		659.98	

† Additional information 9.
‡ Absolute Iγ from 1984So18 are based on I(γ+ce)(293.3γ)=42.8% *4* in ^{143}Ce β^- decay (1982Ge03).
# γ's: Eγ (Iγ): 595.0 (2), 653.3 (1.5), 681.9 (2), 743.3 (2), 753.0 (1), 911.3 (1.5), 969.6 (3) from 1979Sc11 were not observed in 1985Ra20 or 1989Ro20.
@ From 1985Ra20 based on α(K)exp, α(L)exp.
& From 1985Ra20; ΔE=0.1-0.3; ΔIγ<10%.
a From 1979Bo26.
b For absolute intensity per 100 decays, multiply by 0.126 *19*.
x γ ray not placed in level scheme.

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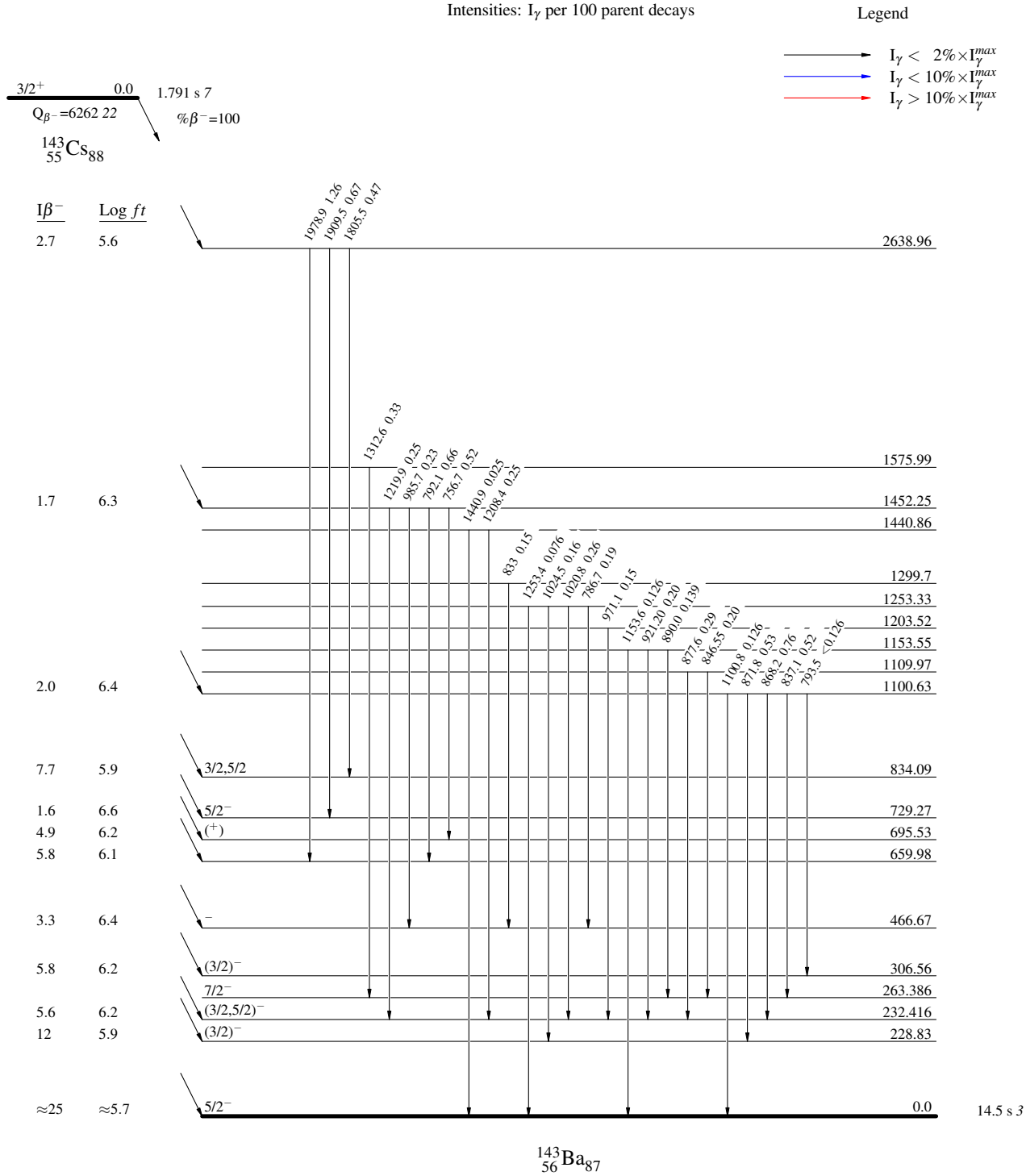
^{143}Cs β^- decay 1989Ro20

Decay Scheme

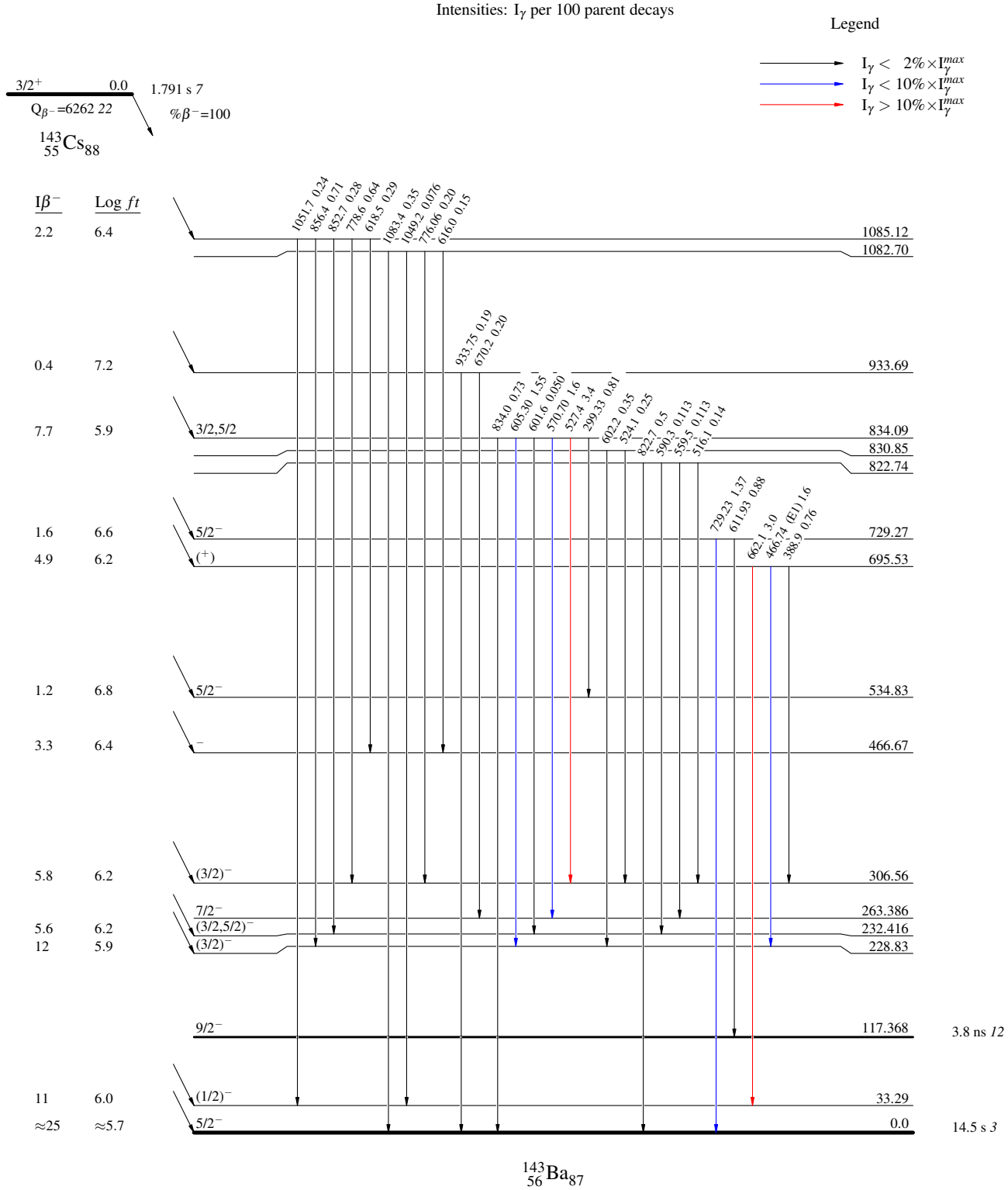
Intensities: I_γ per 100 parent decays



^{143}Cs β^- decay 1989Ro20

Decay Scheme (continued)

Intensities: I_γ per 100 parent decays



^{143}Cs β^- decay 1989Ro20

Decay Scheme (continued)

Intensities: I_γ per 100 parent decays