^{127}Ce β^+ decay (28.6 s) 2005Ii01,1996Ge07,1978Bo32

History

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

Parent: ^{127}Ce: E=7.3 *11*; J$^\pi$=(5/2$^+$); $T_{1/2}$=28.6 s *7*; Q(β^+)=5.92×10^3 *6*; %β^+ decay=100.0

^{127}Ce-$T_{1/2}$: From 2005Ii01.

2005Ii01: (^{94}Mo,^{96}Mo)+^{35}Cl, E=185 MeV; on-line mass separation; semi plastic; measured Eγ, Iγ, $\gamma\gamma$(t) coin, $\beta\gamma$(t) coin, (ce)γ coin.

1996Ge07: (^{94}Mo,^{96}Mo)+^{40}Ca, E=210, 255 MeV; on-line mass separation, He-jet; semi, plastic, Ge; measured γ, ce, $\gamma\gamma$(t),

1993GeZZ: (^{94}Mo,^{96}Mo)+^{40}Ca, E=255 MeV; on-line mass separation; measured γ, $\gamma\gamma$(t), (K x ray)γ(t), (ce)(γ) coin.

1987GeZX: (^{92}Mo,^{94}Mo,^{95}Mo,^{96}Mo)+^{35}Cl or +^{36}Ar reactions, E=170-210 MeV, on-line mass; measured γ, $\gamma\gamma$ coin, (K x ray)γ coin, (K x ray)γ(t).

1978Bo32: ^{98}Ru+^{32}S reaction, E≈190 MeV, on-line mass separation; semi γ,γ(t).

The decay scheme is from 2005Ii01, unless otherwise noted.

^{127}La Levels

E(level)[†]	J$^\pi$[#]	$T_{1/2}$	Comments
0.0[&]	(11/2$^-$)		
14.2[a] *4*	(3/2$^+$)		Additional information 1. From Adopted Levels.
73.36[a] *5*	(5/2$^+$)[@]		Assuming β-decay branchings to the ground and 14.8 states are both zero, 2005Ii01 estimate a feeding of ≈17% to this level.
135.13 *5*	($^+$)[@]		
210.83 *6*	($^+$)[@]	1.9 ns *3*	$T_{1/2}$: Deduced from (β+)(196γ)(t) with FWHM=4 ns. The derived half-life is ascribed to this level based upon the lack of observation of other strong delayed γ rays.
226.34[&] *9*	($^-$)[@]		
250.80[a] *6*	(7/2$^+$)[@]		
326.46 *6*	($^+$)[@]		
352.96 *8*	($^+$)[@]		
387.15[‡] *15*	(5/2,7/2)$^+$		
423.06[&] *9*	($^-$)[@]		
425.1[‡] *7*	(9/2$^+$)		
443.51 *6*	($^+$)[@]		
471.11 *6*	($^+$)[@]		
506.28 *7*			
679.30 *8*			
723.35[&] *10*			
838.22 *6*			
887.4 *3*			
929.1 *3*			
935.15 *6*			
999.76 *11*			
1309.36 *20*			
1374.6[&] *4*			
1388.15 *11*			
1476.3 *3*			
1578.47 *10*			
1602.29 *12*			
1654.7[&] *4*			
1669.42 *6*			

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^{127}Ce β^+ decay (28.6 s) 2005Ii01,1996Ge07,1978Bo32 (continued)

^{127}La Levels (continued)

E(level)[†]
1803.96 *13*
1932.5 *4*

[†] From a least-squares fit to E_γ's (evaluator).
[‡] From 1996Ge07.
[#] From Adopted Levels.
[@] Parity assignment to state based on multipolarity assigned to transition.
[&] Band(A): g.s. band.
[a] Band(B): (3/2$^+$) band.

$\gamma(^{127}La)$

E_γ[†]	I_γ[†]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[&]	α[‡]	Comments
58.5 *1*	13.5 *14*	73.36	(5/2$^+$)	14.2	(3/2$^+$)	M1+E2	10 *5*	α(K)=4.6 *4*; α(L)=4 *4*; α(M)=0.9 *8*; α(N+..)=0.21 *18* α(N)=0.18 *16*; α(O)=0.026 *22*; α(P)=0.00030 *4* α(K)exp=15 *8*, α(L)exp=0.3 *2* (2005Ii01). α(exp) value deduced from intensity balance between the 58.5 and 397.6 transitions by using the cascade relation between these transitions. The intensities used to do so were obtained from spectrum gated on 367.0 γ ray where 2005Ii01 assume the multipolarity of the 397.6 transition to be M1 or E2.
75.7 *1*	3.4 *4*	210.83	($^+$)	135.13	($^+$)			α(L)exp=0.10 *6* (2005Ii01).
75.8[#] *3*	0.2[#] *1*	326.46	($^+$)	250.80	(7/2$^+$)			
91.1[@] *2*	4 *2*	443.51	($^+$)	352.96	($^+$)			
^{x}103.2 *2*	0.7 *1*							
115.6 *2*	1.9 *2*	326.46	($^+$)	210.83	($^+$)			
120.3 *1*	100 *10*	135.13	($^+$)	14.2	(3/2$^+$)	M1(+E2)	0.84 *20*	α(K)=0.62 *8*; α(L)=0.17 *10*; α(M)=0.037 *22*; α(N+..)=0.009 *6* α(N)=0.008 *5*; α(O)=0.0012 *7*; α(P)=4.06×10^{-5} *21* α(K)exp=0.40 *16*, α(L)exp=0.051 *22* (2005Ii01).
136.2[@] *2*	2 *1*	387.15	(5/2,7/2)$^+$	250.80	(7/2$^+$)			
137.5 *1*	1.7 *2*	210.83	($^+$)	73.36	(5/2$^+$)			
142.1 *1*	1.8 *2*	352.96	($^+$)	210.83	($^+$)			
175[@] *1*	2 *1*	425.1	(9/2$^+$)	250.80	(7/2$^+$)			
^{x}176.4 *1*	4.6 *5*							α(K)exp=0.15 *5* E_γ: 176.4 and 177.5 form a doublet structure. α(K)exp value is for the doublet with undivided intensities.
177.5 *1*	8.9 *9*	250.80	(7/2$^+$)	73.36	(5/2$^+$)			E_γ: 176.4 and 177.5 form a doublet

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^{127}Ce β^+ decay (28.6 s) 2005Ii01,1996Ge07,1978Bo32 (continued)

γ(^{127}La) (continued)

E_γ [†]	I_γ [†]	E_i(level)	J_i^π	E_f	J_f^π	Mult. [&]	α [‡]	Comments
								structure. α(K)exp=0.015 *5* (2005Ii01), for the doublet with undivided intensities.
179.8 *1*	1.3 *2*	506.28		326.46	($^+$)			
191.4 *1*	0.9 *2*	326.46	($^+$)	135.13	($^+$)			
196.0 *1*	35 *4*	210.83	($^+$)	14.2	(3/2$^+$)	M1,E2	0.178 *13*	α(K)=0.143 *3*; α(L)=0.027 *9*; α(M)=0.0058 *19*; α(N+..)=0.0015 *5* α(N)=0.0012 *4*; α(O)=0.00019 *6*; α(P)=1.00×10^{-5} *10*
196.6[#] *3*	0.8[#] *3*	423.06	($^-$)	226.34	($^-$)	M1,E2	0.176 *13*	α(K)=0.142 *3*; α(L)=0.027 *9*; α(M)=0.0057 *19*; α(N+..)=0.0014 *5* α(N)=0.0012 *4*; α(O)=0.00019 *5*; α(P)=9.9×10^{-6} *10* α(K)exp=0.09 *4*, α(L)exp=0.016 *5* (2005Ii01).
226.3 *1*	17.8 *18*	226.34	($^-$)	0.0	(11/2$^-$)	M1,E2	0.115 *4*	α(K)=0.0938 *24*; α(L)=0.016 *4*; α(M)=0.0035 *9*; α(N+..)=0.00088 *20* α(N)=0.00076 *18*; α(O)=0.000117 *23*; α(P)=6.6×10^{-6} *8* α(K)exp=0.064 *20*, α(L)exp=0.036 *15* (2005Ii01).
236.1 *1*	6.6 *7*	250.80	(7/2$^+$)	14.2	(3/2$^+$)	E2	0.1021	α(K)=0.0803 *12*; α(L)=0.01716 *25*; α(M)=0.00368 *6*; α(N+..)=0.000917 *13* α(N)=0.000793 *12*; α(O)=0.0001195 *17*; α(P)=5.16×10^{-6} *8* α(K)exp=0.08 *4* (2005Ii01). Mult.: From adopted multipolarity: 2005II01 propose M1,E2 from α(K)exp.
253.0[#] *3*	13[#] *4*	326.46	($^+$)	73.36	(5/2$^+$)			
256.0[#] *3*	0.8[#] *4*	506.28		250.80	(7/2$^+$)			
279.7 *1*	8.3 *9*	352.96	($^+$)	73.36	(5/2$^+$)	(M1,E2)	0.061 *3*	α(K)=0.051 *4*; α(L)=0.0082 *10*; α(M)=0.00172 *23*; α(N+..)=0.00044 *6* α(N)=0.00037 *5*; α(O)=5.9×10^{-5} *6*; α(P)=3.7×10^{-6} *6* α(k)exp≈0.046 (2005Ii01).
295.7 *3*	0.7 *4*	506.28		210.83	($^+$)			
300.3 *1*	1.3 *4*	723.35		423.06	($^-$)			
311.6 *1*	30 *3*	326.46	($^+$)	14.2	(3/2$^+$)	M1,E2	0.045 *4*	α(K)=0.037 *4*; α(L)=0.0058 *4*; α(M)=0.00122 *10*; α(N+..)=0.000311 *22* α(N)=0.000266 *20*; α(O)=4.20×10^{-5} *19*; α(P)=2.7×10^{-6} *5* α(K)exp=0.032 *11*, α(L)exp≈0.009 (2005Ii01).
338[@] *1*	2 *1*	352.96	($^+$)	14.2	(3/2$^+$)			
351[@] *1*	2 *1*	425.1	(9/2$^+$)	73.36	(5/2$^+$)			
367.0 *1*	2.5 *6*	838.22		471.11	($^+$)			
370.9 *1*	1.5 *6*	506.28		135.13	($^+$)			
372.5[@] *2*	2 *1*	387.15	(5/2,7/2)$^+$	14.2	(3/2$^+$)			
394.7 *1*	2.3 *4*	838.22		443.51	($^+$)			
397.6 *1*	11.7 *13*	471.11	($^+$)	73.36	(5/2$^+$)	M1,E2	0.023 *3*	α(K)=0.019 *3*; α(L)=0.00279 *9*; α(M)=0.000584 *13*; α(N+..)=0.000149 *5* α(N)=0.000128 *4*; α(O)=2.03×10^{-5} *10*;

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^{127}Ce β^+ decay (28.6 s) 2005Ii01,1996Ge07,1978Bo32 (continued)

γ(^{127}La) (continued)

E_γ[†]	I_γ[†]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[&]	α[‡]	Comments
								α(P)=1.4×10^{-6} *3* α(K)exp=0.031 *14* (2005Ii01).
423.1 *1*	6.5 *8*	423.06	($^-$)	0.0	(11/2$^-$)	M1,E2	0.019 *3*	α(K)=0.016 *3*; α(L)=0.00233 *12*; α(M)=0.000487 *20*; α(N+..)=0.000125 *7* α(N)=0.000107 *5*; α(O)=1.70×10^{-5} *12*; α(P)=1.20×10^{-6} *24* α(K)exp=0.024 *13* (2005Ii01).
428.7 *1*	20 *3*	443.51	($^+$)	14.2	(3/2$^+$)	M1,E2	0.018 *3*	α(K)=0.0156 *25*; α(L)=0.00225 *12*; α(M)=0.000469 *21*; α(N+..)=0.000120 *7* α(N)=0.000103 *6*; α(O)=1.64×10^{-5} *12*; α(P)=1.16×10^{-6} *24* α(K)exp=0.016 *6* (2005Ii01). I_γ: Derived by subtracting out daughter (^{127}La) contamination; electromagnetic mass-separation of reaction products was not able to remove ^{127}La impurities from the beam.
429.2[#] *5*	0.7[#] *4*	679.30		250.80	(7/2$^+$)			
433.1 *1*	1.4 *5*	506.28		73.36	(5/2$^+$)			
456.3 *1*	16.2 *17*	471.11	($^+$)	14.2	(3/2$^+$)	(M1,E2)	0.0156 *24*	α(K)=0.0133 *22*; α(L)=0.00188 *14*; α(M)=0.000393 *25*; α(N+..)=0.000101 *8* α(N)=8.6×10^{-5} *6*; α(O)=1.38×10^{-5} *12*; α(P)=9.8×10^{-7} *21* α(K)exp≈0.019 (2005Ii01).
491.7 *1*	4.0 *6*	935.15		443.51	($^+$)			
497.0 *1*	1.5 *6*	723.35		226.34	($^-$)			
587.3 *2*	1.3 *4*	838.22		250.80	(7/2$^+$)			
605.9 *1*	3.3 *4*	679.30		73.36	(5/2$^+$)			
627.4 *2*	0.9 *2*	838.22		210.83	($^+$)			
^{x}631.2 *1*	1.2 *2*							
664.5 *1*	5.1 *6*	679.30		14.2	(3/2$^+$)			
676.3 *3*	1.3 *3*	887.4		210.83	($^+$)			
678.2 *3*	0.5 *2*	929.1		250.80	(7/2$^+$)			
684.3 *2*	2.4 *4*	935.15		250.80	(7/2$^+$)			
703.2 *1*	2.7 *6*	838.22		135.13	($^+$)			
718.3[#] *5*	1.3[#] *6*	929.1		210.83	($^+$)			
724.3[#] *5*	0.7[#] *4*	935.15		210.83	($^+$)			
752.9[#] *5*	0.7[#] *4*	887.4		135.13	($^+$)			
764.3 *3*	1.0 *3*	838.22		73.36	(5/2$^+$)			
789.4 *4*	1.4 *5*	999.76		210.83	($^+$)			
794.2[@]	2 *1*	929.1		135.13	($^+$)			
800.0 *2*	1.1 *3*	935.15		135.13	($^+$)			
823.5 *1*	4.1 *5*	838.22		14.2	(3/2$^+$)			
861.7 *1*	6.9 *8*	935.15		73.36	(5/2$^+$)			
864.6 *1*	7.6 *9*	999.76		135.13	($^+$)			
865.8 *2*	2.8 *6*	1309.36		443.51	($^+$)			
920.4 *1*	3.8 *6*	935.15		14.2	(3/2$^+$)			
951.8 *4*	1.2 *5*	1374.6		423.06	($^-$)			
^{x}984.9[@]	3 *1*							
^{x}1071.9 *2*	1.9 *5*							
1131.0[#] *5*	1.7[#] *8*	1602.29		471.11	($^+$)			
1135.2 *4*	1.8 *5*	1578.47		443.51	($^+$)			
1137.8 *3*	1.9 *5*	1388.15		250.80	(7/2$^+$)			

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^{127}Ce β^+ decay (28.6 s) 2005Ii01,1996Ge07,1978Bo32 (continued)

γ(^{127}La) (continued)

E_γ[†]	I_γ[†]	E_i(level)	J^π_i	E_f	J^π_f
1147.9[#] *5*	1.0[#] *4*	1374.6		226.34	$(^-)$
[x]1148.2 *1*	9.4 *13*				
1150.0[#] *5*	0.8[#] *4*	1476.3		326.46	$(^+)$
1158.8 *1*	2.2 *3*	1602.29		443.51	$(^+)$
1174.5[#] *5*	0.8[#] *4*	1309.36		135.13	$(^+)$
1198.1 *2*	1.2 *3*	1669.42		471.11	$(^+)$
1225.0[#] *5*	0.9[#] *6*	1476.3		250.80	$(7/2^+)$
1226.1[#] *5*	0.9[#] *5*	1669.42		443.51	$(^+)$
1231.6 *3*	1.0 *4*	1654.7		423.06	$(^-)$
1252.4 *3*	2.5 *6*	1578.47		326.46	$(^+)$
1253.7 *5*	1.2 *5*	1388.15		135.13	$(^+)$
1314.7 *1*	3.7 *5*	1388.15		73.36	$(5/2^+)$
1341.6[#] *5*	1.3[#] *5*	1476.3		135.13	$(^+)$
1342.9 *1*	6.7 *10*	1669.42		326.46	$(^+)$
1361.1[#] *5*	0.6[#] *3*	1803.96		443.51	$(^+)$
1418.7 *1*	1.3 *3*	1669.42		250.80	$(7/2^+)$
1450.7 *2*	1.6 *3*	1803.96		352.96	$(^+)$
1466.6[#] *5*	1.3[#] *6*	1602.29		135.13	$(^+)$
1477.9 *3*	1.0 *2*	1803.96		326.46	$(^+)$
1488.9[#] *5*	0.7[#] *4*	1932.5		443.51	$(^+)$
1534.3 *1*	1.5 *3*	1669.42		135.13	$(^+)$
1563.6 *1*	8.5 *10*	1578.47		14.2	$(3/2^+)$
1593.1[#] *5*	0.9[#] *5*	1803.96		210.83	$(^+)$
1654.6 *1*	5.0 *7*	1669.42		14.2	$(3/2^+)$
1668.7[#] *5*	1.2[#] *6*	1803.96		135.13	$(^+)$
1681.7[#] *5*	0.9[#] *5*	1932.5		250.80	$(7/2^+)$
1730.6 *2*	2.3 *6*	1803.96		73.36	$(5/2^+)$
[x]1838.2 *2*	1.6 *4*				
[x]1961.1 *3*	0.8 *2*				

[†] From 2005Ii01, except as noted.

[‡] Theoretical conversion coefficients are calculated using BrIcc code for the multipolarity indicated.

[#] From $\gamma\gamma$ coincidence (2005Ii01).

[@] From 1996Ge07, not confirmed by 2005Ii01.

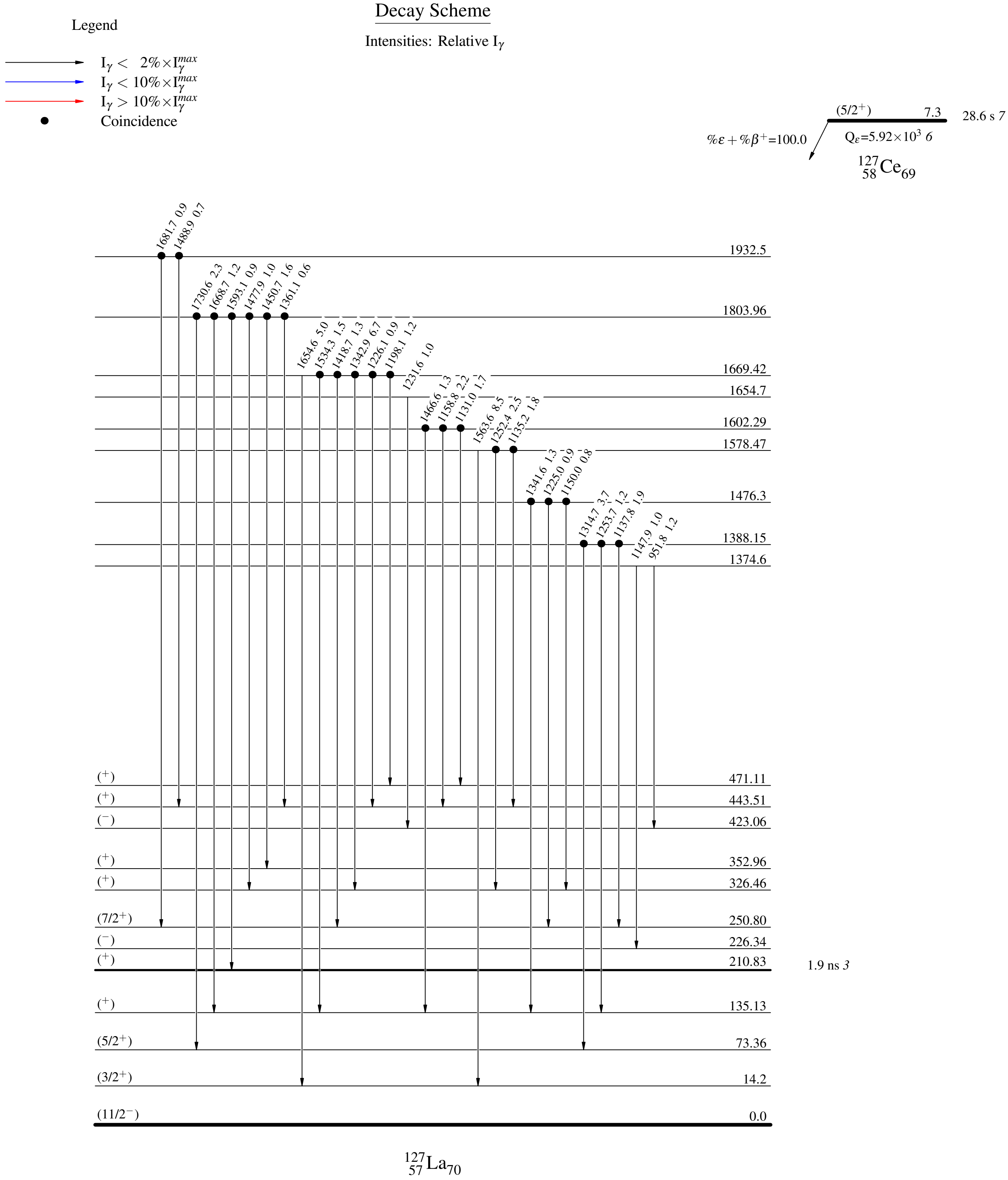
[&] From α(K)exp, unless otherwise noted.

[x] γ ray not placed in level scheme.

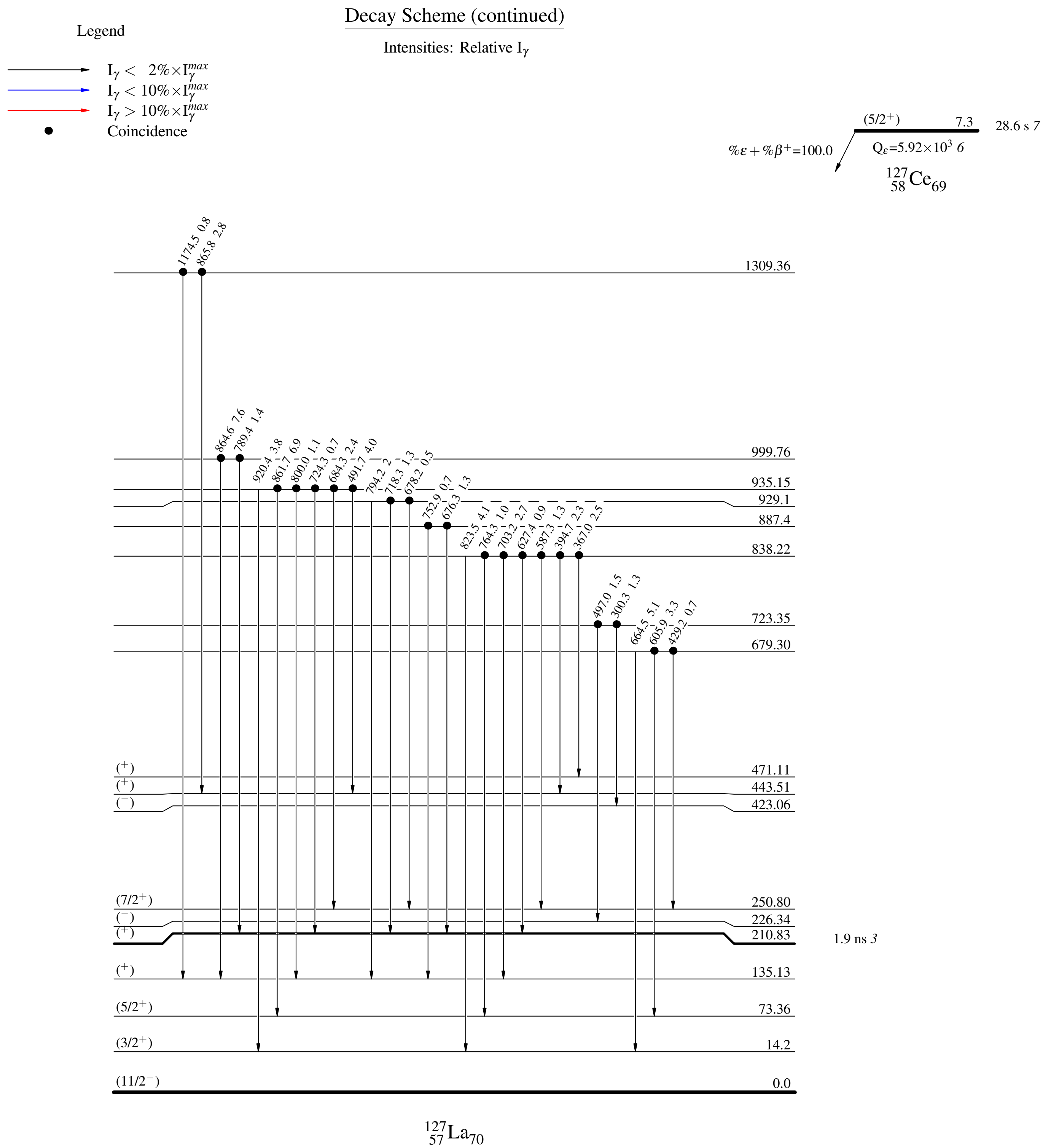
^{127}Ce β^+ decay (28.6 s) 2005Ii01,1996Ge07,1978Bo32

Decay Scheme

Intensities: Relative I_γ



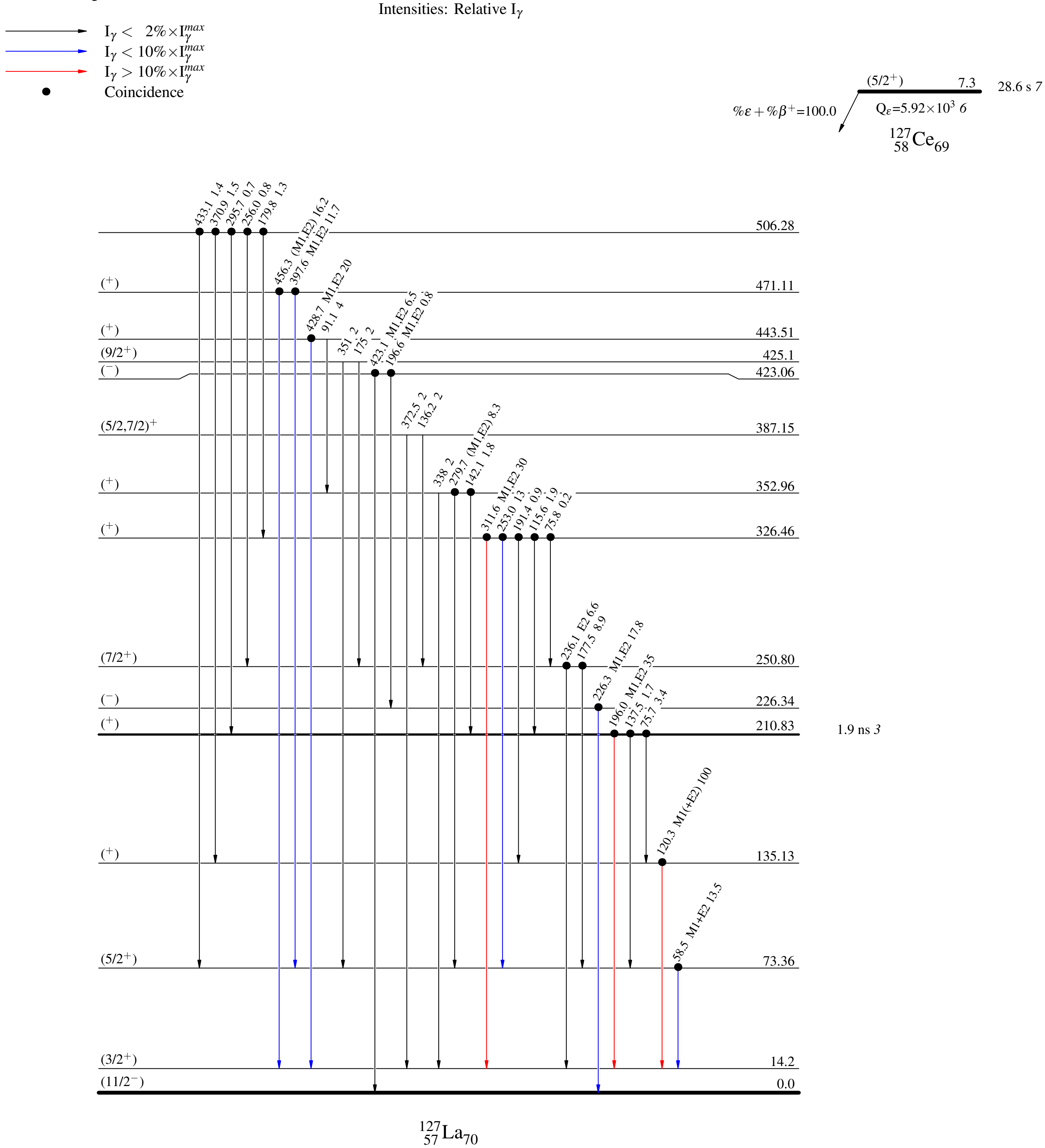
$^{127}Ce\ \beta^+$ decay (28.6 s) 2005Ii01,1996Ge07,1978Bo32



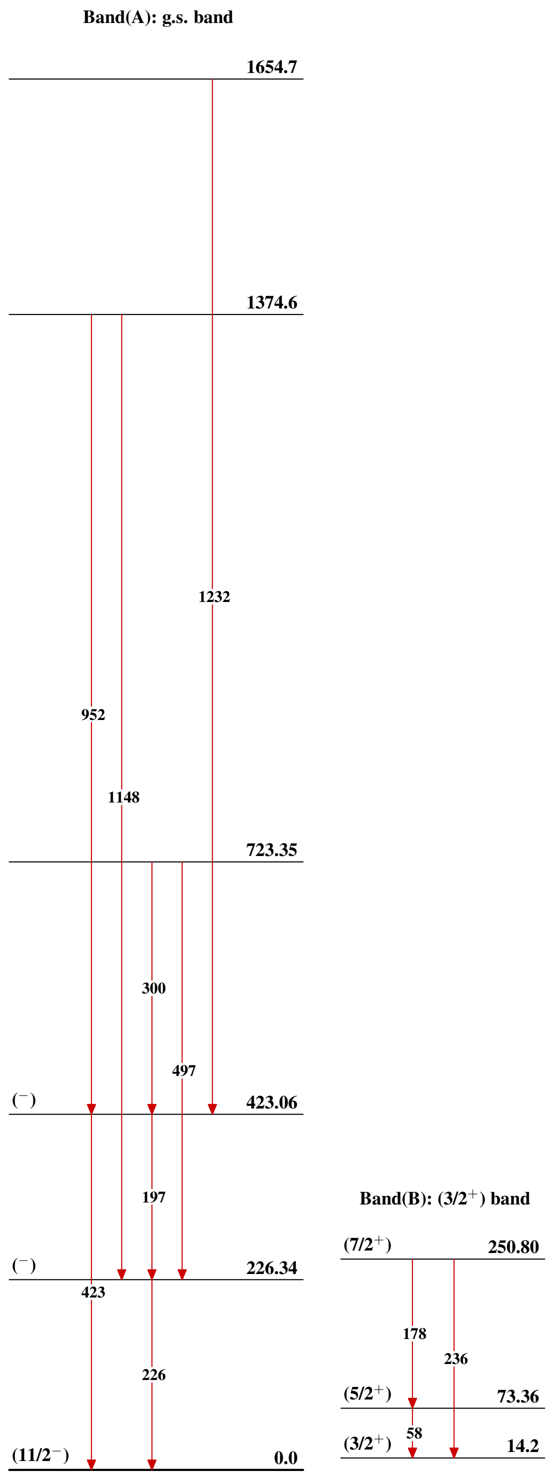
^{127}Ce β^+ decay (28.6 s) 2005Ii01,1996Ge07,1978Bo32

Decay Scheme (continued)

Intensities: Relative I_γ



$^{127}Ce\ \beta^{+}$ decay (28.6 s) 2005Ii01,1996Ge07,1978Bo32



$^{127}_{57}La_{70}$