^{126}Ba ε decay 1976Pa11

History

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

Parent: ^{126}Ba: E=0.0; $J^\pi=0^+$; $T_{1/2}$=100 min *2*; Q(ε)=1681 *16*; %ε+%β^+ decay=100.0
1976Pa11: ^{115}In(^{16}O,5n)^{126}La ε decay, ^{121}Sb(^{11}B,6n), ^{133}Cs(p,8n), chem, Eγ, γγ, ce, βγ.
Others: 1975Pa10, 1973Bl08.
The decay scheme is that proposed by 1976Pa11 on the basis of γγ and Eγ sums.

^{126}Cs Levels

E(level)†	J^π‡	$T_{1/2}$	E(level)†	J^π‡	E(level)†	J^π‡
0.0	1+	1.643 min *17*	489.41 *13*	1,0−	876.9 *3*	1,0−
217.87 *10*			508.51 *21*		903.5 *3*	1,0−
233.63 *8*	1+		538.88 *17*	1,0−	1097.48 *13*	1+
241.00 *9*	0−,1−,2−		542.67 *11*	0,1,2,3+	1140.5 *3*	1,0−
257.60 *8*	0+,1+		589.45 *21*		1210.75 *15*	1+
281.20 *12*	0,1,2,3+		681.84 *12*	1+	1234.32 *11*	1+
328.28 *13*	0,1,2,3+		709.53 *17*	1,0−	1241.63 *16*	1+
347.82 *21*			776.6 *3*	0,1	1293.01 *12*	1+
454.7 *3*			781.51 *22*	0,1		
457.11 *16*	0,1		841.92 *18*	1,0−		

† From a least-squares fit to the E(γ′s) by evaluators.
‡ From the Adopted Levels.

ε,β^+ radiations

E(decay)	E(level)	Iβ^+ #	Iε†#	Log *ft*	I(ε+β^+)†#	Comments
(388 *16*)	1293.01		9.1 *10*	4.56 *7*	9.1 *10*	εK=0.8334 *11*; εL=0.1300 *9*; εM+=0.0366 *3*
(439 *16*)	1241.63		3.5 *5*	5.09 *8*	3.5 *5*	εK=0.8363 *9*; εL=0.1278 *7*; εM+=0.03589 *20*
(447 *16*)	1234.32		9.6 *10*	4.67 *6*	9.6 *10*	εK=0.8366 *8*; εL=0.1275 *6*; εM+=0.03580 *20*
(470 *16*)	1210.75		3.7 *5*	5.13 *7*	3.7 *5*	εK=0.8377 *7*; εL=0.1268 *6*; εM+=0.03555 *18*
(541 *16*)	1140.5		0.94 *17*	5.86 *9*	0.94 *17*	εK=0.8402 *6*; εL=0.1248 *4*; εM+=0.03492 *13*
(584 *16*)	1097.48		5.1 *6*	5.19 *6*	5.1 *6*	εK=0.8415 *5*; εL=0.1239 *4*; εM+=0.03462 *11*
(778 *16*)	903.5		0.69 *13*	6.32 *9*	0.69 *13*	εK=0.8452 *3*; εL=0.12108 *18*; εM+=0.03370 *6*
(804 *16*)	876.9		0.94 *17*	6.22 *9*	0.94 *17*	εK=0.8456 *3*; εL=0.12081 *17*; εM+=0.03361 *6*
(839 *16*)	841.92		1.1 *4*	6.19 *16*	1.1 *4*	εK=0.8460 *2*; εL=0.12047 *15*; εM+=0.03350 *5*
(899 *16*)	781.51		0.27 *12*	6.86 *20*	0.27 *12*	εK=0.8467 *2*; εL=0.11996 *13*; εM+=0.03333 *5*
(904 *16*)	776.6		0.29 *10*	6.84 *15*	0.29 *10*	εK=0.8468 *2*; εL=0.11992 *13*; εM+=0.03332 *5*
(971 *16*)	709.53		2.0 *5*	6.06 *11*	2.0 *5*	εK=0.8474 *2*; εL=0.1194 *1*; εM+=0.03316 *4*
(999 *16*)	681.84		5.4 *7*	5.66 *6*	5.4 *7*	εK=0.8477 *2*; εL=0.1192 *1*; εM+=0.03310 *4*
(1142 *16*)	538.88		1.6 *3*	6.30 *9*	1.6 *3*	εK=0.8487 *1*; εL=0.11845 *8*; εM+=0.03284 *3*
(1192 *16*)	489.41		3.8 *5*	5.97 *6*	3.8 *5*	εK=0.8489; εL=0.11822 *8*; εM+=0.03277 *3*
(1224 *16*)	457.11		0.41 *21*	6.96 *23*	0.41 *21*	εK=0.8491; εL=0.11807 *8*; εM+=0.03272 *3*
(1423 *16*)	257.60	0.0050 *21*	1.8 *7*	6.45 *17*	1.8 *7*	av Eβ=189.6 *71*; εK=0.8477 *4*; εL=0.1170 *1*; εM+=0.03240 *4*
(1447 *16*)	233.63	0.060 *11*	16.8 *18*	5.49 *5*	16.9 *18*	av Eβ=200.1 *71*; εK=0.8472 *5*; εL=0.1169 *2*; εM+=0.03235 *4*
(1463 *16*)	217.87	0.0078 *24*	1.9 *5*	6.45 *12*	1.9 *5*	av Eβ=207.0 *70*; εK=0.8468 *5*; εL=0.11678 *12*; εM+=0.03232 *4*
(1681 *16*)	0.0	0.58 *12*	30 *6*	5.37 *9*	31‡ *6*	av Eβ=302.2 *70*; εK=0.8350 *14*; εL=0.11452 *24*; εM+=0.03167 *7*

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^{126}Ba ε decay 1976Pa11 (continued)

ε,β^+ radiations (continued)

† From inensity balances at each level, except for the ground state feeding. Note that transition multipolarities are not generally known so the imbalances are from Iγ data only. Inclusion of internal conversion would make only small differences.
‡ From equilibrium condition for the chain decay of ^{126}Ba – ^{126}Cs – ^{126}Xe.
# Absolute intensity per 100 decays.

γ(^{126}Cs)

Iγ normalization: from I(ε+β^+ to g.s.)=31% *6*; from equilibrium condition for the chain decay of ^{126}Ba – ^{126}Cs – ^{126}Xe; see ^{126}Cs β^+ decay.

E_γ[†]	I_γ[‡c]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[b]	α[d]	Comments
94.5 *3*	0.6 *2*	328.28	0,1,2,3$^+$	233.63	1$^+$			
106.9 *2*	1.2 *3*	454.7		347.82				
[x]126.5 *2*	1.1 *3*							
130.0 *2*	1.9 *4*	347.82		217.87				
192.5 *5*		681.84	1$^+$	489.41	1,0$^-$			I_γ: Weak (1976Pa11). Other Iγ<1 (1973Bl08).
201.1 *2*	1.5 *4*	709.53	1,0$^-$	508.51				
[x]203.8 *3*	0.82 *20*							
208.2 *2*	1.3 *3*	489.41	1,0$^-$	281.20	0,1,2,3$^+$			
[x]213.5[#] *3*	0.43 *20*							
217.9 *1*	10.0 *10*	217.87		0.0	1$^+$			
231.7[#] *3*	2.2 *3*	489.41	1,0$^-$	257.60	0$^+$,1$^+$			
233.6 *1*	48.2 *25*	233.63	1$^+$	0.0	1$^+$	M1,E2	0.092 *7*	α(K)=0.076 *3*; α(L)=0.013 *3*; α(M)=0.00264 *67* α(N)=0.00055 *14*; α(O)=7.3×10^{-5} *15*; α(P)=2.73×10^{-6} *17* α(K)exp=0.088, α(L)exp=0.016.
239.3 *5*	1.1 *3*	457.11	0,1	217.87				
241.0 *1*	14.7 *12*	241.00	0$^-$,1$^-$,2$^-$	0.0	1$^+$	E1	0.0194	α(K)=0.01673 *24*; α(L)=0.00214 *3*; α(M)=0.000435 *7* α(N)=9.13×10^{-5} *13*; α(O)=1.248×10^{-5} *18*; α(P)=5.74×10^{-7} *8* α(K)exp=0.027.
257.6 *1*	18.7 *10*	257.60	0$^+$,1$^+$	0.0	1$^+$	M1,E2	0.069 *3*	α(K)=0.0573 *9*; α(L)=0.0092 *18*; α(M)=0.0019 *4* α(N)=0.00040 *8*; α(O)=5.3×10^{-5} *8*; α(P)=2.07×10^{-6} *16* α(K)exp=0.053.
[x]269.3 *3*	0.44 *20*							
281.2 *2*	7.5 *8*	281.20	0,1,2,3$^+$	0.0	1$^+$			
284.9 *3*	1.0 *3*	542.67	0,1,2,3$^+$	257.60	0$^+$,1$^+$			
290.8 *3*	1.3 *3*	508.51		217.87				
303.4 *5*	0.3 *1*	841.92	1,0$^-$	538.88	1,0$^-$			
308.9 *3*	0.8 *2*	542.67	0,1,2,3$^+$	233.63	1$^+$			
320.5 *5*	0.2 *1*	1097.48	1$^+$	776.6	0,1			
[x]324.8 *5*	0.6 *2*							
328.3 *2*	5.1 *5*	328.28	0,1,2,3$^+$	0.0	1$^+$			
347.6[@f]		347.82		0.0	1$^+$			
348.5 *2*	1.8 *4*	589.45		241.00	0$^-$,1$^-$,2$^-$			
353.5 *3*	1.3 *3*	681.84	1$^+$	328.28	0,1,2,3$^+$			
392.5 *2*	1.9 *4*	1234.32	1$^+$	841.92	1,0$^-$			
400.6 *2*	2.8 *4*	681.84	1$^+$	281.20	0,1,2,3$^+$			

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^{126}Ba ε decay 1976Pa11 (continued)

γ(^{126}Cs) (continued)

Eγ[†]	Iγ[‡c]	Ei(level)	$J^π_i$	Ef	$J^π_f$
415.5 3	1.5 3	1097.48	1+	681.84	1+
441.0 5	1.0 2	681.84	1+	241.00	0−,1−,2−
452.8 3	0.45 20	1234.32	1+	781.51	0,1
457.2 2	1.7 3	457.11	0,1	0.0	1+
475.5 3	0.8 2	709.53	1,0−	233.63	1+
489.3 2	7.1 7	489.41	1,0−	0.0	1+
508.7[@f]		508.51		0.0	1+
535.4 3	0.9 2	776.6	0,1	241.00	0−,1−,2−
538.9 2	4.8 5	538.88	1,0−	0.0	1+
542.5 2	2.2 4	542.67	0,1,2,3+	0.0	1+
548.7[&] 3	1.6 3	876.9	1,0−	328.28	0,1,2,3+
551.2 3	1.8 3	1140.5	1,0−	589.45	
558.5 5	0.3 1	1097.48	1+	538.88	1,0−
561.1 5	0.7 3	841.92	1,0−	281.20	0,1,2,3+
583.5 3	1.0 3	1293.01	1+	709.53	1,0−
608.5[e] 5	1.0[e] 2	841.92	1,0−	233.63	1+
608.5[ef] 5	1.0[e] 2	1097.48	1+	489.41	1,0−
611.2 5	1.2 2	1293.01	1+	681.84	1+
640.6 3	1.4 2	1097.48	1+	457.11	0,1
643.1 5	0.9 2	1097.48	1+	454.7	
667.8 3	0.7 3	1210.75	1+	542.67	0,1,2,3+
681.8 2	10.8 11	681.84	1+	0.0	1+
685.6 3	1.1 2	903.5	1,0−	217.87	
691.6 2	2.0 2	1234.32	1+	542.67	0,1,2,3+
698.6 3	0.7 2	1241.63	1+	542.67	0,1,2,3+
702.6 5	0.2 1	1241.63	1+	538.88	1,0−
709.8 3	3.7 8	709.53	1,0−	0.0	1+
744.5 3	1.4 2	1234.32	1+	489.41	1,0−
750.5 5	0.3 1	1293.01	1+	542.67	0,1,2,3+
[x]779.0 5	0.4 2				
781.5 3	1.1 2	781.51	0,1	0.0	1+
835.9 5	0.4 2	1293.01	1+	457.11	0,1
839.5 5	1.2 3	1097.48	1+	257.60	0+,1+
841.6 5	2.6 5	841.92	1,0−	0.0	1+
856.5 3	1.8 3	1097.48	1+	241.00	0−,1−,2−
863.9 2	3.6 7	1097.48	1+	233.63	1+
876.8 5	0.7 2	876.9	1,0−	0.0	1+
882.5 5	0.7 2	1210.75	1+	328.28	0,1,2,3+
899.2 5	0.5 2	1140.5	1,0−	241.00	0−,1−,2−
903.5 5	0.6 2	903.5	1,0−	0.0	1+
905.9 5	0.9 2	1234.32	1+	328.28	0,1,2,3+
[x]910.0 5	0.3 1				
913.5 5	1.1 2	1241.63	1+	328.28	0,1,2,3+
929.6 5	1.5 3	1210.75	1+	281.20	0,1,2,3+
953.1 3	1.2 3	1234.32	1+	281.20	0,1,2,3+
964.4 5	0.5 2	1293.01	1+	328.28	0,1,2,3+
976.8 2	4.4 4	1234.32	1+	257.60	0+,1+
977.2 2	1.6[a]	1210.75	1+	233.63	1+
984.2 3	2.8 6	1241.63	1+	257.60	0+,1+
993.4 3	6.0 10	1234.32	1+	241.00	0−,1−,2−
1000.8 5	0.6 2	1234.32	1+	233.63	1+
1008.0 5	1.2 2	1241.63	1+	233.63	1+
1011.8 5	1.8 4	1293.01	1+	281.20	0,1,2,3+
1035.4 3	4.0 8	1293.01	1+	257.60	0+,1+
1052.0 2	3.0 5	1293.01	1+	241.00	0−,1−,2−

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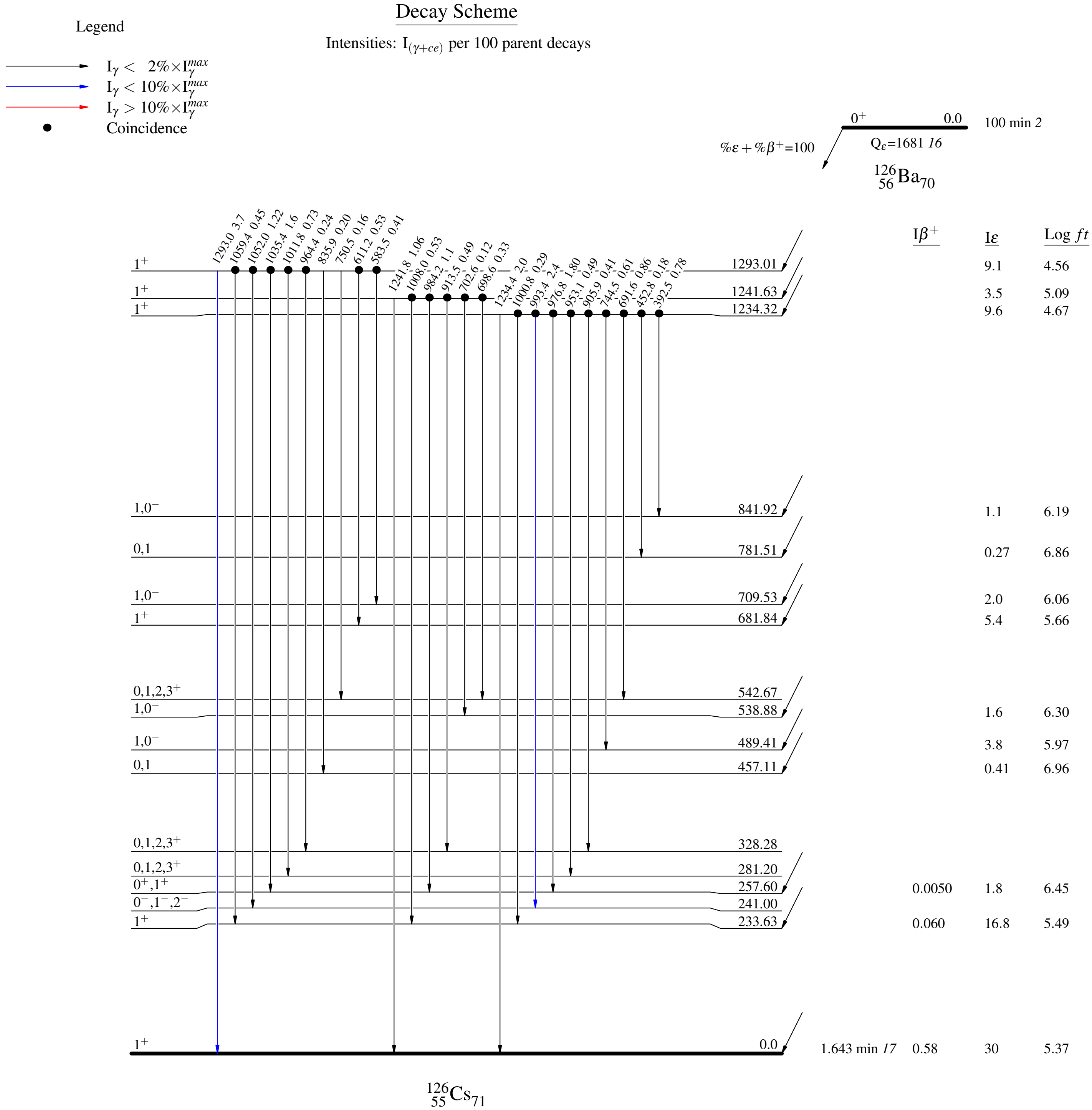
^{126}Ba ε decay 1976Pa11 (continued)

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

E_γ [†]	I_γ [‡c]	E_i(level)	J^π_i	E_f	J^π_f
1059.4 *5*	1.0 *2*	1293.01	1^+	233.63	1^+
1097.5 *5*	1.7 *4*	1097.48	1^+	0.0	1^+
1210.8 *3*	4.5 *9*	1210.75	1^+	0.0	1^+
1234.4 *3*	4.8 *9*	1234.32	1^+	0.0	1^+
1241.8 *3*	2.6 *5*	1241.63	1^+	0.0	1^+
1293.0 *3*	9.1 *10*	1293.01	1^+	0.0	1^+

† From 1976Pa11.
‡ From Iγ in ^{126}Cs $\varepsilon+\beta$; decay, Iγ measured in ^{126}Ba for ^{126}Cs and to ^{126}Xe source in equilibrium. See ^{126}Cs $\varepsilon+\beta^+$ decay.
# Assignment to ^{126}Ba decay is not certain (1976Pa11).
@ Not included in authors′ table, but shown as a tentative placement in authors′ decay scheme (1976Pa11).
& This γ is seen in $\gamma\gamma$ coin spectra of Ba decay and is included in the Ba decay scheme although 1976Pa11 lists it as belonging to Cs.
a From $\gamma\gamma$-coin (1976Pa11).
b From α(K) data of 1976Pa11 based on relative Iγ and I(ce(K)) data normalized so that α(K)(388.6γ in ^{126}Xe) has the theoretical E2 value, unless otherwise noted.
c For absolute intensity per 100 decays, multiply by 0.408 *32*.
d 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.
e Multiply placed with undivided intensity.
f Placement of transition in the level scheme is uncertain.
x γ ray not placed in level scheme.

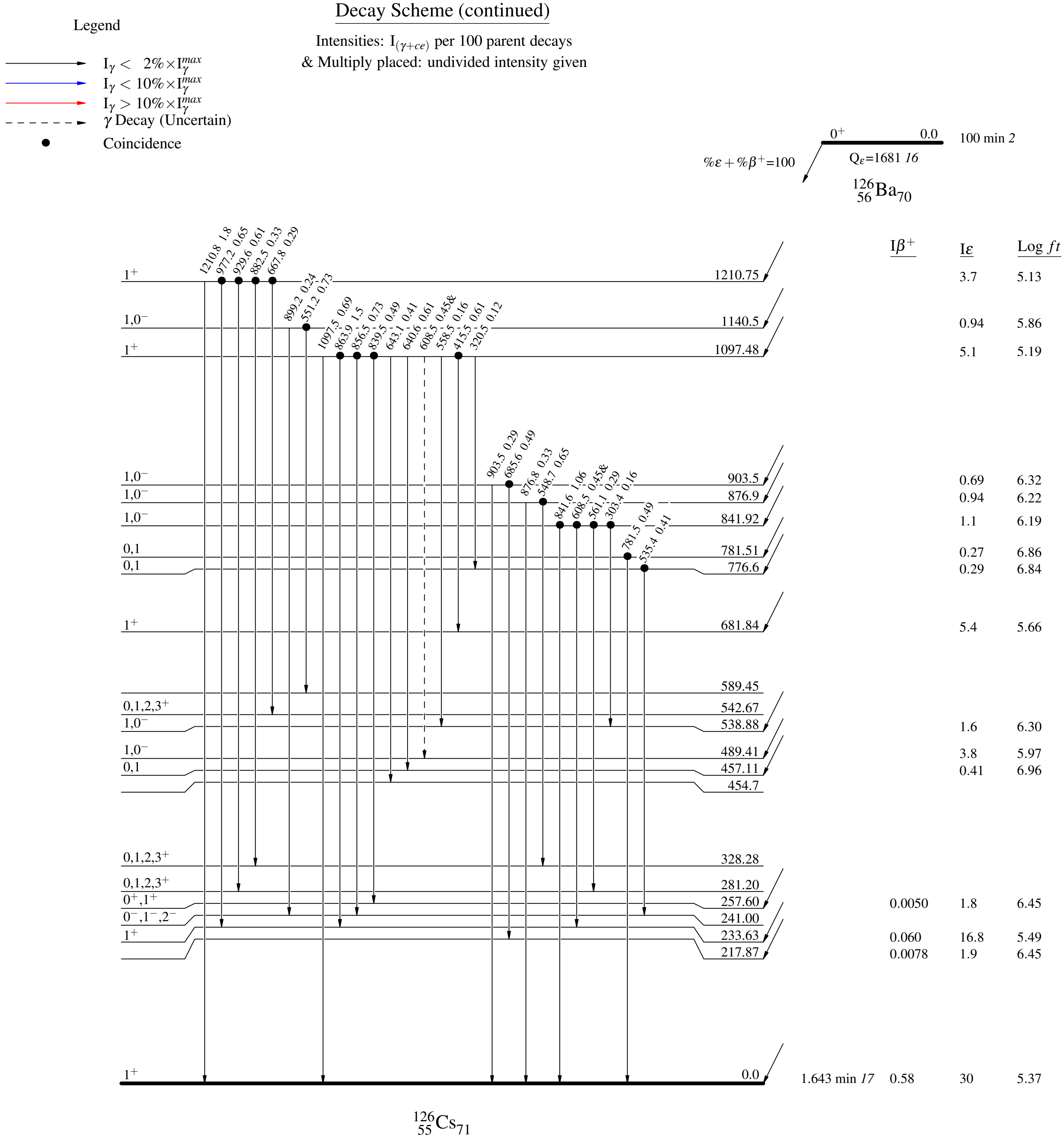
^{126}Ba ε decay 1976Pa11



^{126}Ba ε decay 1976Pa11

Decay Scheme (continued)

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays
& Multiply placed: undivided intensity given



^{126}Ba ε decay 1976Pa11

Decay Scheme (continued)

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays
& Multiply placed: undivided intensity given