^{127}Pr ε decay 1995Os03,1995Gi12

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	A. Hashizume	NDS 112, 1647 (2011)	1-Oct-2009

Parent: ^{127}Pr: E=0.0; $T_{1/2}$=4.2 s *3*; Q(ε)=7.54×10^3 *SY*; %ε+%β^+ decay=100.0

^{127}Pr-$T_{1/2}$: 7.7 s *6* (1994Se13).

1995Os03: Source produced by ^{94}Mo(^{36}Ar,x) E=5.4 MeV/u, mass separation; measured γ, β-γ, γ-γ. 1994Se13 is the first report of the same group.

1995Gi12: Source produced by ^{92}Mo,^{94}Mo(^{40}Ca,X) E=210 MeV, mass separation; measured β-X, βγ, βγγ, γ-X(t), γγ(t).

The decay scheme is only partly known, the β feedings were not calculated.

^{127}Ce Levels

E(level)[†‡]	Jπ[#]	$T_{1/2}$[#]	Comments
0[@]	(1/2$^+$)	34 s *2*	%ε+%β^+=100
7.3[&] *11*	(5/2$^+$)	28.6 s *7*	%ε+%β^+=100 Additional information 1. E(level): From Adopted Levels.
28.8[@] *3*	(3/2$^+$)		
36.9[a] *11*	(7/2$^-$)	>10 μs	
162.7[a] *11*	(9/2$^-$)		
167.2[&] *11*	(7/2$^+$)		
205.68[@] *9*	(5/2$^+$)		
271.9[@] *3*	(7/2$^+$)		
325.2[a] *11*	(11/2$^-$)		
366.0[&] *11*	(9/2$^+$)		
553.3[a] *11*	(13/2$^-$)		
600.2[&] *12*	(11/2$^+$)		
703.3[@] *4*	(5/2$^+$)		
710.2[&] *12*	(7/2$^+$,5/2$^+$)		
742.01 *13*			
777.02 *12*			
821.2 *3*			
997.47 *13*			
1057.6 *3*			

[†] From a least-squares fit to E_γ's. The energy of the first (5/2$^+$) state is 8.1 *9* and this level is fixed for the least-squares fit, 0.9 keV were added in quadratic form on the ΔE in band(B) and band(C) (evaluator).

[‡] 1994Se13 and 1995Os03 report the 29.56 *5* γ to be delayed more than 10 μs, being not coincide with other prompt γ's. On the other hand, 1995Gi12 report the M1 28.8 γ coincides with several γ's, and attributed this prompt γ from (3/2$^+$) to (1/2$^+$) level in band(A). 1995Gi12 observe prompt γ's which coincide with the β-rays from ^{127}Pr decay, and do not report any delayed γ. One of authors (T.Sekine) in 1995Os03 gave evaluator an e-mail at 2 Sept.2010. He says that, after the 1995Os03 being reported, the weak 28.8 γ is found resolved from 29.56 γ, and confirmed the 28.8 γ coincides with 674 γ and Ce K x ray. In 1997, B. Firestone proposed in ENSDF file on A=127 (added file in 1993Ki01) that the 29.56 γ is the E1 transition from 11/2$^-$ level (the head of band(C)) to 5/2$^+$ level (the head of band(B)). Further, evaluator notes that if 29.56 γ is E1 and is delayed more than 10 μs, the order of BE1/BE1W becomes equal or smaller than 10^{-7} and this order for E1 transition is permissible from the examples in this mass region.

[#] From Adopted Levels.

[@] Band(A): π =+ band built on the ground (1/2$^+$) state.

[&] Band(B): π =+ band built on the (5/2$^+$) state.

[a] Band(C): π =− band built on the (7/2$^-$) state.

^{127}Pr ε decay 1995Os03,1995Gi12 (continued)

γ(^{127}Ce)

Iγ normalization: Not given as the level scheme is incomplete.

Eγ[†]	Iγ[†]	E_i(level)	J^π_i	E_f	J^π_f	Mult.	α[‡]	Comments
28.8 *5*	≈11	28.8	(3/2+)	0	(1/2+)	[M1]	6.7 *4*	α(L)=5.3 *3*; α(M)=1.11 *6*; α(N+..)=0.287 *16* α(N)=0.245 *14*; α(O)=0.0396 *22*; α(P)=0.00295 *17*
29.56[@] *5*	106 *6*	36.9	(7/2−)	7.3	(5/2+)	[E1]	1.158	α(L)=0.918 *14*; α(M)=0.192 *3*; α(N+..)=0.0472 *7* α(N)=0.0410 *6*; α(O)=0.00591 *9*; α(P)=0.000256 *4*
66.0[#] *5*		271.9	(7/2+)	205.68	(5/2+)	[M1]	3.92 *11*	α(K)=3.34 *9*; α(L)=0.459 *13*; α(M)=0.096 *3*; α(N+..)=0.0250 *7* α(N)=0.0213 *6*; α(O)=0.00345 *10*; α(P)=0.000259 *7*
125.84 *5*	100 *4*	162.7	(9/2−)	36.9	(7/2−)	[M1]	0.617	α(K)=0.526 *8*; α(L)=0.0717 *10*; α(M)=0.01501 *21*; α(N+..)=0.00391 *6* α(N)=0.00333 *5*; α(O)=0.000539 *8*; α(P)=4.07×10^{-5} *6*
159.84 *7*	48.0 *30*	167.2	(7/2+)	7.3	(5/2+)	[M1]	0.316	α(K)=0.270 *4*; α(L)=0.0366 *6*; α(M)=0.00765 *11*; α(N+..)=0.00199 *3* α(N)=0.001698 *24*; α(O)=0.000275 *4*; α(P)=2.08×10^{-5} *3*
162.53 *5*	30.9 *32*	325.2	(11/2−)	162.7	(9/2−)	[M1]	0.302	α(K)=0.257 *4*; α(L)=0.0349 *5*; α(M)=0.00731 *11*; α(N+..)=0.00190 *3* α(N)=0.001621 *23*; α(O)=0.000263 *4*; α(P)=1.99×10^{-5} *3*
176.7[#] *5*		205.68	(5/2+)	28.8	(3/2+)	[M1]	0.239	α(K)=0.204 *4*; α(L)=0.0277 *5*; α(M)=0.00579 *10*; α(N+..)=0.001509 *25* α(N)=0.001285 *21*; α(O)=0.000208 *4*; α(P)=1.58×10^{-5} *3*
198.79 *7*	11.9 *23*	366.0	(9/2+)	167.2	(7/2+)	[M1]	0.1734	α(K)=0.1482 *21*; α(L)=0.0200 *3*; α(M)=0.00418 *6*; α(N+..)=0.001090 *16* α(N)=0.000928 *13*; α(O)=0.0001504 *22*; α(P)=1.141×10^{-5} *16*
205.68 *9*	25.2 *32*	205.68	(5/2+)	0	(1/2+)	[E2]	0.1673	α(K)=0.1276 *18*; α(L)=0.0312 *5*; α(M)=0.00680 *10*; α(N+..)=0.001700 *24* α(N)=0.001474 *21*; α(O)=0.000218 *3*; α(P)=7.87×10^{-6} *11*
234.2[#] *5*		600.2	(11/2+)	366.0	(9/2+)	[M1]	0.1113 *17*	α(K)=0.0951 *15*; α(L)=0.01278 *20*; α(M)=0.00267 *4*; α(N+..)=0.000696 *11* α(N)=0.000593 *9*; α(O)=9.61×10^{-5} *15*; α(P)=7.31×10^{-6} *11*
243.14 *7*	77 *12*	271.9	(7/2+)	28.8	(3/2+)	[E2]	0.0959	α(K)=0.0751 *11*; α(L)=0.01638 *23*; α(M)=0.00355 *5*; α(N+..)=0.000891 *13* α(N)=0.000771 *11*; α(O)=0.0001155 *17*; α(P)=4.78×10^{-6} *7*
288.6[#] *5*		325.2	(11/2−)	36.9	(7/2−)	[E2]	0.0551 *9*	α(K)=0.0440 *7*; α(L)=0.00869 *14*; α(M)=0.00187 *3*; α(N+..)=0.000472 *8* α(N)=0.000408 *7*; α(O)=6.18×10^{-5} *10*; α(P)=2.89×10^{-6} *5*
359.0[#] *5*		366.0	(9/2+)	7.3	(5/2+)	[E2]	0.0280	α(K)=0.0228 *4*; α(L)=0.00405 *6*; α(M)=0.000866 *13*; α(N+..)=0.000220 *4*

Continued on next page (footnotes at end of table)

^{127}Pr ε decay 1995Os03,1995Gi12 (continued)

$\gamma(^{127}Ce)$ (continued)

E_γ †	I_γ †	E_i(level)	J_i^π	E_f	J_f^π	Mult.	α ‡	Comments
								α(N)=0.000189 *3*; α(O)=2.91×10^{-5} *5*; α(P)=1.547×10^{-6} *23*
390.55@ *8*	5.5 *9*	553.3	(13/2$^-$)	162.7	(9/2$^-$)	[E2]	0.0218	α(K)=0.0179 *3*; α(L)=0.00306 *5*; α(M)=0.000653 *10*; α(N+..)=0.0001663 *24* α(N)=0.0001429 *20*; α(O)=2.21×10^{-5} *3*; α(P)=1.224×10^{-6} *18*
431.38 *9*	55 *4*	703.3	(5/2$^+$)	271.9	(7/2$^+$)			
433.2# *5*		600.2	(11/2$^+$)	167.2	(7/2$^+$)	[E2]	0.01610	α(K)=0.01332 *20*; α(L)=0.00219 *4*; α(M)=0.000466 *7*; α(N+..)=0.0001191 *18* α(N)=0.0001022 *15*; α(O)=1.590×10^{-5} *23*; α(P)=9.23×10^{-7} *14*
543.1 *5*		710.2	(7/2$^+$,5/2$^+$)	167.2	(7/2$^+$)			
579.31 *10*	31.0 *20*	742.01		162.7	(9/2$^-$)			
614.31 *10*	13.7 *14*	777.02		162.7	(9/2$^-$)			
658.51 *27*	14.4 *15*	821.2		162.7	(9/2$^-$)			
672.32 *27*	7.1 *13*	997.47		325.2	(11/2$^-$)			
674.3# *5*		703.3	(5/2$^+$)	28.8	(3/2$^+$)			
740.19 *27*	24.6 *27*	777.02		36.9	(7/2$^-$)			
834.75 *11*	6.9 *12*	997.47		162.7	(9/2$^-$)			
894.87 *27*	20.7 *20*	1057.6		162.7	(9/2$^-$)			

† From 1995Os03, except as noted.
‡ Theoretical conversion coefficients are calculated using BrIcc code for the multipolarity indicated.
# Observed by 1995Gi12 only.
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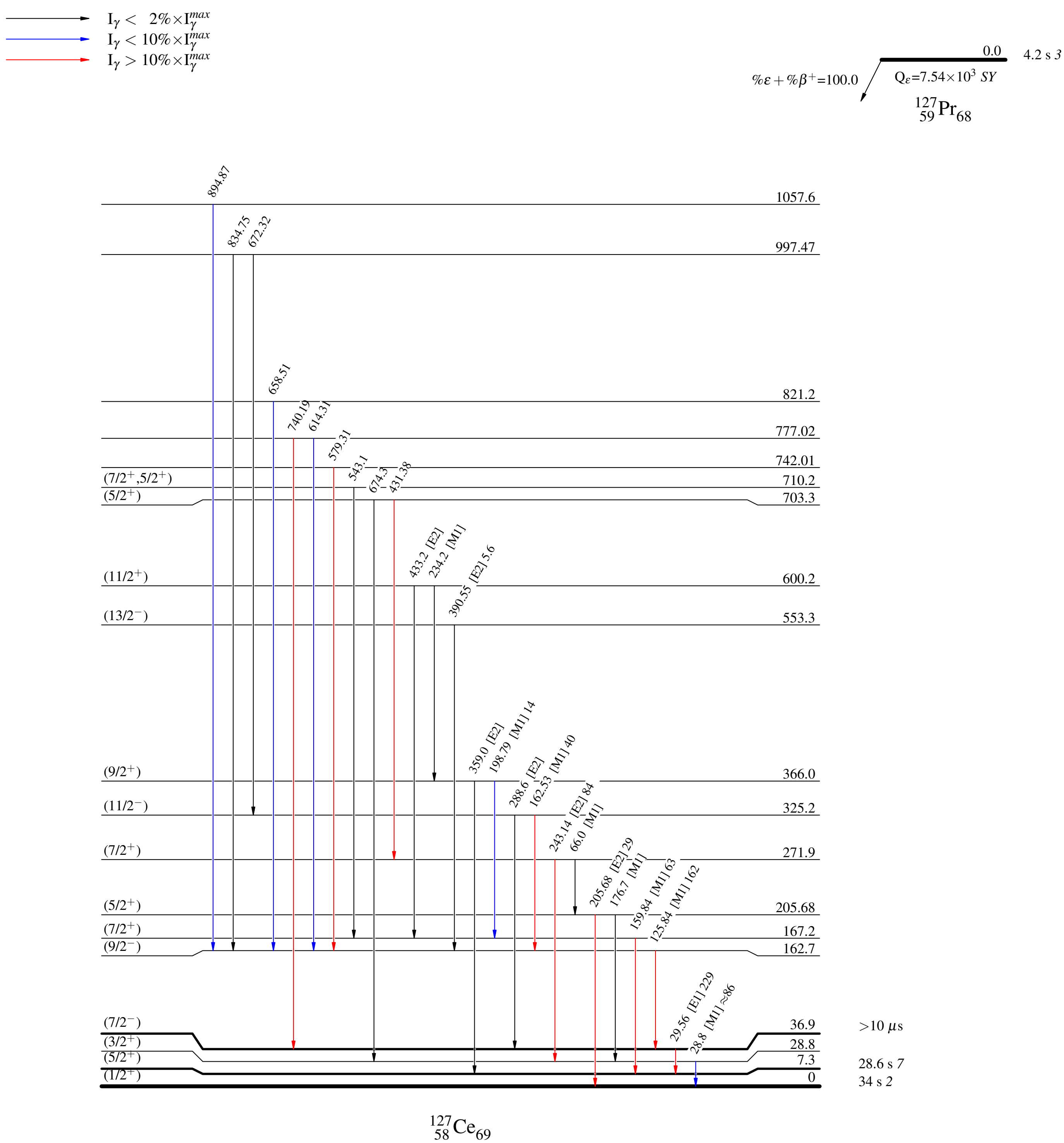
^{127}Pr ε decay 1995Os03,1995Gi12

Decay Scheme

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



^{127}Pr ε decay 1995Os03,1995Gi12