^{146}La β^- decay (9.8 s) 2000Ya08,1993Sh10

History

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

Parent: ^{146}La: E=0.0+x; J$^\pi$=(6$^-$); T$_{1/2}$=9.8 s *4*; Q(β^-)=6590 *30*; %β^- decay=100.0

^{146}La-E(level)=1.3×10^2 *13* for 9.8 s ^{146}La isomer from 2012Au07 evaluation.

2000Ya08,1993Sh10: ^{146}La β^- decay [from ^{235}U(n,F), E=th]; measured Eγ, Iγ(θ), $\gamma\gamma$ coin, I(ce). ^{146}Ce; deduced levels, J^π, δ, B(λ). Mass-separator KUR-ISOL, IBM-2 calculations, band assignment.

Others: 1974Ar17, 1978Mo33, 1977Sk02, 1979Ke02.

The level scheme is from 1993Sh10. Part of levels are excited also in 6.1 s β^- decay of ^{146}La. In some cases, the branching ratios differ from each other for 9.8 s and 6.1 s ^{146}La decays.

^{146}Ce Levels

Band assignments from 2000Ya08, 1993Sh10.

E(level)[†]	J$^\pi$[‡]	E(level)[†]	J$^\pi$[‡]	E(level)[†]	J$^\pi$[‡]	E(level)[†]	J$^\pi$[‡]
0.0[#]	0$^+$	1891.79 *10*	(3$^-$,4,5$^-$)	2367.0 *5*	(1$^-$,2$^+$)	3273.6 *9*	
258.45[#] *4*	2$^+$	1916.05 *12*	(4,5$^-$)	2373.2 *3*		3283.62 *11*	(1$^-$,2$^+$)
668.27[#] *6*	4$^+$	1956.19 *9*		2398.07 *20*	(2$^+$)	3330.04 *17*	(2$^+$)
924.60 *6*	1$^-$	1988.7 *4*		2414.78 *17*	(4$^+$)	3342.14 *19*	
960.58 *6*	3$^-$	2022.5 *3*	(4$^+$)	2446.82 *14*	(3$^-$)	3390.1 *6*	
1043.18[@] *10*	0$^+$	2031.67 *12*	(4$^+$)	2468.7 *3*		3403.3 *4*	
1171.28[#] *7*	6$^+$	2051.90 *18*		2512.56 *25*		3450.5 *4*	
1182.87 *8*	5$^-$	2072.2 *4*	(2$^+$)	2519.07 *15*		3494.9 *4*	
1274.35[@] *8*	2$^+$	2090.38 *14*	(4$^+$)	2543.92 *21*		3502.09 *22*	
1381.98[&] *7*	2$^+$	2126.98 *17*	(1$^+$,2$^+$)	2551.68 *12*		3532.6 *4*	
1551.06 *10*	5$^-$	2128.58 *21*		2570.2 *4*		3535.5 *7*	
1576.54[&] *9*	3$^+$	2139.72 *14*	(4$^+$,5$^+$)	2587.59 *22*		3653.6 *5*	
1627.22[@] *8*	4$^+$	2156.3 *4*	(1$^-$,2$^+$)	2713.78 *25*		3729.8 *4*	
1657.6 *4*	0$^+$	2177.29 *8*	(5$^-$,4$^+$)	2779.5 *4*	(1,2$^+$)	3859.1 *5*	
1711.81[&] *9*	(4$^+$)	2183.0 *5*		2796.62 *25*		3917.9 *6*	
1736.98[#] *22*	8$^+$	2193.99 *18*		2809.4 *3*		3978.3 *5*	(3$^-$,4$^+$)
1753.76 *11*	(1$^-$,2,3$^-$)	2209.5 *4*		2841.28 *21*		4190.3 *6*	
1756.68 *8*	(1,2$^+$)	2222.45 *22*	(3,4$^+$)	2862.04 *11*	(1,2$^+$)	4209.9 *5*	
1769.09 *11*	(4,5$^-$)	2256.46 *9*	(4$^+$,5,6$^+$)	2869.29 *25*		4255.2 *4*	
1797.0 *3*		2262.04 *12*		2914.14 *13*		4269.5 *4*	
1802.29 *18*	(4$^+$)	2270.20 *14*	(6$^+$)	2953.70 *11*	(2,3$^-$)	4497.1 *9*	
1808.8 *3*		2274.4 *3*		3063.9 *3*		4521.6 *3*	
1810.34[&] *7*	5$^+$	2311.20 *24*	(1$^-$,2$^+$)	3164.6 *5*	(1,2$^+$)		
1832.16 *21*	(1,2$^+$)	2318.57 *11*	(1,2$^+$)	3243.02 *12*			
1875.43 *17*	(4,5$^-$)	2337.4 *6*		3254.7 *3*	(2,3$^+$)		

[†] From a least-squares fit to Eγ's; normalized χ^2=1.4.
[‡] From 'Adopted Levels'.
[#] Ground state band.
[@] Quasi-β band on 1043.2, J=0$^+$.
[&] Quasi-γ band on 1381.9, J=2$^+$.

^{146}La β^- decay (9.8 s) 2000Ya08,1993Sh10 (continued)

β^- radiations

E(decay)	E(level)	Iβ^-†‡	Log *ft*	Comments
(3.68×10^3 *3*)	2914.14	2.5 *4*	6.50 *8*	av Eβ=1601 *14* Other: I(β^-)<2.4%, log *ft*>6.5 (1993Sh10).
(4.07×10^3 *3*)	2519.07	1.76 *19*	6.84 *6*	av Eβ=1785 *14* Other: I(β^-)<1.7%, log *ft*>6.8 (1993Sh10).
(4.14×10^3 *3*)	2446.82			Other: I(β^-)<1.1%, log *ft*>7.1 (1993Sh10).
(4.18×10^3 *3*)	2414.78	1.29 *15*	7.02 *6*	av Eβ=1834 *14* Other: I(β^-)<1.2%, log *ft*>7.0 (1993Sh10).
(4.32×10^3 *3*)	2270.20	2.08 *23*	6.87 *6*	av Eβ=1901 *14* Other: I(β^-)<2.0%, log *ft*>6.9 (1993Sh10).
(4.33×10^3 *3*)	2262.04	2.04 *24*	6.88 *6*	av Eβ=1905 *14* Other: I(β^-)<2.0%, log *ft*>6.9 (1993Sh10).
(4.33×10^3 *3*)	2256.46	8.5 *9*	6.27 *5*	av Eβ=1908 *14* Other: I(β^-)<8.2%, log *ft*>6.3 (1993Sh10).
(4.41×10^3 *3*)	2177.29	7.5 *7*	6.35 *5*	av Eβ=1945 *14* Other: I(β^-)<7.1%, log *ft*>6.4 (1993Sh10).
(4.45×10^3 *3*)	2139.72	1.82 *18*	6.98 *5*	av Eβ=1962 *14* Other: I(β^-)<1.8%, log *ft*>7.0 (1993Sh10).
(4.46×10^3 *3*)	2128.58	1.26 *22*	7.15 *8*	av Eβ=1968 *14* Other: I(β^-)<1.2%, log *ft*>7.2 (1993Sh10).
(4.50×10^3 *3*)	2090.38	1.84 *20*	6.998 *22*	av Eβ=1985 *14* Other: I(β^-)<1.7%, log *ft*>7.0 (1993Sh10).
(4.63×10^3 *3*)	1956.19	2.1 *5*	6.99 *11*	av Eβ=2048 *14* Other: I(β^-)<2.1%, log *ft*>7.0 (1993Sh10).
(4.67×10^3 *3*)	1916.05	2.2 *3*	6.99 *7*	av Eβ=2067 *14* Other: I(β^-)<2.1%, log *ft*>7.0 (1993Sh10).
(4.70×10^3 *3*)	1891.79	1.32 *19*	7.22 *7*	av Eβ=2078 *14* Other: I(β^-)<2.6%, log *ft*>6.9 (1993Sh10).
(4.78×10^3 *3*)	1810.34	4.0 *11*	6.77 *13*	av Eβ=2116 *14* Other: I(β^-)<2.5%, log *ft*>7.0 (1993Sh10).
(4.82×10^3 *3*)	1769.09	1.8 *4*	7.13 *10*	av Eβ=2136 *14* Other: I(β^-)<1.5%, log *ft*>7.2 (1993Sh10).
(4.88×10^3 *3*)	1711.81	2.9 *4*	6.95 *7*	av Eβ=2162 *14* Other: I(β^-)<2.7%, log *ft*>7.0 (1993Sh10).
(4.96×10^3 *3*)	1627.22	2.0 *12*	7.1 *3*	av Eβ=2202 *14* Other: I(β^-)<3.7%, log *ft*>6.9 (1993Sh10).
(5.04×10^3 *3*)	1551.06	3.9 *6*	6.88 *7*	av Eβ=2238 *14* Other: I(β^-)<3.7%, log *ft*>6.9 (1993Sh10).
(5.41×10^3 *3*)	1182.87	11.3 *22*	6.55 *9*	av Eβ=2410 *14* Other: I(β^-)<10.7%, log *ft*>6.6 (1993Sh10).
(5.42×10^3 *3*)	1171.28	7.6 *18*	6.72 *11*	av Eβ=2415 *14* Other: I(β^-)<7.2%, log *ft*>6.7 (1993Sh10).
(5.63×10^3 *3*)	960.58			Other: I(β^-)<1.7%, log *ft*>7.4 (1993Sh10).
(5.92×10^3 *3*)	668.27	5 *3*	7.1 *3*	av Eβ=2650 *14* Other: I(β^-)<4.4%, log *ft*>7.7 (1993Sh10).

† Deduced from transition intensity balance at the levels. Because of many unplaced γ's (about 10% of the total γ intensity) and missing γ's from higher-lying levels, small Iβ deduced from balance of Iγ in the scheme are not very reliable. Therefore, only the strongest (with I$\beta\geq$1.5%) are given here. The evaluators also exclude the possibility of the β^- decay from J=6$^-$ to levels with J$\leq$3.

‡ Absolute intensity per 100 decays.

$\gamma(^{146}Ce)$

Iγ normalization: from no direct feeding the g.s., $J^\pi=0^+$ in β^- decay of ^{146}La, $J^\pi=(6^-)$.

E_γ[†]	I_γ[†a]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[#]	δ[@]	α[&]	Comments
81.2 2	3.8 4	1891.79	$(3^-,4,5^-)$	1810.34	5^+				
108.3[‡] 4	2.3 6	1381.98	2^+	1274.35	2^+				
118.2 4	<0.5	1043.18	0^+	924.60	1^-				
123.1 4	3.0 10	1891.79	$(3^-,4,5^-)$	1769.09	$(4,5^-)$				
145.5 6	1.1 3	1956.19		1810.34	5^+				
183.16 7	74 7	1810.34	5^+	1627.22	4^+	E2+M1	2.7 +9−6	0.244	ce(K)=0.199 14; ce(L)=0.058 9 α(K)=0.185 3; α(L)=0.0466 17; α(M)=0.0102 4 α(N)=0.00220 9; α(O)=0.000325 11; α(P)=1.15×10^{-5} 3 A_2=0.13 3, A_4=0.02 6, 183γ-959γ cascade. The 2nd value δ=0.25 8 (2000Ya08).
221.5 2	3.8 9	2031.67	(4^+)	1810.34	5^+				
225.0 4	4.6 6	2256.46	$(4^+,5,6^+)$	2031.67	(4^+)				
233.6 4	4.4 5	1810.34	5^+	1576.54	3^+				
258.42 5	1266 90	258.45	2^+	0.0	0^+	E2		0.0786	α(K)=0.0620 9; α(L)=0.01303 19; α(M)=0.00282 4 α(N)=0.000612 9; α(O)=9.22×10^{-5} 13; α(P)=4.00×10^{-6} 6
284.7 4	1.8 3	2177.29	$(5^-,4^+)$	1891.79	$(3^-,4,5^-)$				
292.31 6	16.0 10	960.58	3^-	668.27	4^+				
300.3 1	11.3 9	2256.46	$(4^+,5,6^+)$	1956.19					
307.0 4	3.1 3	2262.04		1956.19					
314.8 8	1.9 4	1274.35	2^+	960.58	3^-				
329.4 2	11.0 10	2139.72	$(4^+,5^+)$	1810.34	5^+				
346.3 3	0.8 5	2398.07	(2^+)	2051.90					
349.9 6	0.5 2	1274.35	2^+	924.60	1^-				
352.9 3	3.7 5	1627.22	4^+	1274.35	2^+				
358.5 8	0.7 2	2274.4		1916.05	$(4,5^-)$				
367.00 7	30 3	2177.29	$(5^-,4^+)$	1810.34	5^+				
379.80 7	66 6	1551.06	5^-	1171.28	6^+	E1		0.00689	α(K)=0.00592 9; α(L)=0.000766 11; α(M)=0.0001592 23 α(N)=3.51×10^{-5} 5; α(O)=5.64×10^{-6} 8; α(P)=4.08×10^{-7} 6 Mult.: α(K)exp≤0.004.
383.4[b] 4	1.7[b] 8	1657.6	0^+	1274.35	2^+				
383.4[b] 4	0.7[b] 2	2193.99		1810.34	5^+				
[x]391.7 7	1.1 2								
404.7 4	7.7 6	1956.19		1551.06	5^-				
409.78 5	1000	668.27	4^+	258.45	2^+	E2		0.0189	α(K)=0.01558 22; α(L)=0.00262 4; α(M)=0.000558 8 α(N)=0.0001222 18; α(O)=1.89×10^{-5} 3; α(P)=1.073×10^{-6} 15 A_2=0.10 1, A_4=−0.02 1, 410γ-258γ(E2) cascade (2000Ya08). A_2=0.105 11, A_4=−0.001 14, 410γ-258γ(E2) cascade (1983Wo03).

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

E_γ[†]	I_γ[†a]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	δ[@]	α[&]	Comments
421.2 3	0.8 5	1381.98	2^+	960.58	3^-				
427.7 2	5.6 5	2139.72	$(4^+,5^+)$	1711.81	(4^+)				
[x]441.5 7	2.0 1								
444.2 2	13.1 7	1627.22	4^+	1182.87	5^-				
446.05 7	77 7	2256.46	$(4^+,5,6^+)$	1810.34	5^+				
457.4 1	2.2 6	1381.98	2^+	924.60	1^-				
465.5 3	4.7 6	2177.29	$(5^-,4^+)$	1711.81	(4^+)				
501.3 6	5.0 15	2270.20	(6^+)	1769.09	$(4,5^-)$				
502.96 6	263 20	1171.28	6^+	668.27	4^+	E2		0.01061	α(K)=0.00886 13; α(L)=0.001386 20; α(M)=0.000294 5 α(N)=6.45×10^{-5} 9; α(O)=1.011×10^{-5} 15; α(P)=6.22×10^{-7} 9 A_2=0.10 2, A_4=0.00 4, 503γ-258γ(E2) cascade (2000Ya08).
514.65 7	317 25	1182.87	5^-	668.27	4^+	E1		0.00336	α(K)=0.00289 4; α(L)=0.000369 6; α(M)=7.67×10^{-5} 11 α(N)=1.696×10^{-5} 24; α(O)=2.73×10^{-6} 4; α(P)=2.02×10^{-7} 3 A_2=−0.07 2, A_4=0.01 3, 515γ-258γ(E2) cascade (2000Ya08).
523.0 2	7.3 9	2414.78	(4^+)	1891.79	$(3^-,4,5^-)$				
528.8 3	5.2 7	1711.81	(4^+)	1182.87	5^-				
[x]533.6 5	2.2 4								
550.0 1	25.6 22	2177.29	$(5^-,4^+)$	1627.22	4^+				
563.4 4	3.7 6	2139.72	$(4^+,5^+)$	1576.54	3^+				
565.7 2	9.2 9	1736.98	8^+	1171.28	6^+				
572.1 4	2.8 6	2446.82	(3^-)	1875.43	$(4,5^-)$				
585.8 4	5.5 8	1769.09	$(4,5^-)$	1182.87	5^-				
595.5 3	5.0 15	2551.68		1956.19					
605.0 5	3.3 5	2373.2		1769.09	$(4,5^-)$				
[x]610.1 7	2.1 3								
627.1 2	10.7 11	1810.34	5^+	1182.87	5^-				
631.4 7	2.3 4	1802.29	(4^+)	1171.28	6^+				
638.9 1	25.4 25	1810.34	5^+	1171.28	6^+	M1+E2	0.33 5	0.00820 14	α(K)=0.00704 12; α(L)=0.000922 15; α(M)=0.000192 3 α(N)=4.27×10^{-5} 7; α(O)=6.92×10^{-6} 12; α(P)=5.30×10^{-7} 10 A_2=−0.36 14, A_4=−0.10 3, 639γ-503γ(E2) cascade. The 2nd value δ=2.37 +32−26 (2000Ya08).
642.9 2	9.1 7	2270.20	(6^+)	1627.22	4^+				
645.8 4	2.0 3	2222.45	$(3,4^+)$	1576.54	3^+				
652.2 3	3.8 5	2914.14		2262.04					
666.09[b] 8	23[b] 3	924.60	1^-	258.45	2^+				A_2=−0.22 3, A_4=−0.02 1, 666γ-258γ(E2) cascade (2000Ya08). A_2=−0.261 24, A_4=−0.02 3, 666γ-258γ(E2) cascade (1983Wo03).

$^{146}_{58}Ce_{88}$-4

γ(^{146}Ce) (continued)

E_γ[†]	I_γ[†a]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[#]	α[&]	Comments
666.09[bc] 8	25[b] 4	1627.22	4+	960.58	3−			E_γ: poor fit, the energy difference between corresponding level energy equals 666.64 7.
[x]667.3 7	6.0 15							
[x]672.0 6	5.0 6							
[x]685.5 5	4.1 8							
692.4 4	3.9 8	1875.43	(4,5−)	1182.87	5−			
702.05 7	149 7	960.58	3−	258.45	2+			A_2=−0.08 2, A_4=−0.01 4, 702γ-258γ(E2) cascade (2000Ya08). A_2=−0.071 24, A_4=−0.05 4, 702γ-258γ(E2) cascade (1983Wo03).
705.8 7	7.6 15	2256.46	(4+,5,6+)	1551.06	5−			
708.8 2	10.0 10	2519.07		1810.34	5+			
713.4[b] 2	1.6[b] 5	1381.98	2+	668.27	4+			
713.4[b] 2	0.9[b] 4	1756.68	(1,2+)	1043.18	0+			
732.4 5	2.1 5	1916.05	(4,5−)	1182.87	5−			
751.1 1	14.8 16	1711.81	(4+)	960.58	3−			
756.8 8	0.7 2	2031.67	(4+)	1274.35	2+			
[x]761.4 6	2.3 4							
[x]769.7 7	1.7 4							
773.5 1	28.4 21	1956.19		1182.87	5−			
777.0 4	2.8 4	2587.59		1810.34	5+			
784.8[b] 1	3.0[b] 10	1043.18	0+	258.45	2+	E2	0.00346	α(K)=0.00294 5; α(L)=0.000412 6; α(M)=8.63×10^{-5} 12 α(N)=1.91×10^{-5} 3; α(O)=3.04×10^{-6} 5; α(P)=2.12×10^{-7} 3 A_2=0.30 7, A_4=0.96 13, 785γ-258γ(E2) cascade (2000Ya08). A_2=0.31 9, A_4=1.02 20, 785γ-258γ(E2) cascade (1983Wo03).
784.8[b] 1	12.0[b] 25	1956.19		1171.28	6+			
787.7 3	5.2 5	2543.92		1756.68	(1,2+)			
793.0 2	3.5 10	1753.76	(1−,2,3−)	960.58	3−			
808.6 1	29 3	1769.09	(4,5−)	960.58	3−			
829.2 1	2.9 6	1753.76	(1−,2,3−)	924.60	1−			
831.9 3	1.2 3	1756.68	(1,2+)	924.60	1−			
851.9 3	0.8 2	2126.98	(1+,2+)	1274.35	2+			
860.7 2	3.7 10	2031.67	(4+)	1171.28	6+			
870.4 4	1.1 4	2446.82	(3−)	1576.54	3+			
882.6 3	6.2 10	1551.06	5−	668.27	4+			
908.0[b] 2	3.0[b] 8	1576.54	3+	668.27	4+			
908.0[b] 2	2.0[b] 4	2090.38	(4+)	1182.87	5−			
[x]912.7 6	2.5 7							
915.0 2	9.8 8	1875.43	(4,5−)	960.58	3−			
918.6 3	5.4 8	2090.38	(4+)	1171.28	6+			
924.63[b] 9	18[b] 3	924.60	1−	0.0	0+			
924.63[b] 9	1.5[b] 5	3494.9		2570.2				
[x]925.3 6	3 1							

$^{146}_{58}$Ce$_{88}$-5

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

E_γ [†]	I_γ [†a]	E_i(level)	J^π_i	E_f	J^π_f	Mult. [#]	δ [@]	α [&]	Comments
948.3 *3*	3.3 *6*	2222.45	$(3,4^+)$	1274.35	2^+				
955.5 *1*	27.5 *25*	1916.05	$(4,5^-)$	960.58	3^-				
957.9 *7*	13 *3*	2914.14		1956.19					
959.0 *2*	104 *10*	1627.22	4^+	668.27	4^+	M1+E2	1.19 *+16−14*	0.00262 *8*	α(K)=0.00225 *7*; α(L)=0.000296 *8*; α(M)=6.17×10^{-5} *16* α(N)=1.37×10^{-5} *4*; α(O)=2.21×10^{-6} *6*; α(P)=1.66×10^{-7} *5* A_2=−0.12 *6*, A_4=−0.01 *6*, 959γ-409γ(E2) cascade (2000Ya08).
969.0 *4*	3.3 *7*	2139.72	$(4^+,5^+)$	1171.28	6^+				
993.8 *4*	3.1 *6*	2177.29	$(5^-,4^+)$	1182.87	5^-				
1006.1 *2*	10.4 *8*	2177.29	$(5^-,4^+)$	1171.28	6^+				
1011.2 *2*	6.7 *10*	2193.99		1182.87	5^-				
1015.90 *9*	17.3 *20*	1274.35	2^+	258.45	2^+	M1+E2	5.4 *+31−15*	0.00198 *4*	α(K)=0.00169 *4*; α(L)=0.000226 *4*; α(M)=4.72×10^{-5} *9* α(N)=1.045×10^{-5} *19*; α(O)=1.68×10^{-6} *3*; α(P)=1.230×10^{-7} *25* A_2=−0.18 *4*, A_4=0.35 *9*, 1016γ-258γ(E2) cascade. The 2nd value δ=0.54 *7* (2000Ya08).
1022.6 *4*	3.5 *6*	2193.99		1171.28	6^+				
1028.1 *4*	1.7 *7*	1988.7		960.58	3^-				
1037.9 *5*	4.9 *10*	2311.20	$(1^-,2^+)$	1274.35	2^+				
1043.6 *1*	19.7 *20*	1711.81	(4^+)	668.27	4^+				
1064.6 *3*	3.1 *5*	2446.82	(3^-)	1381.98	2^+				
1074.0 *2*	10.3 *8*	2256.46	$(4^+,5,6^+)$	1182.87	5^-				
1079.1 *1*	27.2 *22*	2262.04		1182.87	5^-				
1084.5 *3*	1.3 *5*	2126.98	$(1^+,2^+)$	1043.18	0^+				
1087.6 *6*	1.5 *5*	2270.20	(6^+)	1182.87	5^-				
1091.5 *3*	3.0 *9*	2274.4		1182.87	5^-				
1098.0 *5*	2.3 *5*	2270.20	(6^+)	1171.28	6^+				
1103.7 *2*	6.2 *7*	2914.14		1810.34	5^+				
1123.5 *3*	1.2 *7*	1381.98	2^+	258.45	2^+				
1134.0 *4*	3.2 *8*	1802.29	(4^+)	668.27	4^+				
1142.1 *1*	66 *5*	1810.34	5^+	668.27	4^+				
1166.9 *7*	5.5 *6*	2337.4		1171.28	6^+				
1171.9 *3*	2.5 *8*	2446.82	(3^-)	1274.35	2^+				
[x]1184.5 *4*	4.8 *7*								
1190.0 *3*	7.0 *10*	2373.2		1182.87	5^-				
1195.2 *5*	5.3 *8*	2156.3	$(1^-,2^+)$	960.58	3^-				
1201.9 *5*	0.5 *1*	2126.98	$(1^+,2^+)$	924.60	1^-				
1216.5 *3*	5.4 *10*	2177.29	$(5^-,4^+)$	960.58	3^-				
1223.5 *1*	19.5 *15*	1891.79	$(3^-,4,5^-)$	668.27	4^+				
1231.9 *3*	5.1 *8*	2414.78	(4^+)	1182.87	5^-				
1248.9 *4*	3.4 *6*	2209.5		960.58	3^-				
1261.6 *4*	2.3 *4*	2222.45	$(3,4^+)$	960.58	3^-				
1274.22 *15*	6.3 *13*	1274.35	2^+	0.0	0^+				
[x]1280.0 *4*	3.3 *7*								

From ENSDF

γ(^{146}Ce) (continued)

E$_\gamma$[†]	I$_\gamma$[†a]	E$_i$(level)	J$^\pi_i$	E$_f$	J$^\pi_f$	Mult.[#]	δ[@]	α[&]	Comments
1288.2 *2*	10.9 *15*	1956.19		668.27	4$^+$				
1297.4 *3*	7.0 *5*	2468.7		1171.28	6$^+$				
[x]1306.0 *2*	6.8 *6*								
1318.13 *8*	21 *3*	1576.54	3$^+$	258.45	2$^+$	M1+E2	6.5 *+17−11*	1.17×10^{-3}	α(K)=0.000988 *15*; α(L)=0.0001280 *19*; α(M)=2.67×10^{-5} *4* α(N)=5.90×10^{-6} *9*; α(O)=9.55×10^{-7} *14*; α(P)=7.19×10^{-8} *11*; α(IPF)=2.49×10^{-5} *4* A$_2$=−0.13 *6*, A$_4$=−0.04 *12*, 1318γ-258γ(E2) cascade. The 2nd value δ=−0.05 *4* (2000Ya08).
[x]1330.1 *4*	2.6 *6*								
1336.3 *5*	3.1 *9*	2519.07		1182.87	5$^-$				
1353.9 *5*	4.5 *7*	2022.5	(4$^+$)	668.27	4$^+$				
1363.2 *2*	3.9 *9*	2031.67	(4$^+$)	668.27	4$^+$				
1363.2 *2*	1.9 *8*	2914.14		1551.06	5$^-$				
1368.8[b] *1*	31[b] *5*	1627.22	4$^+$	258.45	2$^+$	E2		1.09×10^{-3}	α(K)=0.000909 *13*; α(L)=0.0001175 *17*; α(M)=2.45×10^{-5} *4* α(N)=5.42×10^{-6} *8*; α(O)=8.77×10^{-7} *13*; α(P)=6.61×10^{-8} *10*; α(IPF)=3.70×10^{-5} *6* A$_2$=0.10 *7*, 1318γ-258γ(E2) cascade (2000Ya08), pure E2.
1368.8[b] *1*	1.9[b] *5*	2551.68		1182.87	5$^-$				
1382.00 *9*	4.0 *13*	1381.98	2$^+$	0.0	0$^+$				
1386.0 *6*	2.1 *4*	2311.20	(1$^-$,2$^+$)	924.60	1$^-$				
1398.7 *7*	1.8 *9*	1657.6	0$^+$	258.45	2$^+$				
1404.2 *6*	0.8 *3*	2072.2	(2$^+$)	668.27	4$^+$				
1416.2 *4*	2.9 *7*	2587.59		1171.28	6$^+$				
1421.7 *2*	14.3 *15*	2090.38	(4$^+$)	668.27	4$^+$				
[x]1435.5 *3*	4.8 *6*								
[x]1438.9 *3*	5.8 *9*								
1453.5 *3*	7.9 *8*	1711.81	(4$^+$)	258.45	2$^+$				
1460.3 *2*	16.4 *25*	2128.58		668.27	4$^+$				
1473.3 *4*	0.7 *4*	2398.07	(2$^+$)	924.60	1$^-$				
1498.1 *2*	6.0 *10*	1756.68	(1,2$^+$)	258.45	2$^+$				
1509.2 *2*	16.1 *12*	2177.29	(5$^-$,4$^+$)	668.27	4$^+$				
[x]1532.2 *3*	3.5 *5*								
1538.5 *3*	2.9 *8*	1797.0		258.45	2$^+$				
1543.8 *2*	6.7 *7*	1802.29	(4$^+$)	258.45	2$^+$				
1550.3 *3*	5.6 *6*	1808.8		258.45	2$^+$				
[x]1555.9 *6*	4.1 *6*								
1573.7 *2*	2.7 *7*	1832.16	(1,2$^+$)	258.45	2$^+$				
1582.7 *6*	1.8 *7*	2543.92		960.58	3$^-$				
1602.1 *2*	9.1 *10*	2270.20	(6$^+$)	668.27	4$^+$				
1619.0 *3*	2.7 *5*	2543.92		924.60	1$^-$				
1625.4 *4*	3.6 *6*	2796.62		1171.28	6$^+$				
1668.2 *8*	3.7 *10*	2337.4		668.27	4$^+$				

γ(^{146}Ce) (continued)

E_γ[†]	I_γ[†a]	E_i(level)	J^π_i	E_f	J^π_f
^{x}1695.0 3	5.0 10				
^{x}1726.8 4	2.7 4				
1731.2 2	8.0 8	2914.14		1182.87	5$^-$
1753.2 4	2.4 10	2713.78		960.58	3$^-$
1756.8 1	3.6 7	1756.68	(1,2$^+$)	0.0	0$^+$
1764.2 3	5.2 8	2022.5	(4$^+$)	258.45	2$^+$
1772.7 3	3.7 8	2031.67	(4$^+$)	258.45	2$^+$
^{x}1786.7 5	2.0 4				
1793.5 2	1.4 6	2051.90		258.45	2$^+$
^{x}1797.7 3	1.2 7				
1813.5 5	0.9 3	2072.2	(2$^+$)	258.45	2$^+$
1832.7 5	2.2 5	2090.38	(4$^+$)	258.45	2$^+$
1844.8 4	2.4 9	2512.56		668.27	4$^+$
1850.7 2	9.8 10	2519.07		668.27	4$^+$
^{x}1857.6 8	1.0 4				
1868.7 3	1.3 2	2126.98	(1$^+$,2$^+$)	258.45	2$^+$
^{x}1872.9 4	4.3 8				
1881.1 3	5.7 10	3063.9		1182.87	5$^-$
^{x}1886.8 5	2.1 5				
^{x}1893.7 7	2.6 7				
1898.5 6	1.7 4	2156.3	(1$^-$,2$^+$)	258.45	2$^+$
^{x}1907.0 4	3.8 17				
1919.5 3	6.4 10	2587.59		668.27	4$^+$
1924.5 5	4.2 7	2183.0		258.45	2$^+$
1944.8 3	3.7 6	2869.29		924.60	1$^-$
^{x}1950.8 5	4.4 6				
1960.6 6	0.8 3	3342.14		1381.98	2$^+$
^{x}1988.8 5	1.5 8				
1992.9 6	<0.5	2953.70	(2,3$^-$)	960.58	3$^-$
^{x}1996.2 8	2.0 9				
^{x}2020.6 7	1.3 3				
^{x}2025.8 5	2.0 4				
2029.5 4	1.3 5	2953.70	(2,3$^-$)	924.60	1$^-$
2052.5 3	5.3 10	2311.20	(1$^-$,2$^+$)	258.45	2$^+$
2060.1[b] 1	8.0[b] 12	2318.57	(1,2$^+$)	258.45	2$^+$
2060.1[b] 1	2.0[b] 4	3243.02		1182.87	5$^-$
2072.4 5	1.3 5	3243.02		1171.28	6$^+$
^{x}2086.5 6	3.3 4				
^{x}2095.5 4	1.2 3				
2102.3 9	1.2 5	3273.6		1171.28	6$^+$
2108.5 5	1.1 4	2367.0	(1$^-$,2$^+$)	258.45	2$^+$
^{x}2119.8 4	4.5 5				
2128.3 3	7.2 10	2796.62		668.27	4$^+$
2141.1 3	3.8 6	2809.4		668.27	4$^+$
2156.3 4	4.4 5	2414.78	(4$^+$)	258.45	2$^+$
2188.5 2	5.0 6	2446.82	(3$^-$)	258.45	2$^+$
^{x}2207.4 5	4.2 4				
2237.8 4	2.0 8	4269.5		2031.67	(4$^+$)
2253.8 3	3.5 12	2512.56		258.45	2$^+$
2267.6 4	5.2 6	3450.5		1182.87	5$^-$
^{x}2278.4 5	1.8 4				
2293.2 4	2.4 5	3254.7	(2,3$^+$)	960.58	3$^-$
2311.5 5	1.0 3	2570.2		258.45	2$^+$
2319.2 2	1.6 7	3502.09		1182.87	5$^-$
2322.8 4	0.8 4	3283.62	(1$^-$,2$^+$)	960.58	3$^-$
^{x}2334.2 4	1.9 3				
^{x}2339.8 6	2.1 9				
2349.7 4	5.3 8	3532.6		1182.87	5$^-$
2359.0 1	5.5 15	3283.62	(1$^-$,2$^+$)	924.60	1$^-$
2381.1 4	1.2 5	3342.14		960.58	3$^-$
2394.8 8	1.3 5	3063.9		668.27	4$^+$
2398.0 3	0.9 4	2398.07	(2$^+$)	0.0	0$^+$
2405.1 3	1.1 4	3330.04	(2$^+$)	924.60	1$^-$
2417.6 3	1.8 7	3342.14		924.60	1$^-$
2427.0 6	3.1 4	3978.3	(3$^-$,4$^+$)	1551.06	5$^-$
2455.3 3	1.0 4	2713.78		258.45	2$^+$
^{x}2512.5 2	2.5 8				
2521.0 4	1.6 6	2779.5	(1,2$^+$)	258.45	2$^+$
2547.3 8	1.1 4	3729.8		1182.87	5$^-$
2582.8 2	4.5 10	2841.28		258.45	2$^+$
2603.6 1	5.8 6	2862.04	(1,2$^+$)	258.45	2$^+$
2610.6 4	3.6 6	2869.29		258.45	2$^+$
2645.5 7	1.9 6	4521.6		1875.43	(4,5$^-$)
^{x}2664.8 7	1.3 4				
2695.2 1	2.2 7	2953.70	(2,3$^-$)	258.45	2$^+$
2721.8 6	1.9 5	3390.1		668.27	4$^+$
2734.6 5	3.2 7	3403.3		668.27	4$^+$
2779.4 5	2.0 6	2779.5	(1,2$^+$)	0.0	0$^+$
^{x}2807.6 9	1.1 4				
^{x}2818.9 6	1.5 5				
2861.5[‡] 4	1.4 6	2862.04	(1,2$^+$)	0.0	0$^+$
^{x}2897.0 9	1.3 4				
2905.7 6	1.3 6	3164.6	(1,2$^+$)	258.45	2$^+$
2971.6 7	2.2 7	4521.6		1551.06	5$^-$
2985.2 6	1.2 4	3653.6		668.27	4$^+$
2997.1 4	1.9 4	3254.7	(2,3$^+$)	258.45	2$^+$

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

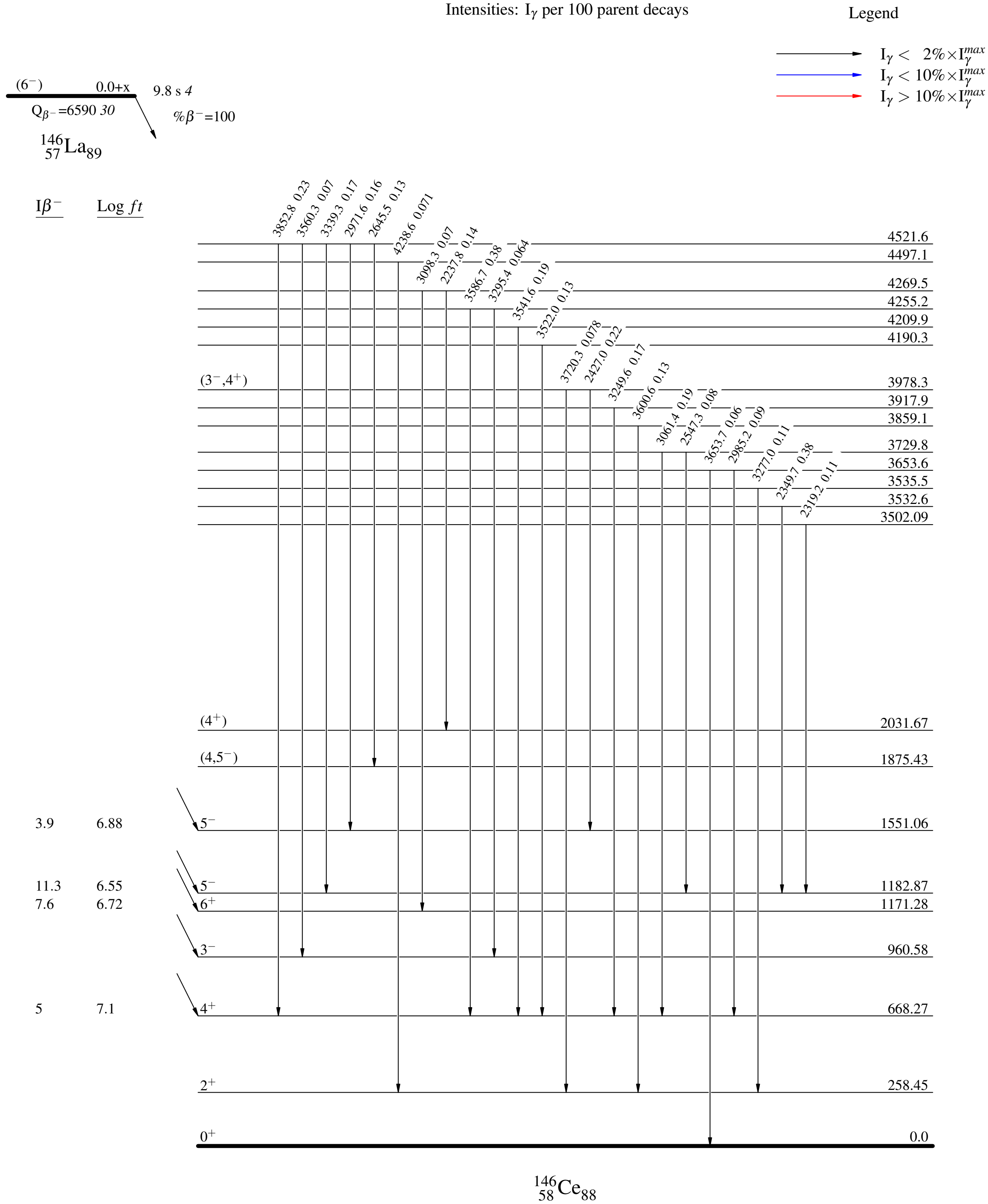
E_γ [†]	I_γ [†a]	E_i(level)	J_i^π	E_f	J_f^π
3025.3 *3*	1.7 *7*	3283.62	(1⁻,2⁺)	258.45	2⁺
3061.4 *4*	2.7 *4*	3729.8		668.27	4⁺
3071.7 *2*	3.2 *9*	3330.04	(2⁺)	258.45	2⁺
3083.7 *3*	2.6 *8*	3342.14		258.45	2⁺
3098.3 *6*	1.0 *5*	4269.5		1171.28	6⁺
3145.5 *7*	1.7 *6*	3403.3		258.45	2⁺
3165.5 *9*	<0.5	3164.6	(1,2⁺)	0.0	0⁺
3236.8 *6*	1.6 *4*	3494.9		258.45	2⁺
3249.6 *6*	2.4 *4*	3917.9		668.27	4⁺
3277.0 *7*	1.5 *4*	3535.5		258.45	2⁺
3295.4 *10*	0.9 *3*	4255.2		960.58	3⁻
3339.3 *6*	2.4 *6*	4521.6		1182.87	5⁻
[x]3465.4 *9*	0.8 *4*				
3522.0 *6*	1.9 *5*	4190.3		668.27	4⁺
3541.6 *5*	2.7 *6*	4209.9		668.27	4⁺
3560.3 *7*	1.0 *6*	4521.6		960.58	3⁻
3586.7 *4*	5.3 *8*	4255.2		668.27	4⁺
3600.6 *5*	1.9 *4*	3859.1		258.45	2⁺
3653.7 *6*	0.8 *5*	3653.6		0.0	0⁺
3720.3 *8*	1.1 *3*	3978.3	(3⁻,4⁺)	258.45	2⁺
3852.8 *6*	3.3 *6*	4521.6		668.27	4⁺
4238.6 *9*	1.0 *3*	4497.1		258.45	2⁺
[x]4448.1 *11*	0.8 *4*				

[†] From 1993Sh10, except as noted.
[‡] Placed by the evaluators from unplaced γ ray in 1993Sh10.
[#] From $\gamma\gamma(\theta)$ (2000Ya08), α(exp) (1993Sh10) and decay pattern.
[@] From $\gamma\gamma(\theta)$ (2000Ya08).
[&] Additional information 1.
[a] For absolute intensity per 100 decays, multiply by 0.077 *6*.
[b] Multiply placed with intensity suitably divided.
[c] Placement of transition in the level scheme is uncertain.
[x] γ ray not placed in level scheme.

^{146}La β^- decay (9.8 s) 2000Ya08,1993Sh10

Decay Scheme

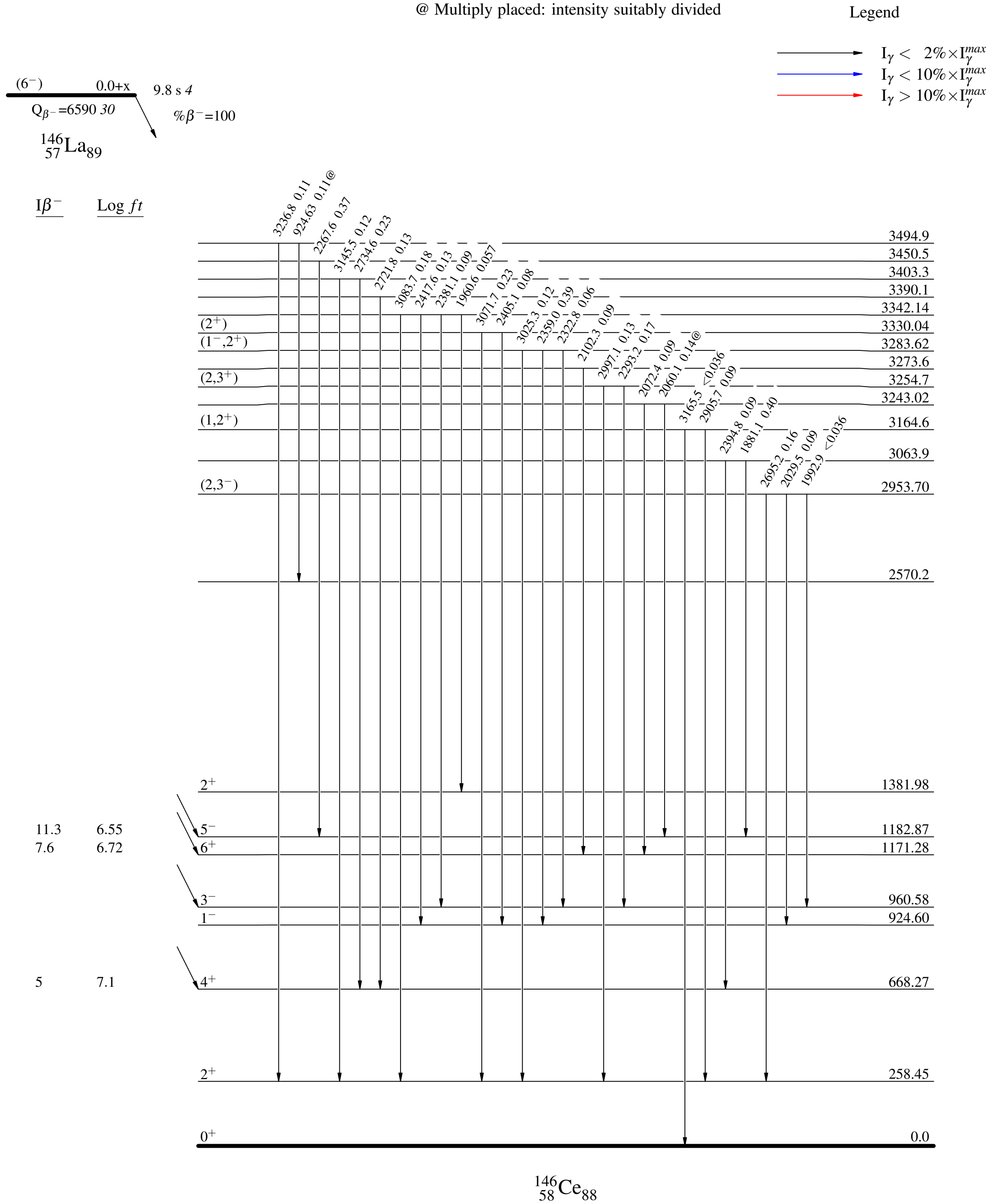
Intensities: I_γ per 100 parent decays



^{146}La β^- decay (9.8 s) 2000Ya08,1993Sh10

Decay Scheme (continued)

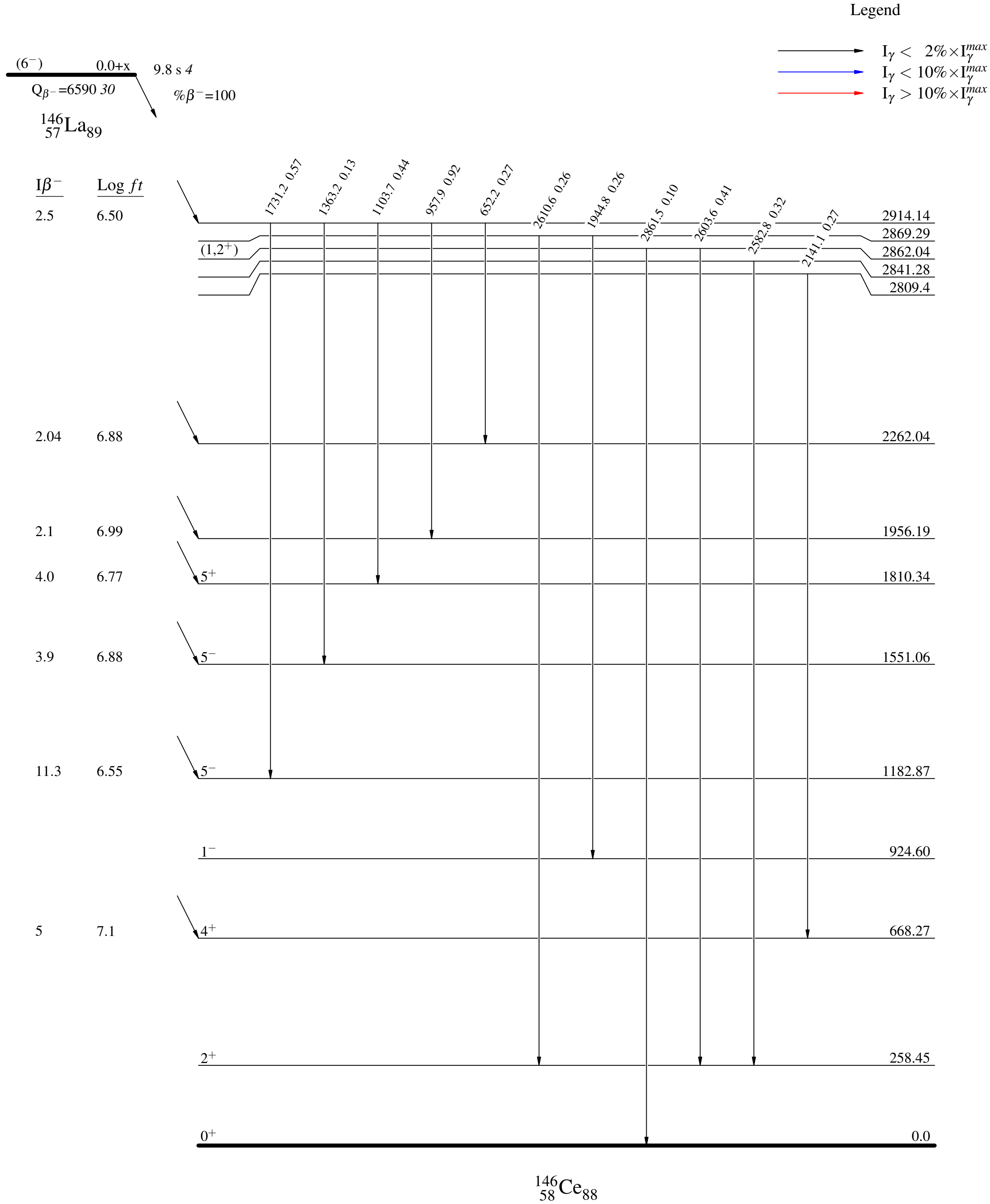
Intensities: I_γ per 100 parent decays
@ Multiply placed: intensity suitably divided



^{146}La β^- decay (9.8 s) 2000Ya08,1993Sh10

Decay Scheme (continued)

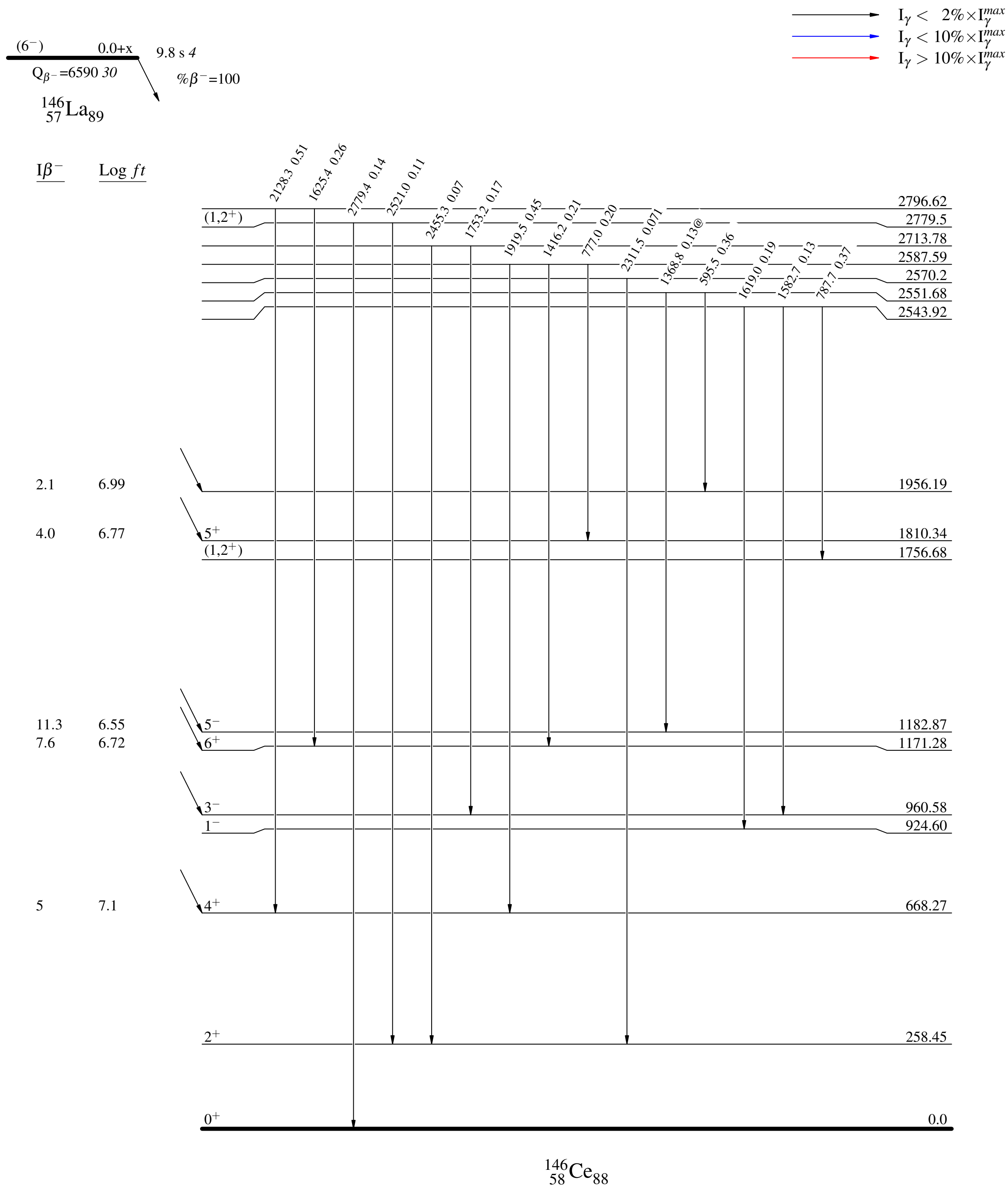
Intensities: I_γ per 100 parent decays
@ Multiply placed: intensity suitably divided



^{146}La β^- decay (9.8 s) 2000Ya08,1993Sh10

Decay Scheme (continued)

Intensities: I_γ per 100 parent decays
@ Multiply placed: intensity suitably divided

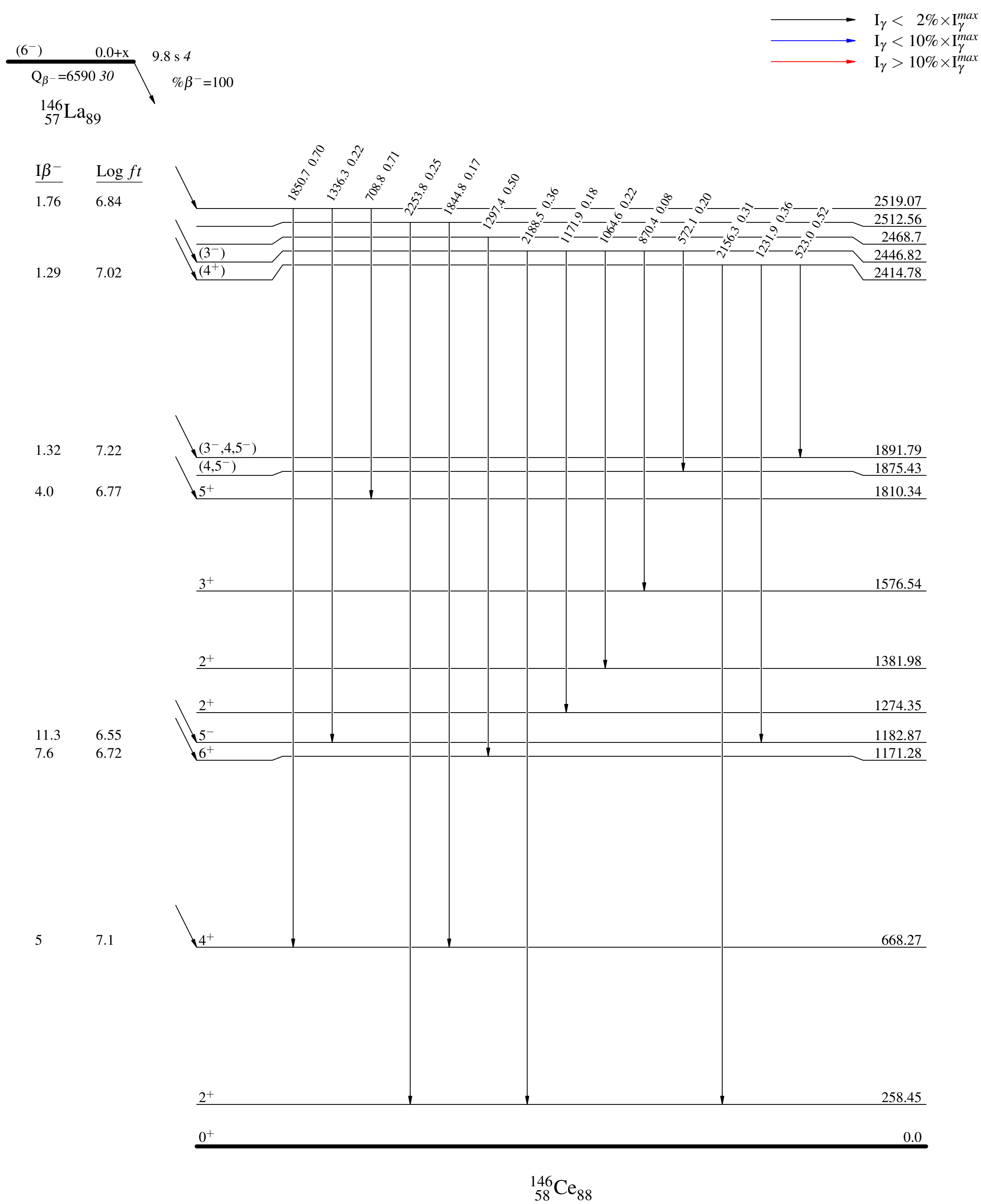


^{146}La β^- decay (9.8 s) 2000Ya08,1993Sh10

Decay Scheme (continued)

Intensities: I_γ per 100 parent decays
@ Multiply placed: intensity suitably divided

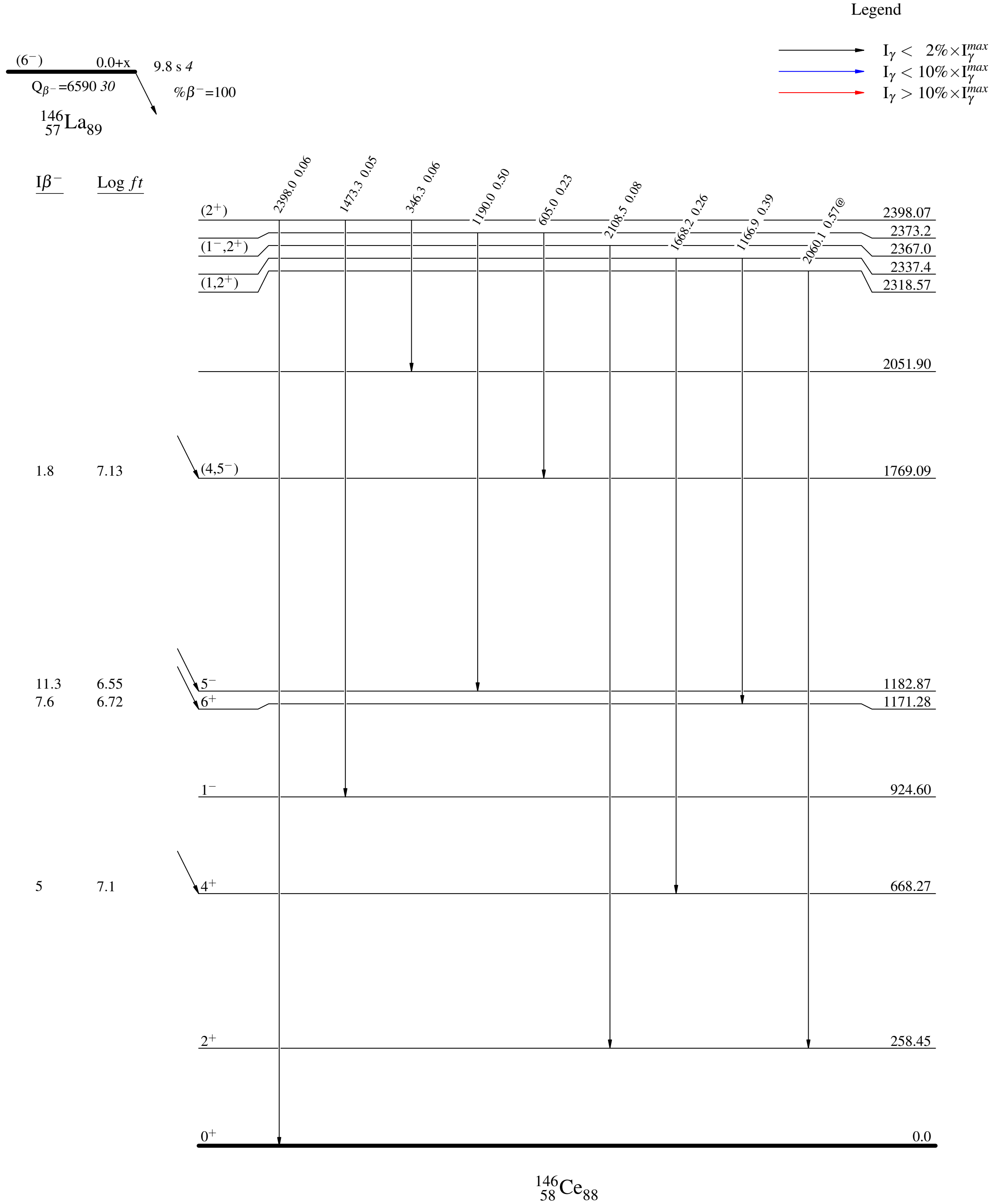
Legend



^{146}La β^- decay (9.8 s) 2000Ya08,1993Sh10

Decay Scheme (continued)

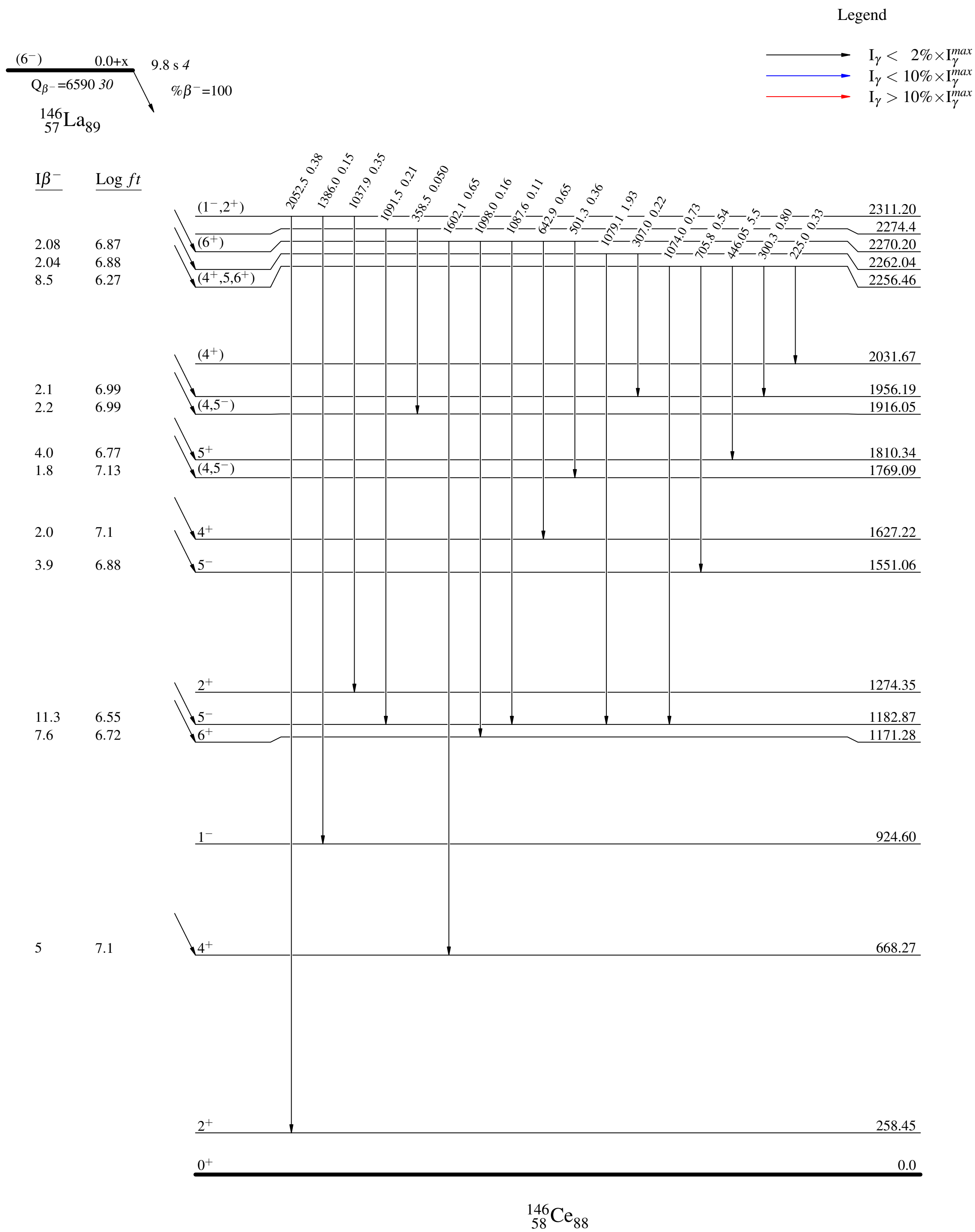
Intensities: I_γ per 100 parent decays
@ Multiply placed: intensity suitably divided



^{146}La β^- decay (9.8 s) 2000Ya08,1993Sh10

Decay Scheme (continued)

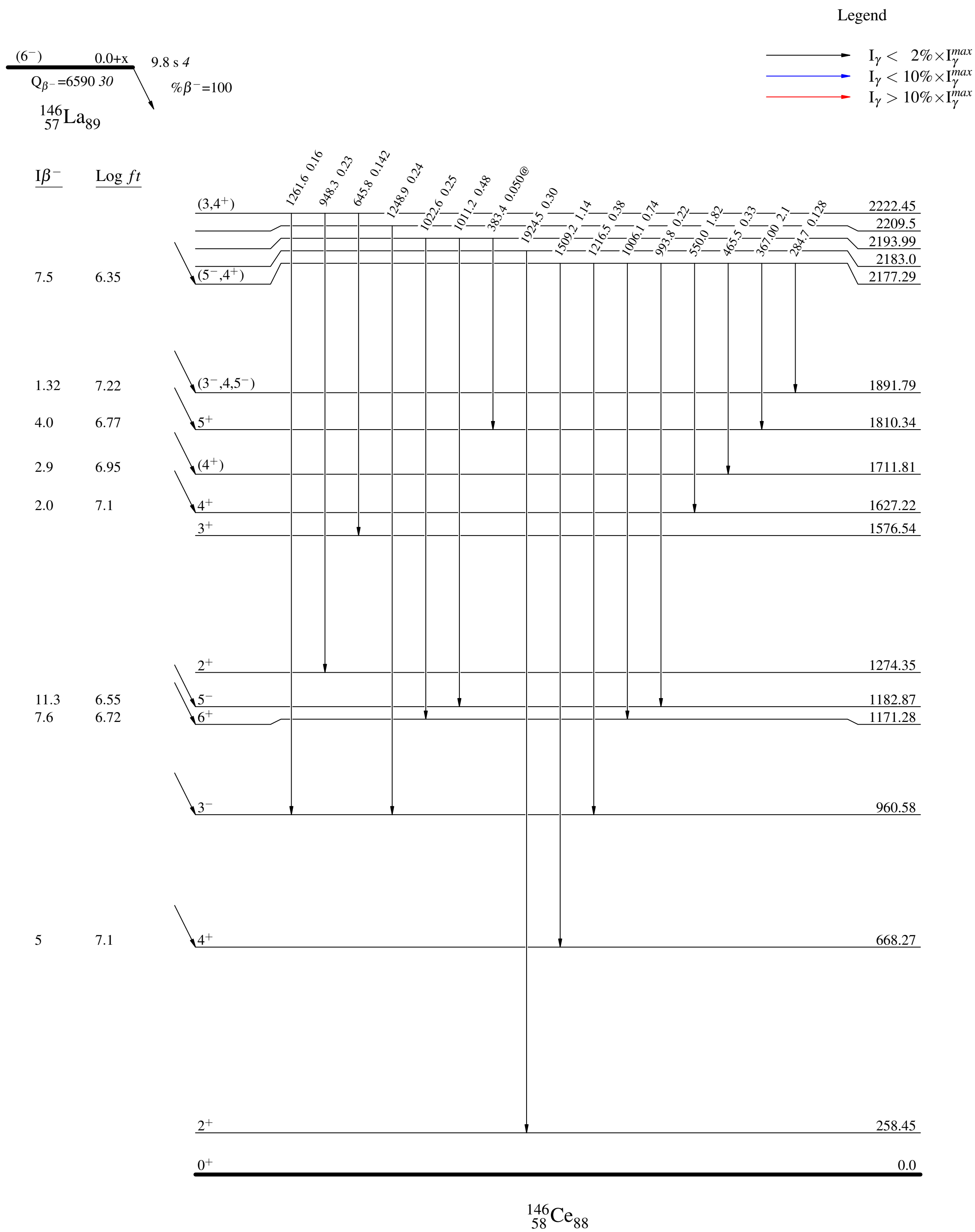
Intensities: I_γ per 100 parent decays
@ Multiply placed: intensity suitably divided



^{146}La β^- decay (9.8 s) 2000Ya08,1993Sh10

Decay Scheme (continued)

Intensities: I_γ per 100 parent decays
@ Multiply placed: intensity suitably divided

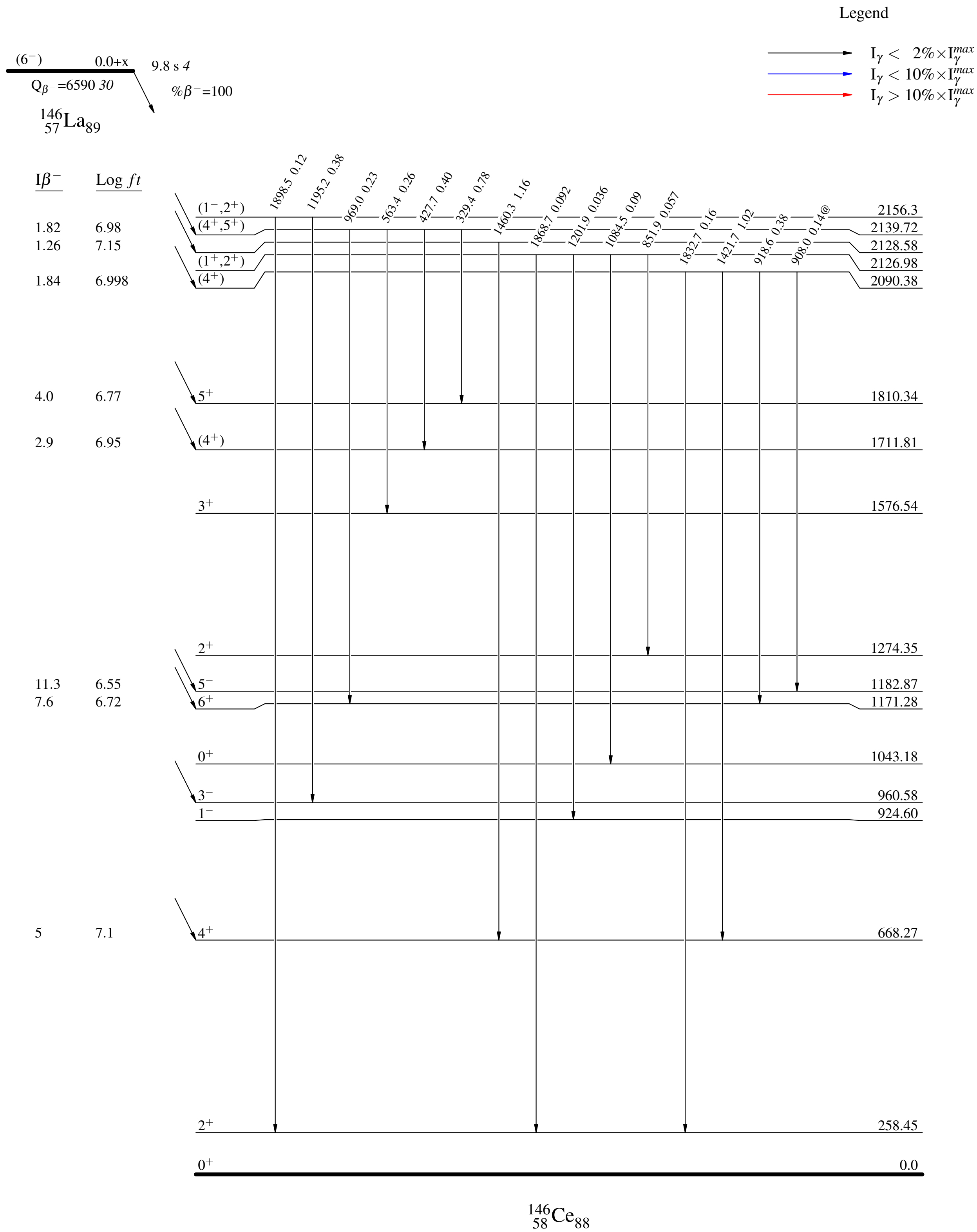


^{146}La β^- decay (9.8 s) 2000Ya08,1993Sh10

Decay Scheme (continued)

Intensities: I_γ per 100 parent decays

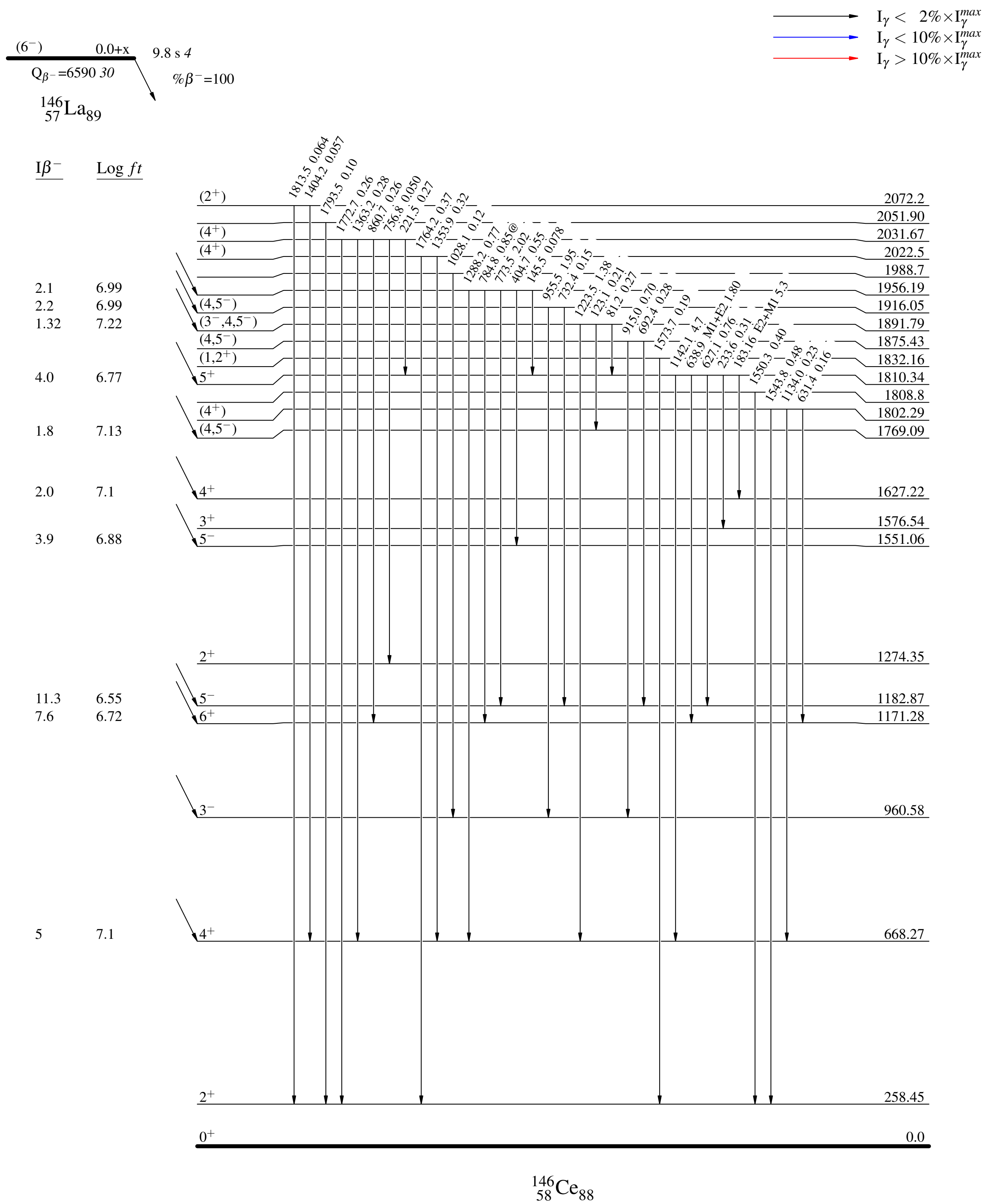
@ Multiply placed: intensity suitably divided



^{146}La β^- decay (9.8 s) 2000Ya08,1993Sh10

Decay Scheme (continued)

Intensities: I_γ per 100 parent decays
@ Multiply placed: intensity suitably divided

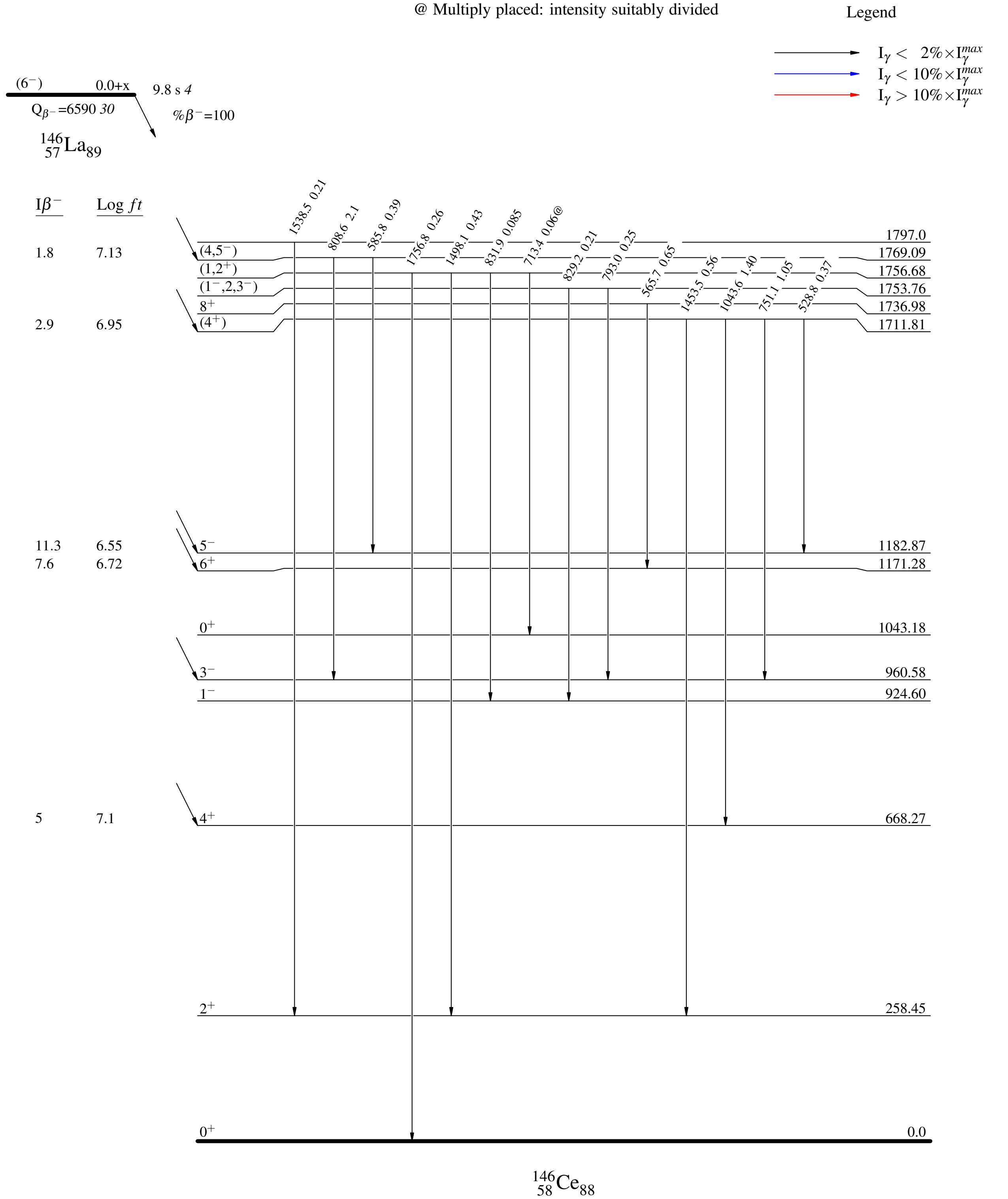


^{146}La β^- decay (9.8 s) 2000Ya08,1993Sh10

Decay Scheme (continued)

Intensities: I_γ per 100 parent decays

@ Multiply placed: intensity suitably divided



^{146}La β^- decay (9.8 s) 2000Ya08,1993Sh10

Decay Scheme (continued)

Intensities: I_γ per 100 parent decays
@ Multiply placed: intensity suitably divided