^{132}Ce ε decay (3.51 h) 1985Ab01

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Yu. Khazov, A. A. Rodionov and S. Sakharov, Balraj Singh	NDS 104, 497 (2005)	10-Feb-2005

Parent: ^{132}Ce: E=0.0; $J^\pi=0^+$; $T_{1/2}$=3.51 h *11*; Q(ε)=1270 *40*; %ε+%β^+ decay=100.0
1985Ab01: Measured Eγ, Iγ, x-ray, ce. Deduced level scheme.
Others: 1973Mo08, 1968Ab02 (also 1969AbZX,1966Ab05), 1967Ge11 (also 1969Ge11,1965Ge03).

^{132}La Levels

E(level)	J^π	$T_{1/2}$	Comments
0.0	2^-		
135.34 *4*	3^-		
155.368 *21*	2^+		
182.071 *21*	1^+	0.83 ns *11*	$T_{1/2}$: from ceγ(t) (1973Mo08).
216.855 *23*	2^+		
279.14 *4*	1^+		
359.05 *4*	$1^+,2^+$		
406.87 *3*	1^+		
485.04 *3*	1^+		
523.83 *4*	1^+		
606.744 *24*	1^+		
648.33 *4*	1^+		
731.77 *3*	1^+		
820.02 *5*	$1^{(+)}$		

ε,β^+ radiations

E(decay)	E(level)	Iε†	Log *ft*	I($\varepsilon+\beta^+$)†	Comments
(4.5×10^2 *4*)	820.02	0.44 *8*	6.41 *12*	0.44 *8*	εK=0.8323 *23*; εL=0.1304 *18*; εM+=0.0373 *6*
(5.4×10^2 *4*)	731.77	1.74 *12*	5.98 *8*	1.74 *12*	εK=0.8360 *16*; εL=0.1276 *12*; εM+=0.0364 *4*
(6.2×10^2 *4*)	648.33	1.61 *14*	6.14 *8*	1.61 *14*	εK=0.8385 *11*; εL=0.1257 *9*; εM+=0.0358 *3*
(6.6×10^2 *4*)	606.744	4.0 *2*	5.81 *7*	4.0 *2*	εK=0.8395 *10*; εL=0.1250 *8*; εM+=0.03551 *24*
(7.5×10^2 *4*)	523.83	1.48 *10*	6.35 *6*	1.48 *10*	εK=0.8411 *8*; εL=0.1238 *6*; εM+=0.03511 *19*
(7.8×10^2 *4*)	485.04	5.1 *3*	5.85 *6*	5.1 *3*	εK=0.8417 *7*; εL=0.1233 *5*; εM+=0.03495 *17*
(8.6×10^2 *4*)	406.87	6.4 *3*	5.84 *5*	6.4 *3*	εK=0.8428 *6*; εL=0.1225 *4*; εM+=0.03468 *14*
(9.1×10^2 *4*)	359.05	<0.1	>7.7	<0.1	εK=0.8434 *5*; εL=0.1221 *4*; εM+=0.03454 *12*
(9.9×10^2 *4*)	279.14	2.1 *3*	6.45 *8*	2.1 *3*	εK=0.8442 *4*; εL=0.1214 *3*; εM+=0.03433 *10*
(1.09×10^3 *4*)	182.071	77.1 *6*	4.97 *4*	77.1 *6*	εK=0.8451 *4*; εL=0.12081 *25*; εM+=0.03412 *8*

† Absolute intensity per 100 decays.

γ(^{132}La)

Iγ normalization: ΣI(γ+ce)(to g.s.)=100.

α(exp), Ice: normalized to α(K)(182.11)=0.0387 (E1, 1968Ha53).

E_γ	I_γ‡	E_i(level)	J^π_i	E_f	J^π_f	Mult.†	δ†	α#	$I_{(\gamma+ce)}$†‡	Comments
20.00 5	0.011 3	155.368	2^+	135.34	3^-	[E1]		3.42	0.048 14	α(L)= 2.68; α(M)= 0.556 $I_{(\gamma+ce)}$: from intensity balance at 135.4 level. I_γ: from I(γ+ce) and α; Iγ≤0.06 (1985Ab01).
26.65 5	0.28 3	182.071	1^+	155.368	2^+	M1+E2	0.024 3	8.04 7		α(L)= 6.31 5; α(M)= 1.304 12 α(L1)exp=3.2 6, α(L2)exp=0.35 5, α(L3)exp=0.125 20.
34.71 5	0.46 5	216.855	2^+	182.071	1^+	M1+E2	0.028 11	3.65 9		α(L)= 2.86 7; α(M)= 0.592 15 α(L1)exp=1.0 2, α(L2)exp=0.10 2, α(L3)exp≈0.035.
47.73 6	0.10 1	406.87	1^+	359.05	$1^+,2^+$	[M1]		9.37		α(K)= 7.99; α(L)= 1.086; α(M)= 0.2257
61.49 5	0.24 2	216.855	2^+	155.368	2^+	M1+E2	0.06 3	4.49 4		α(K)= 3.815 4; α(L)= 0.537 24; α(M)= 0.112 6; α(N+..)= 0.0307 14 α(K)exp=4.2 6, α(L1)exp=0.50 9, α(L2)exp=0.050 9, α(L3)exp≈0.013.
62.27 6	0.13 1	279.14	1^+	216.855	2^+	M1+E2	0.05 3	4.32 3		α(K)= 3.677 3; α(L)= 0.512 19; α(M)= 0.106 5; α(N+..)= 0.0293 11 α(K)exp=4.0 7, α(L1)exp=0.51 7, α(L2)exp=0.045 7, α(L3)exp≈0.015.
^{x}76.2 1	≤0.02									ce(K)=0.16 4.
78.2 1	≤0.015	485.04	1^+	406.87	1^+	M1,E2			0.032 7	α(K)exp≥1.3, α(L1)exp≥0.2.
81.53 7	≤0.015	216.855	2^+	135.34	3^-	E1		0.415	0.02 1	α(K)= 0.353; α(L)= 0.0496; α(M)=0.01017; α(N+..)=0.00266 α(K)exp≥0.4.
83.43 6	≤0.015	731.77	1^+	648.33	1^+	M1,E2			0.07 2	α(K)exp≥2.6, α(L1)exp≥0.3.
88.20 7	≤0.015	820.02	$1^{(+)}$	731.77	1^+	(M1,E2)			≈0.04	α(K)exp>1.0.
^{x}112.35 9	0.030 9					M1,E2				α(K)exp=1.0 2, α(L1)exp=0.17 4.
123.66 9	0.10 1	279.14	1^+	155.368	2^+	M1+E2	0.4 3	0.65 7		α(K)= 0.530 25; α(L)= 0.09 4; α(M)= 0.020 8; α(N+..)= 0.0053 19 α(K)exp=0.66 10, α(L1)exp=0.080 22, α(L2)exp≤0.02.
125.19 9		731.77	1^+	606.744	1^+				0.04 1	ce(K)=0.012 3.
127.72 9	0.12 1	406.87	1^+	279.14	1^+	M1+E2	0.4 3	0.59 6		α(K)= 0.483 21; α(L)= 0.08 3; α(M)= 0.018 7; α(N+..)= 0.0048 16 α(K)exp=0.52 8, α(L1)exp=0.067 18, α(L2)exp<0.017.
^{x}134.1 1										ce(K)=0.016 4.
135.26 9	0.046 6	135.34	3^-	0.0	2^-	M1+E2	0.21 3	0.476 3		α(K)= 0.4018 11; α(L)= 0.0583 14; α(M)= 0.0121 3; α(N+..)=0.00333 8 α(K)exp=0.41 10; δ from IT decay.
^{x}137.66 10	0.10 1					M1+E2	≈0.6	≈0.5		α(K)= 0.399; α(L)= 0.0778; α(M)=0.01648;

γ(^{132}La) (continued)

E_γ	I_γ‡	E_i(level)	J^π_i	E_f	J^π_f	Mult.†	δ†	α#	$I_{(\gamma+ce)}$†‡	Comments
										α(N+..)=0.00445 α(K)exp=0.50 *8*, α(L1)exp=0.060 *12*, α(L2)exp≈0.02.
142.18 *8*	0.64 *5*	359.05	$1^+,2^+$	216.855	2^+	M1+E2	0.23 *5*	0.414 *4*		α(K)= 0.3496 *15*; α(L)= 0.0509 *20*; α(M)= 0.0106 *5*; α(N+..)=0.00291 *11* α(K)exp=0.36 *7*, α(L1)exp=0.044 *10*, α(L2)exp=0.006 *2*, α(L3)exp≤0.003.
^{x}147.4 *1*										ce(K)=0.008 *3*.
155.37 *4*	13.6 *6*	155.368	2^+	0.0	2^-	E1		0.0698		α(K)= 0.0598; α(L)=0.00795; α(M)=0.00163; α(N+..)=0.00044 α(K)exp=0.055 *6*, α(L1)exp=0.0060 *7*, α(L2)exp=0.00066 *15*, α(L3)exp=0.00088 *8*.
^{x}168.9 *1*										ce(K)=0.008 *3*.
176.84 *7*	0.250 *13*	359.05	$1^+,2^+$	182.071	1^+	M1+E2	0.8 *4*	0.241 *13*		α(K)= 0.195 *4*; α(L)= 0.036 *8*; α(M)= 0.0077 *16*; α(N+..)= 0.0021 *4* α(K)exp=0.22 *5*, α(L1)exp=0.032 *8*, α(L2)exp≈0.008.
182.11 *3*	100	182.071	1^+	0.0	2^-	E1		0.0451		α(K)= 0.0387; α(L)=0.00510; α(M)=0.00105; α(N+..)=0.00028 α(L1)exp=0.0043 *6*, α(L2)exp=0.00043 *6*, α(L3)exp=0.00054 *6*.
190.04 *5*	3.45 *15*	406.87	1^+	216.855	2^+	M1+E2	0.28 *4*	0.1844 *7*		α(K)=0.15635 *12*; α(L)= 0.0222 *4*; α(M)=0.00461 *9*; α(N+..)=0.00127 α(K)exp=0.174 *19*, α(L1)exp=0.026 *3*, α(L2)exp=0.0023 *3*, α(L3)exp≤0.0012.
199.78 *5*	0.172 *17*	606.744	1^+	406.87	1^+	M1,E2		0.17 *1*		α(K)exp=0.14 *3*.
205.80 *8*	0.180 *18*	485.04	1^+	279.14	1^+	M1,E2		0.155 *8*		α(K)exp<0.11.
216.83 *4*	6.4 *3*	216.855	2^+	0.0	2^-	E1		0.0281		α(K)=0.02417; α(L)=0.00315; α(M)=0.00065; α(N+..)=0.00017 α(K)exp=0.025 *5*, α(L1)exp=0.0027 *5*, α(L2)exp=0.00025 *6*, α(L3)exp=0.00030 *7*.
^{x}217.6 *1*										ce(K)=0.004 *1*.
224.68 *10*	0.23 *3*	406.87	1^+	182.071	1^+	M1,E2		0.119 *3*		α(K)exp=0.083 *17*.
246.90 *7*	0.24 *3*	731.77	1^+	485.04	1^+	M1,E2		0.089 *1*		α(K)exp=0.067 *19*.
251.46 *4*	2.9 *2*	406.87	1^+	155.368	2^+	M1+E2	0.50 *5*	0.08495 *6*		α(K)=0.07169 *23*; α(L)=0.01048 *13*; α(M)=0.00218 *3*; α(N+..)=0.00060 α(K)exp=0.086 *12*, α(L1)exp=0.0107 *16*, α(L2)exp=0.0017 *3*, α(L3)exp=0.00079 *15*.
268.13 *5*	0.61 *6*	485.04	1^+	216.855	2^+	M1,E2		0.070 *2*		α(K)exp=0.044 *7*.
279.12 *7*	2.5 *3*	279.14	1^+	0.0	2^-	E1		0.01440		α(K)=0.01239; α(L)=0.00160; α(M)=0.00033 Mult.: α(K)exp=0.012 *4*.
296.00 *12*		820.02	$1^{(+)}$	523.83	1^+				0.13 *4*	ce(K)=0.006 *2*.
303.12 *4*	2.7 *2*	485.04	1^+	182.071	1^+	M1,E2		0.049 *3*		α(K)exp=0.048 *12*.
324.82 *7*	0.16 *2*	731.77	1^+	406.87	1^+	M1,E2		0.040 *3*		α(K)exp=0.050 *14*.
327.69 *8*		606.744	1^+	279.14	1^+				0.09 *3*	ce(K)=0.003 *1*.
329.64 *4*	3.0 *2*	485.04	1^+	155.368	2^+	M1+E2		0.038 *3*		α(K)= 0.0322; α(L)=0.00492; α(M)=0.00103;

$^{132}_{57}$La$_{75}$-3

γ(^{132}La) (continued)

E_γ	I_γ‡	E_i(level)	J_i^π	E_f	J_f^π	Mult.†	α#	$I_{(\gamma+ce)}$†‡	Comments
									α(N+..)=0.00028 α(K)exp=0.032 5, α(L1)exp=0.0040 10, α(L2)exp<0.0007. δ: <1.0.
368.51 5	1.46 10	523.83	1^+	155.368	2^+	M1,E2	0.028 3		α(K)exp=0.024 5, α(L1)exp=0.0041 7.
369.15 5		648.33	1^+	279.14	1^+			0.18 4	ce(K)=0.005 1.
^{x}384.7 1									ce(K)=0.003 1.
389.83 5	0.25 3	606.744	1^+	216.855	2^+	M1,E2	0.024 3		α(K)exp=0.025 5.
424.67 3	1.5 1	606.744	1^+	182.071	1^+	M1+E2	0.019 3		α(K)exp=0.018 5, α(L1)exp=0.0027 7, α(L2)exp<0.0007.
431.49 4	1.25 9	648.33	1^+	216.855	2^+	M1,E2	0.018 3		α(K)exp=0.015 3.
451.44 3	2.9 2	606.744	1^+	155.368	2^+	M1,E2	0.017 2		α(K)exp=0.0100 25.
460.94 6		820.02	$1^{(+)}$	359.05	$1^+,2^+$			0.25 9	ce(K)=0.003 1.
466.26 8		648.33	1^+	182.071	1^+			0.3 1	ce(K)=0.004 1.
492.95 9		648.33	1^+	155.368	2^+			0.4 1	ce(K)=0.005 1.
^{x}498.7 1									ce(K)=0.010 3.
514.8 1		731.77	1^+	216.855	2^+			0.35 9	ce(K)=0.004 1.
523.78 4	0.54 6	523.83	1^+	0.0	2^-	E1	0.00309		α(K)=0.00265; α(L)=0.00033 α(K)exp≤0.0035.
576.38 3	1.3 1	731.77	1^+	155.368	2^+	M1,E2	0.009 2		α(K)exp=0.0062 9.
606.73 7	0.20 3	606.744	1^+	0.0	2^-				
731.68 8	0.090 14	731.77	1^+	0.0	2^-				
820.34 10	0.15 2	820.02	$1^{(+)}$	0.0	2^-				

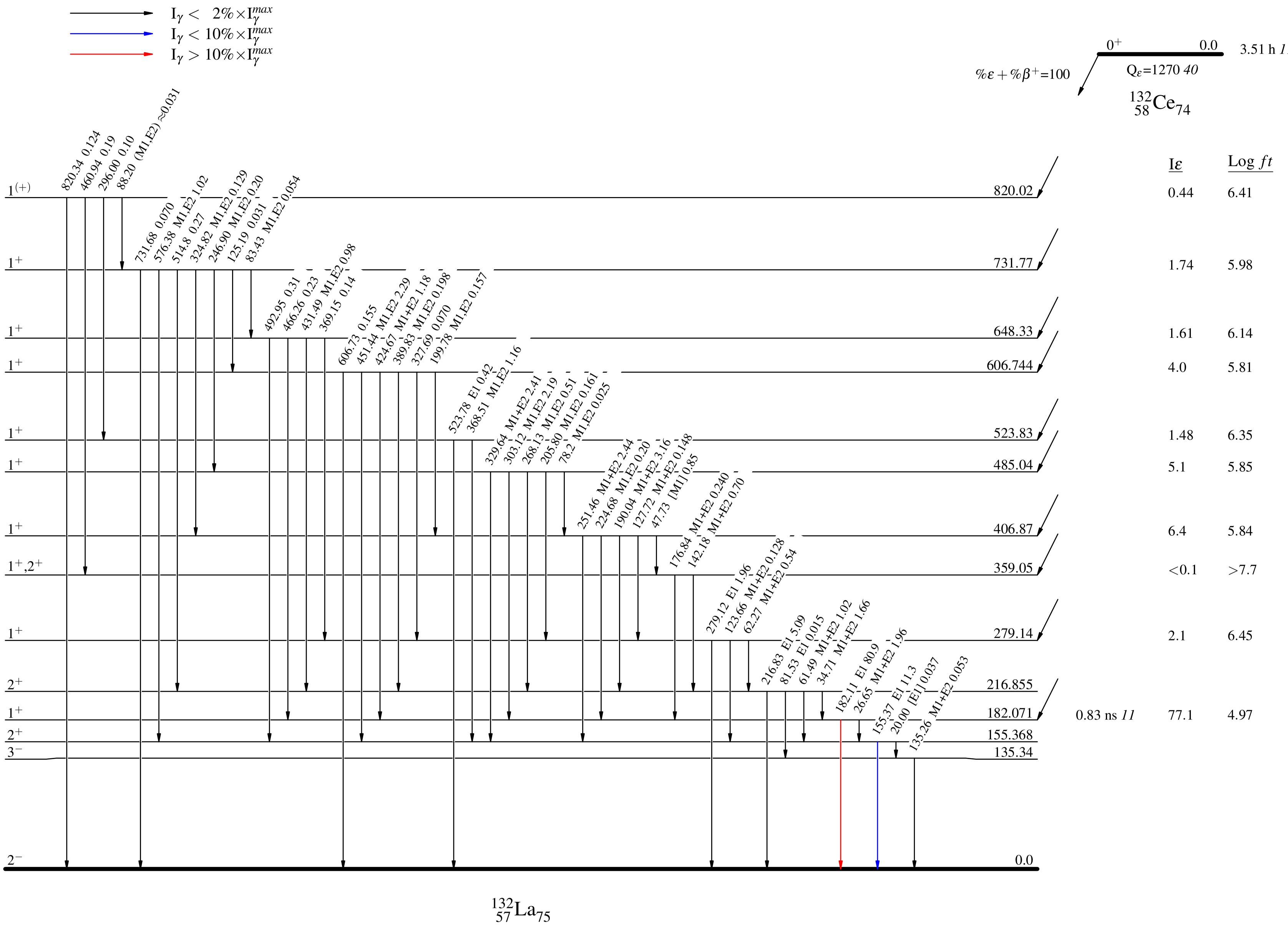
† From ce data.
‡ For absolute intensity per 100 decays, multiply by 0.774 5.
\# Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.
^{x} γ ray not placed in level scheme.

$^{132}_{57}$La$_{75}$-4

^{132}Ce ε decay (3.51 h)   1985Ab01

Decay Scheme

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



$^{132}_{57}La_{75}$-5