^{145}Ce β^- decay 1989Ba14,1997Gr09

History

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

Parent: ^{145}Ce: E=0.0; J^π=(5/2$^-$); $T_{1/2}$=3.01 min *6*; Q(β^-)=2530 *40*; %β^- decay=100.0

Additional information 1.

Measured: Eγ, Iγ (1989Ba14,1980Ya07,1979Ta17,1978Pf02,1977Bj02, 1972Oh08,\1967Ho19), $\gamma\gamma$ coin (1989Ba14,1980Ya07,1979Ta17,1978Pf02, 1977Bj02,1972Oh08), $\gamma\gamma(\theta)$ (1989Ba14), $\beta\gamma$ coin (1980Ya07,1978Pf02, 1978St03), ce (1989Ba14), B(K x ray) coin (1981Eb01), β (1980Ya07).

^{145}Pr Levels

All levels above 1609 keV are pseudolevels deduced from total γ-ray absorption spectrometer measurements.

E(level)‡	J^π†	Comments
0.0	7/2$^+$	
62.65 *1*	5/2$^+$	
188.84 *1*	(3/2)$^+$	
347.18 *1*	3/2$^+$	
350.90 *3*	5/2$^+$	
540.09 *2*		
554.81 *1*	3/2$^+$	
697.20 *4*		
766.31 *3*		
786.91 *1*	(3/2)$^-$	
806.43 *4*	(3/2)$^+$	
835.64 *5*		
845.93 *2*		
859.43 *4*		
948.4 *1*		J^π=(1/2$^+$,3/2$^+$,5/2$^+$) from logft=7.5 from J^π=(3/2)$^-$.
1046.97 *4*		
1110.56 *3*	(5/2)$^+$	
1210.54 *2*	5/2$^-$	
1318.4 *1*		
1330.1 *1*		
1420#		
1560.46 *5*		
1608.8 *1*		
1700#		
1800#		
1900#		
2000#		
2100#		
2200#		

† Adopted values.

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

"Pseudo Level" from total absorption γ-ray spectrometer measurements (1997Gr09).

^{145}Ce β^- decay 1989Ba14,1997Gr09 (continued)

β^- radiations

Analysis of β^- (1967Ho19,1978Pf02,1980Ya07) and $\beta\gamma$ coin (1978St03,1978Pf02,1980Ya07) suggests weak or no β^- to g.s. and to levels with E<787 keV, in disagreement with the strong β^- to the 62.66-keV level (Eβ=2349 *10* (24%) (in B(K x ray) coin reported by 1981Eb01).

E(decay)	E(level)	Iβ^-[‡]	Log *ft*	Comments
(3.3×10^2 *4*)	2200	0.28	4.8	av Eβ=95 *13*
(4.3×10^2 *4*)	2100	0.103	5.6	av Eβ=128 *14*
(5.3×10^2 *4*)	2000	0.041	6.3	av Eβ=163 *15*
(6.3×10^2 *4*)	1900	0.072	6.3	av Eβ=199 *15*
(7.3×10^2 *4*)	1800	0.176	6.1	av Eβ=236 *16*
(8.3×10^2 *4*)	1700	0.196	6.3	av Eβ=275 *16*
(9.2×10^2 *4*)	1608.8	0.30 *4*	6.27 *9*	av Eβ=311 *16* Iβ^-: Iβ=0.45 %, from total absorption γ-ray spectrometer measurement (1997Gr09).
(9.7×10^2 *4*)	1560.46	0.20 *4*	6.53 *11*	av Eβ=330 *17* Iβ^-: Iβ=0.25 %, from total absorption γ-ray spectrometer measurement (1997Gr09).
(1.11×10^3 *4*)	1420	0.26	6.6	av Eβ=387 *17*
(1.20×10^3 *4*)	1330.1	0.10 *2*	7.17 *11*	av Eβ=424 *17* Iβ^-: Iβ=0.103 %, from total absorption γ-ray spectrometer measurement (1997Gr09).
(1.21×10^3 *4*)	1318.4	0.083 *13*	7.27 *9*	av Eβ=429 *17* Iβ^-: Iβ=0.086 %, from total absorption γ-ray spectrometer measurement (1997Gr09).
1.27×10^3 *10*	1210.54	18.5 *22*	5.06 *8*	av Eβ=474 *17* E(decay): from 1981Eb01. Others: 1464 *200* (1978Pf02), 1370 *150* (1978St03). Iβ^-: Iβ=19.13 %, from total absorption γ-ray spectrometer measurement (1997Gr09).
(1.42×10^3 *4*)	1110.56	3.0 *4*	5.97 *8*	av Eβ=517 *18* Iβ^-: Iβ=3.10 %, from total absorption γ-ray spectrometer measurement (1997Gr09).
(1.48×10^3 *4*)	1046.97	0.46 *9*	6.86 *10*	av Eβ=544 *18* Iβ^-: Iβ=0.62 %, from total absorption γ-ray spectrometer measurement (1997Gr09).
(1.58×10^3 *4*)	948.4	0.14 *2*	7.48 *8*	av Eβ=587 *18* Iβ^-: Iβ=0.41 %, from total absorption γ-ray spectrometer measurement (1997Gr09).
1.62×10^3 *20*	845.93	3.1 *4*	6.24 *7*	av Eβ=631 *18* E(decay): from 1978Pf02, 1978St03. Iβ^-: Iβ=3.21 %, from total absorption γ-ray spectrometer measurement (1997Gr09).
1715 *50*	786.91	66 *8*	4.97 *7*	av Eβ=657 *18* E(decay): from 1978Pf02. Others: 1762 *103* (1981Eb01), 1800 *100* (1980Ya07), 1715 *100* (1978St03). Iβ^-: Iβ=68.26 %, from total absorption γ-ray spectrometer measurement (1997Gr09).
(1.98×10^3 *4*)	554.81	0.62[†]	7.2	av Eβ=760 *18*
(1.99×10^3 *4*)	540.09	1.0 *2*	7.02 *10*	av Eβ=767 *18* Iβ^-: Iβ=0.62 %, from total absorption γ-ray spectrometer measurement (1997Gr09).
(2.18×10^3 *4*)	347.18	0.52[†]	7.5	av Eβ=853 *18*
(2.47×10^3 *4*)	62.65	1.5[†] *20*	7.2 *6*	av Eβ=982 *19*

Continued on next page (footnotes at end of table)

^{145}Ce β^- decay 1989Ba14,1997Gr09 (continued)

β^- radiations (continued)

† From total absorption γ-ray spectrometer measurements (1997Gr09). Other: 1992Gr21.
‡ Absolute intensity per 100 decays.

$\gamma(^{145}Pr)$

Iγ normalization: I(724.23γ)=59% 7 (1978Pf02).
The following γ rays were reported only in 1980Ya07: 467.5 *2* (1.5 *1*), 1183.1 *3* (0.46 *5*), 1294.3 *3* (0.49 *4*), 1347.0 *6* (0.12 *2*), 1476.4 *4* (0.37 *3*).

E_γ†	I_γ†‡	E_i(level)	J_i^π	E_f	J_f^π	Mult.	α#	Comments
62.54 *2*	22.6 *4*	62.65	5/2$^+$	0.0	7/2$^+$	M1	5.02	α(K)=4.27 *6*; α(L)=0.593 *9*; α(M)=0.1250 *18*; α(N+..)=0.0328 *5* α(N)=0.0279 *4*; α(O)=0.00449 *7*; α(P)=0.000328 *5* I$_\gamma$: from 1989Ba14. Others: 21.0 *10* (1979Ta17), 26 (1978Pf02), 14.1 *14* (1977Bj02); however, 1980Ya07 report Iγ=46 *3*. Mult.: $\alpha\approx$4 (1978Pf02) if all observed x rays are from conversion of 62.54γ.
[x]125.3 *1*								
126.07 *2*	0.83 *2*	188.84	(3/2)$^+$	62.65	5/2$^+$	[M1,E2]	0.80 *13*	α(K)=0.589 *20*; α(L)=0.17 *9*; α(M)=0.037 *21*; α(N+..)=0.009 *5* α(N)=0.008 *5*; α(O)=0.0012 *6*; α(P)=3.9×10^{-5} *6*
158.5 *3*	0.05 *1*	347.18	3/2$^+$	188.84	(3/2)$^+$			
188.85 *1*	1.08 *3*	188.84	(3/2)$^+$	0.0	7/2$^+$	[E2]	0.230	α(K)=0.1706 *24*; α(L)=0.0469 *7*; α(M)=0.01035 *15*; α(N+..)=0.00260 *4* α(N)=0.00226 *4*; α(O)=0.000329 *5*; α(P)=1.021×10^{-5} *15*
189.2 *3*	0.35 *1*	540.09		350.90	5/2$^+$	[D,E2]	0.14 *9*	
193.01 *7*	0.19 *2*	540.09		347.18	3/2$^+$	[D,E2]	0.13 *9*	
[x]198.2 *1*	0.38 *2*							
204.07 *7*	0.06 *2*	554.81	3/2$^+$	350.90	5/2$^+$			
207.61 *1*	1.84 *4*	554.81	3/2$^+$	347.18	3/2$^+$	[M1,E2]	0.1678	α(K)=0.135 *9*; α(L)=0.026 *7*; α(M)=0.0056 *15*; α(N+..)=0.0014 *4* α(N)=0.0012 *4*; α(O)=0.00019 *4*; α(P)=9.3×10^{-6} *17*
211.46 *3*	0.080 *3*	766.31		554.81	3/2$^+$			
232.08 *1*	3.45 *6*	786.91	(3/2)$^-$	554.81	3/2$^+$	[E1]	0.0254	α(K)=0.0217 *3*; α(L)=0.00289 *4*; α(M)=0.000606 *9*; α(N+..)=0.0001572 *22* α(N)=0.0001345 *19*; α(O)=2.12×10^{-5} *3*; α(P)=1.425×10^{-6} *20*
246.88 *3*	0.24 *1*	786.91	(3/2)$^-$	540.09		[D,E2]	0.06 *4*	
[x]249.8 *1*	0.09 *1*							
284.53 *1*	13.8 *2*	347.18	3/2$^+$	62.65	5/2$^+$	M1	0.0722	α(K)=0.0617 *9*; α(L)=0.00831 *12*; α(M)=0.001749 *25*; α(N+..)=0.000459 *7* α(N)=0.000391 *6*; α(O)=6.31×10^{-5} *9*; α(P)=4.69×10^{-6} *7* Mult.: α(K)exp=0.064 *19*.
288.4 *1*	0.21 *2*	350.90	5/2$^+$	62.65	5/2$^+$	[D,E2]	0.04 *3*	
304.66 *7*	0.16 *1*	859.43		554.81	3/2$^+$	[D,E2]	0.04 *3*	
319.4 *1*	0.05 *1*	859.43		540.09				
347.17 *1*	1.31 *2*	347.18	3/2$^+$	0.0	7/2$^+$	[E2]	0.0322	α(K)=0.0260 *4*; α(L)=0.00483 *7*;

Continued on next page (footnotes at end of table)

^{145}Ce β^- decay 1989Ba14,1997Gr09 (continued)

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

E_γ[†]	I_γ[†‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.	α[#]	Comments
								α(M)=0.001043 *15*; α(N+..)=0.000266 *4* α(N)=0.000230 *4*; α(O)=3.49×10^{-5} *5*; α(P)=1.738×10^{-6} *25*
349		697.20		347.18	3/2$^+$			
350.9[@]	4.30[@] *5*	350.90	5/2$^+$	0.0	7/2$^+$	M1,E2	0.036 *6*	α(K)=0.030 *6*; α(L)=0.00471 *9*; α(M)=0.001004 *15*; α(N+..)=0.000260 *5* α(N)=0.000223 *4*; α(O)=3.49×10^{-5} *14*; α(P)=2.2×10^{-6} *5* Iγ: part of the triplet with Iγ=7.36 *5* (1989Ba14). Mult.: α(K)exp=0.027 *7* for the triply-placed 350.9γ requires mult=M1 or E2 for 350.9γ from 350.9 level and is consistent with mult=E1, E2, M1 for other placements.
350.9[@]	1.54[@] *2*	540.09		188.84	(3/2)$^+$	[D,E2]	0.026 *16*	
350.9[@]	1.52[@] *2*	1210.54	5/2$^-$	859.43		[D,E2]	0.026 *16*	
364.6 *1*	0.06 *1*	1210.54	5/2$^-$	845.93				
365.8 *5*	0.05 *3*	554.81	3/2$^+$	188.84	(3/2)$^+$			
[x]403.1 *1*	0.037 *5*							
423.60 *3*	6.5 *1*	1210.54	5/2$^-$	786.91	(3/2)$^-$	M1	0.0257	α(K)=0.0220 *3*; α(L)=0.00292 *4*; α(M)=0.000614 *9*; α(N+..)=0.0001612 *23* α(N)=0.0001373 *20*; α(O)=2.22×10^{-5} *4*; α(P)=1.660×10^{-6} *24* Mult.: from α(K)exp (not given).
[x]430.5 *3*	0.05 *1*							
435.99 *4*	2.05 *4*	786.91	(3/2)$^-$	350.90	5/2$^+$			
439.71 *4*	11.4 *2*	786.91	(3/2)$^-$	347.18	3/2$^+$			
444.04 *7*		1210.54	5/2$^-$	766.31				
[x]447.18 *7*	0.13 *1*							
472.8 *1*	0.04 *1*	1318.4		845.93				
477.2 *1*	0.09 *1*	540.09		62.65	5/2$^+$			
482.5 *1*	0.10 *1*	1318.4		835.64				
492.21 *3*	2.5 *1*	554.81	3/2$^+$	62.65	5/2$^+$			
498.97 *3*	0.60 *1*	845.93		347.18	3/2$^+$			
507.3 *2*	0.15 *3*	1046.97		540.09				
507.4 *2*	0.08 *3*	697.20		188.84	(3/2)$^+$			
512.21 *7*	1.4 *3*	859.43		347.18	3/2$^+$			
512.61 *8*	0.3 *1*	1210.54	5/2$^-$	697.20				
[x]517.9 *6*	1.2 *4*							
524.8 *4*	0.02 *1*	1330.1		806.43	(3/2)$^+$			
540.36 *5*	0.67 *2*	540.09		0.0	7/2$^+$			
554.83 *3*	0.64 *1*	554.81	3/2$^+$	0.0	7/2$^+$			
597.9 *1*	0.66 *5*	786.91	(3/2)$^-$	188.84	(3/2)$^+$			
634.54 *6*	0.62 *2*	697.20		62.65	5/2$^+$			
[x]645.6 *1*	0.06 *1*							
655.95 *7*	1.6 *1*	1210.54	5/2$^-$	554.81	3/2$^+$			
657.2 *1*	0.4 *1*	845.93		188.84	(3/2)$^+$			
670.6[@] *1*	0.08[@] *4*	859.43		188.84	(3/2)$^+$			
670.6[@] *1*	0.8[@] *1*	1210.54	5/2$^-$	540.09				
695.93 *6*	0.17 *1*	1046.97		350.90	5/2$^+$			
701.4 *2*	0.02 *1*	1560.46		859.43				
714.3 *5*	0.04 *2*	1560.46		845.93				

Continued on next page (footnotes at end of table)

^{145}Ce β^- decay 1989Ba14,1997Gr09 (continued)

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

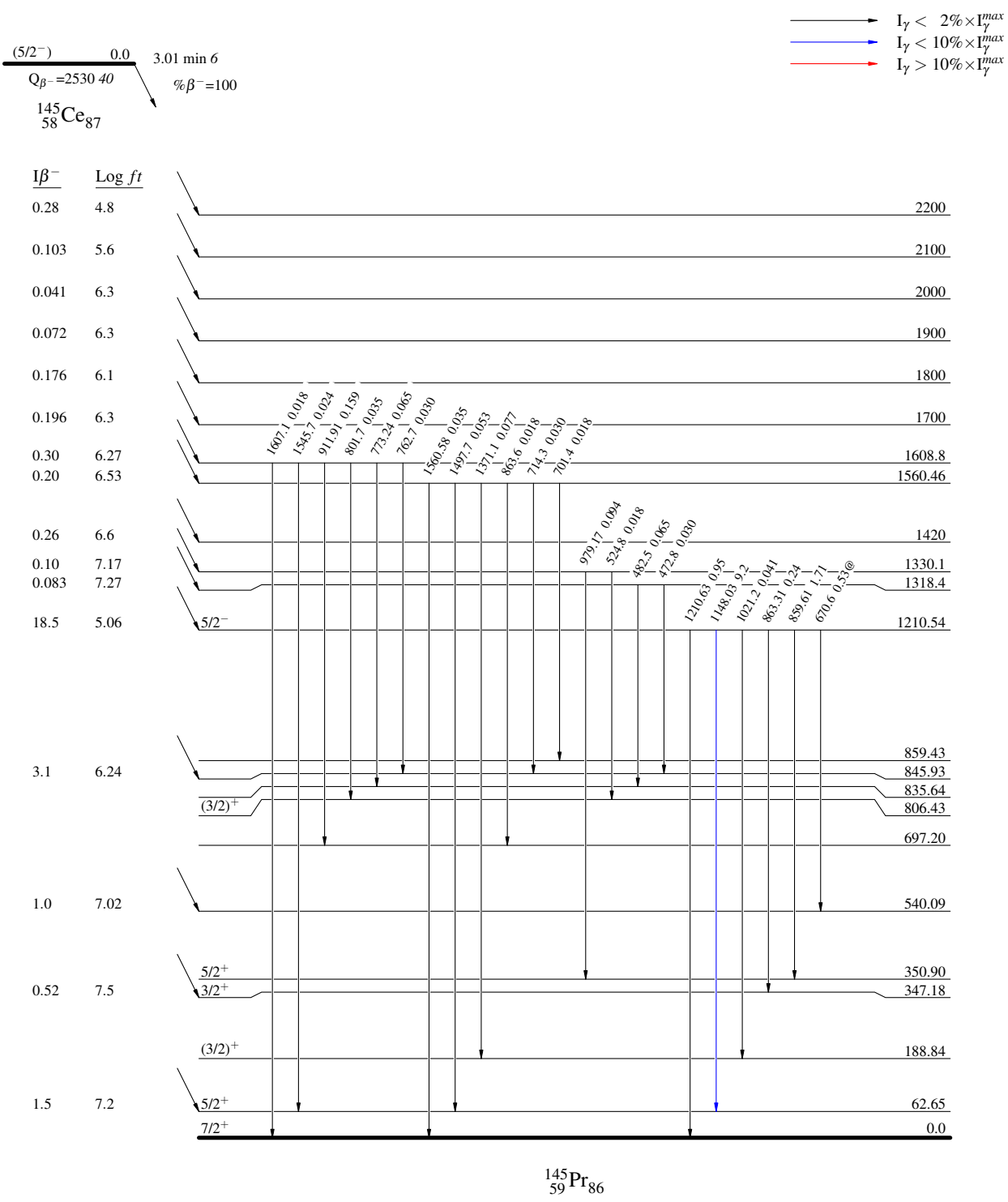
E_γ[†]	I_γ[†‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.	α[#]	Comments
724.33 *3*	100	786.91	(3/2)$^-$	62.65	5/2$^+$	E1	1.68×10^{-3}	%Iγ=59 *7* (1978Pf02) α(K)=0.001447 *21*; α(L)=0.000184 *3*; α(M)=3.84×10^{-5} *6*; α(N+..)=1.004×10^{-5} *14* α(N)=8.56×10^{-6} *12*; α(O)=1.376×10^{-6} *20*; α(P)=1.011×10^{-7} *15* Mult.: α(K)exp=0.0017 *4*.
743.76 *4*	0.24 *1*	806.43	(3/2)$^+$	62.65	5/2$^+$			
759.74 *5*	0.57 *2*	1110.56	(5/2)$^+$	350.90	5/2$^+$			
762.7 *2*	0.04 *2*	1608.8		845.93				
763.24 *6*	0.14 *5*	1110.56	(5/2)$^+$	347.18	3/2$^+$			
773.19 *6*	0.31 *5*	835.64		62.65	5/2$^+$			
773.24 *6*	0.10 *2*	1608.8		835.64				
783.09 *3*	3.98 *6*	845.93		62.65	5/2$^+$			
801.7 *2*	0.05 *1*	1608.8		806.43	(3/2)$^+$			
[x]831.4 *1*	0.037 *5*							
835.0 *1*	0.04 *1*	835.64		0.0	7/2$^+$			
845.88 *5*	0.51 *1*	845.93		0.0	7/2$^+$			
858.11 *6*	0.3 *1*	1046.97		188.84	(3/2)$^+$			
859.61 *6*	2.8 *1*	1210.54	5/2$^-$	350.90	5/2$^+$			
863.31 *5*	0.40 *2*	1210.54	5/2$^-$	347.18	3/2$^+$			
863.6 *1*	0.02 *1*	1560.46		697.20				
[x]872.1 *1*	0.026 *3*							
885.5 *1*	0.15 *1*	948.4		62.65	5/2$^+$			
911.91 *8*	0.26 *1*	1608.8		697.20				
921.44 *6*	0.25 *1*	1110.56	(5/2)$^+$	188.84	(3/2)$^+$			
948.6 *1*	0.08 *1*	948.4		0.0	7/2$^+$			
[x]953.6 *2*	0.04 *1*							
[x]968.92 *7*	0.090 *4*							
979.17 *6*	0.15 *1*	1330.1		350.90	5/2$^+$			
1021.2 *2*	0.06 *2*	1210.54	5/2$^-$	188.84	(3/2)$^+$			
1047.07 *6*	0.16 *1*	1046.97		0.0	7/2$^+$			
1110.68 *4*	4.19 *7*	1110.56	(5/2)$^+$	0.0	7/2$^+$			
1148.03 *4*	15.5 *2*	1210.54	5/2$^-$	62.65	5/2$^+$			
1210.63 *4*	1.60 *1*	1210.54	5/2$^-$	0.0	7/2$^+$			
1371.1 *1*	0.12 *1*	1560.46		188.84	(3/2)$^+$			
1497.7 *1*	0.08 *1*	1560.46		62.65	5/2$^+$			
1545.7 *2*	0.03 *1*	1608.8		62.65	5/2$^+$			
1560.58 *8*	0.06 *3*	1560.46		0.0	7/2$^+$			
1607.1 *2*	0.02 *1*	1608.8		0.0	7/2$^+$			

[†] From 1989Ba14, except where noted otherwise.
[‡] For absolute intensity per 100 decays, multiply by 0.59 *7*.
[#] 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}Ce β^- decay 1989Ba14,1997Gr09

Decay Scheme

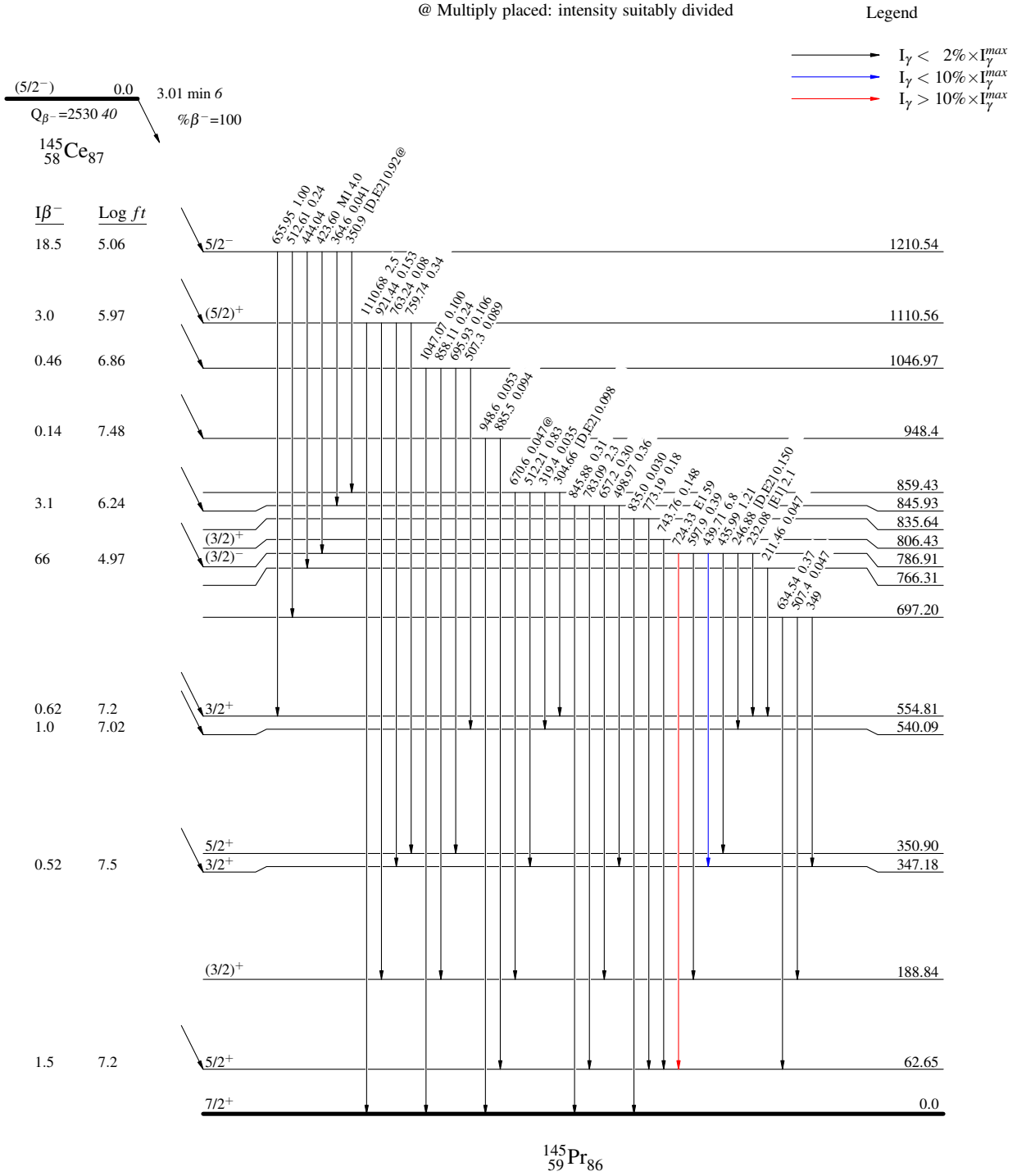
Intensities: $I_{(\gamma+ce)}$ per 100 parent decays
@ Multiply placed: intensity suitably divided



^{145}Ce β^- decay 1989Ba14,1997Gr09

Decay Scheme (continued)

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays
@ Multiply placed: intensity suitably divided



^{145}Ce β^- decay 1989Ba14,1997Gr09

Decay Scheme (continued)

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays
@ Multiply placed: intensity suitably divided