^{135}Ce ε decay (17.7 h) 1975He21,1981Ab08,1974Na11

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh, Alexander A. Rodionov And Yuri L. Khazov	NDS 109, 517 (2008)	22-Jan-2008

Parent: ^{135}Ce: E=0.0; $J^{\pi}=1/2^{(+)}$; $T_{1/2}$=17.7 h *3*; Q(ε)=2026 *5*; %ε+%β^+ decay=100.0

1975He21: measured Eγ, Iγ, γγ, ce.

1981Ab08: measured Eγ, Iγ, ce.

1974Na11: measured Eγ, Iγ, γγ(θ), ce, ceγ coin, ceγ(t).

Others:

γ: 1973Mo22, 1969Gr32, 1968Ab03 (also 1969AbZX), 1967Re08, 1967Go16, 1965Ba46, 1964Ta10.

γγ: 1968Ab03, 1964Ta10.

β^+: 1948Ch03, 1951St03.

ce: 1973Mo22, 1968Ab03, 1966Ab05, 1965Ba46, 1964Ta10, 1963Dz02, 1958Dz10, 1958Da13.

(ce)(ce) coin: 1965Dz08.

(ce)γ(t): 1973Mo22, 1972Af03, 1972Be77, 1972Ak01, 1970Na10.

(ce)(ce)(t): 1972Be77.

γγγ coin: 1981Sa09.

γγ(θ): 1981BuZW, 1972Zh03.

$T_{1/2}$(^{135}Ce isotope): 1948Ch03, 1951St03, 1958Dz10, 1958An39, 1959Gr23, 1960La07, 1963Dz02, 1964Ta10, 1965Ba46, 1967Go16, 1974DzZY, 1976Ge10.

Total decay energy of 2044 keV *34* calculated (by RADLIST code) from level scheme agrees with the expected value of 2026 keV *5*.

^{135}La Levels

E(level)	J^{π} †	$T_{1/2}$	Comments
0.0	$5/2^+$		
119.534 *14*	$7/2^+$	4.0 ns *1*	$T_{1/2}$: average of 4.12 ns *10* (1974Na11) and 3.9 ns *1* (1972Be77). Other: 4.8 ns *8* (1972Af03).
206.504 *11*	$5/2^+$	0.52 ns *3*	$T_{1/2}$: average of 0.55 ns *5* (1974Na11) and 0.48 ns *3* (1972Be77). Other: 0.68 ns *14* (1972Af03).
265.546 *11*	$3/2^+$	<0.08 ns	$T_{1/2}$: from 1974Na11. Other: 1972Be77.
300.053 *11*	$1/2^+$	<0.08 ns	$T_{1/2}$: from 1974Na11. Other: 1972Be77.
583.9? *5*	$9/2^+$		
604.564 *13*	$3/2^+,5/2^+$		
665.557 *17*	$5/2^+$		
712.35 *9*	$(3/2^-,5/2^-)$		
783.601 *11*	$3/2^+$		
786.8? *6*	$11/2^-$		
828.372 *13*	$3/2^+$		
872.313 *13*	$(1/2)^+$		
984.359 *14*	$3/2^+$		
993.43 *6*	$1/2^+,3/2^+,5/2^+$		
1038.52 *2*	$3/2^+,5/2^+$		
1171.418 *11*	$3/2^+$		
1439.485 *18*	$3/2^+$		
1449.636 *17*	$1/2^+,3/2^+$		
1479.66 *3*	$1/2^+,3/2^+$		
1568.9? *2*			
1599.25 *3*	$1/2^+,3/2^+$		
1766.98 *2*	$3/2^+$		
1797.15 *7*	$1/2^+,3/2$		
1850.74 *15*	1/2,3/2		

† From Adopted Levels.

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ε,β+ radiations

Total Iβ+=0.38% 5 (1981Sa09).

E(decay)	E(level)	Iβ+ ‡	Iε‡	Log *ft*	I(ε+β+)†‡	Comments
(175 *5*)	1850.74		0.041 *4*	7.2 *1*	0.041 *4*	εK=0.789 *3*; εL=0.1630 *19*; εM+=0.0483 *7*
(229 *5*)	1797.15		0.038 *3*	7.5 *1*	0.038 *3*	εK=0.8073 *13*; εL=0.1491 *10*; εM+=0.0436 *4*
(259 *5*)	1766.98		0.60 *3*	6.44 *3*	0.60 *3*	εK=0.8137 *10*; εL=0.1443 *7*; εM+=0.04197 *24*
(427 *5*)	1599.25		0.26 *3*	7.29 *6*	0.26 *3*	εK=0.8310; εL=0.13136 *22*; εM+=0.03763 *8*
(457# *5*)	1568.9?		0.033 *13*	8.3 *2*	0.033 *13*	εK=0.8326; εL=0.13013 *19*; εM+=0.03722 *7*
(546 *5*)	1479.66		0.29 *3*	7.47 *5*	0.29 *3*	εK=0.8363; εL=0.12739 *13*; εM+=0.03631 *5*
(576 *5*)	1449.636		2.04 *7*	6.65 *2*	2.04 *7*	εK=0.8373; εL=0.1267; εM+=0.03607 *4*
(587 *5*)	1439.485		0.80 *4*	7.10 *3*	0.80 *4*	εK=0.8375; εL=0.1265; εM+=0.03600 *4*
(855 *5*)	1171.418		8.5 *3*	6.41 *2*	8.5 *3*	εK=0.8427; εL=0.1226; εM+=0.03471
(987# *5*)	1038.52		0.09 *3*	8.6 *2*	0.09 *3*	εK=0.8442; εL=0.1215; εM+=0.03434
(1033# *5*)	993.43		0.011 *6*	9.3 *2*	0.011 *6*	εK=0.8446; εL=0.1212; εM+=0.03424
(1042 *5*)	984.359		2.78 *8*	7.08 *2*	2.78 *8*	εK=0.8447; εL=0.1211; εM+=0.03422
(1154 *5*)	872.313		33.7 *9*	6.09 *2*	33.7 *9*	εK=0.8455; εL=0.1205; εM+=0.03400
(1198 *5*)	828.372		5.2 *2*	6.93 *2*	5.2 *2*	εK=0.8458; εL=0.1202; εM+=0.03393
(1242 *5*)	783.601	0.0052 *6*	30.1 *9*	6.21 *2*	30.1 *9*	av Eβ=110.0 *23*; εK=0.8460; εL=0.1200; εM+=0.03386
(1360# *5*)	665.557		<0.4	>8.2	<0.4	εK=0.8458; εL=0.1194; εM+=0.03367
(1421# *5*)	604.564		0.26 *16*	8.4 *3*	0.26 *16*	εK=0.8451; εL=0.1191; εM+=0.03356
1727 *3*	300.053	0.36 *6*	14.4 *9*	6.80 *3*	14.7 *9*	av Eβ=323.2 *22*; εK=0.8313; εL=0.1161; εM+=0.03270 E(decay): Eβ=705 *3* (1976GaZI), 694 *13* (1981Sa09). Iβ+: 0.36% +7-5 (1981Sa09) from γ(γ±) triple coin.
(1760# *5*)	265.546	<0.027	<2.7	>7.6	<2.7	av Eβ=338.2 *22*; εK=0.8283; εL=0.1156; εM+=0.03255 Iβ+: 0.019 +*8*–*19* (1981Sa09) from γ(γ±) triple coin.

† From γ-ray intensity balance.
‡ Absolute intensity per 100 decays.
# Existence of this branch is questionable.

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γ(^{135}La)

Iγ normalization: from Σ(I(γ+ce) of γ′s to g.s.)=100. No direct ε feeding to g.s. (ΔJ=2,Δπ=no) is expected.
Ice: weighted average of 1981Ab08, 1975He21 and 1974Na11. These intensities are normalized to ce(K)(265.56γ)=100, thus should be multiplied by 0.0625 (α(K)(265.56γ)) to scale these to γ-ray intensities.
α(exp)=Ice/Iγ normalized to α(K)(265.56)=0.0618 (BrIcc code).
For penetration parameters, see 1975Mo12 (also 1973Mo22).
Relative to Iγ(265.56γ)=100, I(Kα$_2$ x ray)=58.4 *23*, I(Kα$_1$ x ray)=106 *3*, I(Kβ$_1$ x ray)=30.9 *15*, I(Kβ$_2$ x ray)=7.5 *3* (1981Ab08).
I(518.05γ)/I(γ$^{\pm}$)=17.7 *18* (1981Sa09).

E_γ [†]	I_γ [‡ f]	E_i(level)	J_i^π	E_f	J_f^π	Mult. [d]	δ	α [g]	Comments
34.508 *17*	3.9 [&] *3*	300.053	1/2$^+$	265.546	3/2$^+$	M1(+E2)	0.013 [e] *13*	3.55 *8*	α(L)=2.81 *6*; α(M)=0.585 *14*; α(N+..)=0.151 *4* α(N)=0.129 *3*; α(O)=0.0208 *5*; α(P)=0.001593 *23* E_γ: from 1974Na11. Eγ=34.52 *3* (1975He21). Additional information 9. α(L)exp=3.0 *3*; L1/L2=11.5 *8*, L1/L3=39 *12*, L2/L3=3.4 *11* (1974Na11).
43.9 [a]	0.09 *1*	872.313	(1/2)$^+$	828.372	3/2$^+$	M1+E2	0.13 *3*	12.2 *4*	α(K)=9.91 *14*; α(L)=1.83 *23*; α(M)=0.39 *6*; α(N+..)=0.098 *13* α(N)=0.084 *11*; α(O)=0.0131 *15*; α(P)=0.000779 *12* ce(K)=14.0 *18*, ce(L1)=1.8 *4*, ce(L2)=0.42 *11* (1981Ab08). I_γ: from ce(K) and δ(E2/M1).
59.038 *20*	0.20 *1*	265.546	3/2$^+$	206.504	5/2$^+$	M1+E2	0.19 *4*	5.25 *16*	α(K)=4.24 *6*; α(L)=0.80 *10*; α(M)=0.169 *22*; α(N+..)=0.043 *6* α(N)=0.037 *5*; α(O)=0.0057 *7*; α(P)=0.000327 *5* Additional information 6. E_γ: from 1974Na11. Eγ=59.03 *5* (1975He21). α(K)exp=3.8 *6*, α(L1)exp=0.55 *10*, α(L2)exp=0.13 *3*. δ: from subshell ratios (1981Ab08). δ<0.05 from L1/L2>11 (1974Na11). I_γ: from 1981Ab08. Iγ=0.055 *9* (1975He21).
60.9 [a]	0.027 [&] *6*	665.557	5/2$^+$	604.564	3/2$^+$,5/2$^+$	E2(+M1)	>0.6 [e]	9 *3*	α(K)=4.3 *3*; α(L)=4.0 *20*; α(M)=0.9 *5*; α(N+..)=0.21 *11* α(N)=0.19 *10*; α(O)=0.026 *13*; α(P)=0.000260 *25* ce(K)=1.6 *3*, ce(L1)=0.18 *4*, ce(L2)>0.3 (1981Ab08). I_γ: from ce(K) and δ(E2/M1).
[x]65.0 [bh] *3*	0.014 *5*								
86.97 *3*	1.00 [&] *3*	206.504	5/2$^+$	119.534	7/2$^+$	M1+E2	0.53 [e] *3*	1.98 *5*	α(K)=1.476 *23*; α(L)=0.395 *20*; α(M)=0.086 *5*; α(N+..)=0.0212 *11* α(N)=0.0184 *9*; α(O)=0.00274 *13*; α(P)=0.0001049 *15* δ: from simultaneous fitting of α(K)exp, α(L3)exp and K/L2 (1975Mo12) with α(K)exp=1.26 *9*, α(L2)exp=0.112 *9*, α(L3)exp=0.118 *10*.

$^{135}_{57}La_{78}$-3

^{135}Ce ε decay (17.7 h) 1975He21,1981Ab08,1974Na11 (continued)

γ(^{135}La) (continued)

E_γ[†]	I_γ[‡f]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[d]	δ	α[g]	Comments
									Additional information 4. E_γ: 86.87 *5* (1974Na11). Penetration parameter λ(M1)=14.5 *55* (1975Mo12). Other: 1973Mo22.
88.71 *2*	1.39[&] *4*	872.313	$(1/2)^+$	783.601	$3/2^+$	M1+E2	0.07[e] *3*	1.531 *23*	α(K)=1.303 *19*; α(L)=0.181 *5*; α(M)=0.0377 *11*; α(N+..)=0.0097 *3* α(N)=0.00827 *24*; α(O)=0.00134 *4*; α(P)=0.0001014 *15* Additional information 33. α(K)exp=1.42 *9*, α(L1)exp=0.166 *17*, α(L2)exp=0.018 *3*, α(L3)exp=0.0045 *18*.
93.5[a]	0.004 *2*	300.053	$1/2^+$	206.504	$5/2^+$				I_γ: from ce(K)=0.11 *4*, and mult=[E2].
112.0[a]	0.020 *7*	984.359	$3/2^+$	872.313	$(1/2)^+$				I_γ: from ce(K)=0.21 *7* and mult=[M1].
115.7[h] *2*	0.052 *7*	828.372	$3/2^+$	712.35	$(3/2^-,5/2^-)$	E1		0.1571	α(K)=0.1342 *20*; α(L)=0.0182 *3*; α(M)=0.00377 *6*; α(N+..)=0.000953 *15* α(N)=0.000816 *13*; α(O)=0.0001284 *19*; α(P)=8.36×10^{-6} *13* Additional information 27. α(K)exp=0.13 *5*.
118.03 *2*	0.90[&] *5*	783.601	$3/2^+$	665.557	$5/2^+$	M1+E2	0.27[e] *5*	0.704 *15*	α(K)=0.587 *10*; α(L)=0.093 *6*; α(M)=0.0195 *13*; α(N+..)=0.0050 *3* α(N)=0.0042 *3*; α(O)=0.00067 *4*; α(P)=4.47×10^{-5} *7* Additional information 19. α(K)exp=0.58 *5*, α(L1)exp=0.087 *10*, α(L2)exp=0.015 *3*, α(L3)exp≈0.008; L1/L2=10.5 *40* (1974Na11).
119.52 *2*	3.1[&] *2*	119.534	$7/2^+$	0.0	$5/2^+$	M1+E2	0.22[e] *1*	0.670	α(K)=0.563 *8*; α(L)=0.0845 *15*; α(M)=0.0177 *3*; α(N+..)=0.00454 *8* α(N)=0.00388 *7*; α(O)=0.000619 *11*; α(P)=4.32×10^{-5} *6* Additional information 3. α(K)exp=0.59 *5*, α(L1)exp=0.073 *7*, α(L2)exp=0.0099 *9*, α(L3)exp=0.0062 *7*.
[x]123.8[bh] *3*	0.013 *7*								
132.88 *3*	0.27 *3*	1171.418	$3/2^+$	1038.52	$3/2^+,5/2^+$	M1		0.484	α(K)=0.413 *6*; α(L)=0.0558 *8*; α(M)=0.01159 *17*; α(N+..)=0.00299 *5* α(N)=0.00255 *4*; α(O)=0.000414 *6*; α(P)=3.22×10^{-5} *5* Additional information 50. Mult.,δ: from α(K)exp=0.38 *5*. L1/L2>12 and L1/L3>12 (1974Na11).
145.97 *4*	≈0.02	265.546	$3/2^+$	119.534	$7/2^+$	(E2)		0.525	α(K)=0.375 *6*; α(L)=0.1177 *17*; α(M)=0.0257 *4*; α(N+..)=0.00630 *9* α(N)=0.00548 *8*; α(O)=0.000799 *12*; α(P)=2.19×10^{-5} *3* Additional information 7. Mult.: α(K)exp≈0.4 gives M1,E2; adopted ΔJ^π requires

^{135}Ce ε decay (17.7 h) 1975He21,1981Ab08,1974Na11 (continued)

γ(^{135}La) (continued)

E_γ [†]	I_γ [‡ f]	E_i(level)	J_i^π	E_f	J_f^π	Mult. [d]	δ	α [g]	Comments
									E2.
									E_γ: from 1981Ab08.
156.0 [#]	≈0.02 [@]	984.359	3/2$^+$	828.372	3/2$^+$	M1,E2		0.36 *6*	α(K)=0.284 *20*; α(L)=0.06 *3*; α(M)=0.013 *6*; α(N+..)=0.0033 *15* α(N)=0.0029 *13*; α(O)=0.00044 *18*; α(P)=1.93×10^{-5} *14* Additional information 38.
									α(K)exp≈0.4 *2*.
162.5 *2*	0.06 *1*	828.372	3/2$^+$	665.557	5/2$^+$	M1,E2		0.32 *5*	α(K)=0.251 *16*; α(L)=0.054 *22*; α(M)=0.011 *5*; α(N+..)=0.0029 *12* α(N)=0.0025 *11*; α(O)=0.00038 *14*; α(P)=1.71×10^{-5} *13* Additional information 28.
									α(K)exp=0.29 *8*.
177.99 *6*	0.14 *1*	1171.418	3/2$^+$	993.43	1/2$^+$,3/2$^+$,5/2$^+$	M1,E2		0.24 *3*	α(K)=0.191 *8*; α(L)=0.038 *14*; α(M)=0.008 *3*; α(N+..)=0.0021 *8* α(N)=0.0018 *7*; α(O)=0.00027 *9*; α(P)=1.32×10^{-5} *12* Additional information 51.
									α(K)exp=0.19 *3*; K/L1=4 *1*.
179.05 *4*	0.07 *1*	783.601	3/2$^+$	604.564	3/2$^+$,5/2$^+$	M1,E2		0.235 *25*	α(K)=0.188 *8*; α(L)=0.037 *14*; α(M)=0.008 *3*; α(N+..)=0.0020 *7* α(N)=0.0017 *7*; α(O)=0.00026 *9*; α(P)=1.30×10^{-5} *11* Additional information 20.
									α(K)exp=0.19 *4*.
187.21 *9*	0.05 *1*	1171.418	3/2$^+$	984.359	3/2$^+$	M1,E2		0.205 *18*	α(K)=0.164 *5*; α(L)=0.032 *11*; α(M)=0.0068 *24*; α(N+..)=0.0017 *6* α(N)=0.0015 *5*; α(O)=0.00023 *7*; α(P)=1.14×10^{-5} *11* Additional information 52.
									α(K)exp=0.14 *5*.
									E_γ: from 1981Ab08. Eγ=188.0 *2* (1975He21).
200.76 *4*	0.114 *10*	984.359	3/2$^+$	783.601	3/2$^+$	(M1,E2)		0.165 *11*	α(K)=0.1336 *23*; α(L)=0.025 *8*; α(M)=0.0053 *17*; α(N+..)=0.0013 *4* α(N)=0.0011 *4*; α(O)=0.00018 *5*; α(P)=9.3×10^{-6} *10* Additional information 39.
									Mult.: α(K)exp=0.23 *6* exceeds α(K)(M1) and α(K)(E2).
202.9 *2*	0.08 *2*	786.8?	11/2$^-$	583.9?	9/2$^+$	E1		0.0336	α(K)=0.0288 *5*; α(L)=0.00378 *6*; α(M)=0.000781 *12*; α(N+..)=0.000199 *3* α(N)=0.0001702 *25*; α(O)=2.72×10^{-5} *4*; α(P)=1.91×10^{-6} *3* Additional information 26.
									δ: α(K)exp=0.054 *20* gives δ(M2/E1)=0.2 *1*. γ(θ) in (HI,xnγ) indicates ΔJ=1, dipole.
206.50 *2*	18.6 *5*	206.504	5/2$^+$	0.0	5/2$^+$	M1+E2	+0.30 *4*	0.1446	α(K)=0.1226 *18*; α(L)=0.0174 *4*; α(M)=0.00363 *8*; α(N+..)=0.000933 *19* α(N)=0.000796 *17*; α(O)=0.0001280 *25*; α(P)=9.36×10^{-6} *14* Additional information 5.

$^{135}_{57}La_{78}$-5

^{135}Ce ε decay (17.7 h) 1975He21,1981Ab08,1974Na11 (continued)

γ(^{135}La) (continued)

E_γ [†]	I_γ [‡ f]	E_i(level)	J_i^π	E_f	J_f^π	Mult. [d]	δ	α [g]	Comments
									α(K)exp=0.124 *9*; L1/L2=9.7 *10*, L1/L3=16.9 *25*, L2/L3=1.74 *30* (1974Na11); K/L=6.9 *10*, K/M=32 *7* (1975He21). δ: from γγ(θ) (1972Zh03,1981BuZW) and subshell ratios.
210.2 [#]	≈0.03 [@]	1038.52	3/2$^+$,5/2$^+$	828.372	3/2$^+$				
223.8 [#]	≈0.05 [@]	828.372	3/2$^+$	604.564	3/2$^+$,5/2$^+$				
265.56 *2*	100 *3*	265.546	3/2$^+$	0.0	5/2$^+$	M1+E2	+0.32 *3*	0.0726	α(K)=0.0618 *9*; α(L)=0.00854 *13*; α(M)=0.00178 *3*; α(N+..)=0.000458 *7* α(N)=0.000390 *6*; α(O)=6.30×10^{-5} *10*; α(P)=4.72×10^{-6} *7* Additional information 8. L1/L2=11.1 *6*, L1/L3=22.4 *20*, L2/L3=2.0 *3* (1974Na11); K/L=7.9 *9*, K/M=25 *3* (1975He21). δ: from γγ(θ) (1972Zh03,1981BuZW) and subshell ratios.
267.76 *3*	1.49 *9*	872.313	(1/2)$^+$	604.564	3/2$^+$,5/2$^+$	E2(+M1)	>1.3	0.0683 *12*	α(K)=0.0553 *16*; α(L)=0.0102 *5*; α(M)=0.00218 *12*; α(N+..)=0.00055 *3* α(N)=0.000471 *24*; α(O)=7.2×10^{-5} *3*; α(P)=3.76×10^{-6} *23* Additional information 34. α(K)exp=0.049 *8*. ce(K)=0.14 *4* (1981Ab08).
[x]278.2									
281 [#h]	≈0.01 [@]	993.43	1/2$^+$,3/2$^+$,5/2$^+$	712.35	(3/2$^-$,5/2$^-$)				
299.11 *3*	3.0 *3*	1171.418	3/2$^+$	872.313	(1/2)$^+$	M1,E2		0.050 *3*	α(K)=0.042 *4*; α(L)=0.0066 *6*; α(M)=0.00139 *14*; α(N+..)=0.00035 *3* α(N)=0.00030 *3*; α(O)=4.8×10^{-5} *3*; α(P)=3.0×10^{-6} *5* Additional information 53. α(K)exp=0.044 *9*.
300.07 *2*	56.3 *8*	300.053	1/2$^+$	0.0	5/2$^+$	E2		0.0469	α(K)=0.0379 *6*; α(L)=0.00710 *10*; α(M)=0.001512 *22*; α(N+..)=0.000379 *6* α(N)=0.000327 *5*; α(O)=5.00×10^{-5} *7*; α(P)=2.53×10^{-6} *4* Additional information 10. α(K)exp=0.039 *1*; L1/L2=2.56 *12*, L1/L3=3.23 *12*, L2/L3=1.26 *5* (1974Na11); K/L=5.1 *7*, K/M=20 *3* (1975He21). Mult.: from subshell ratios, δ(E2/M1)>5.
304.58 *4*	0.15 *1*	604.564	3/2$^+$,5/2$^+$	300.053	1/2$^+$	M1,E2		0.048 *4*	α(K)=0.040 *4*; α(L)=0.0062 *5*; α(M)=0.00131 *13*; α(N+..)=0.00033 *3* α(N)=0.000286 *24*; α(O)=4.51×10^{-5} *25*;

$^{135}_{57}La_{78}$-6

^{135}Ce ε decay (17.7 h) 1975He21,1981Ab08,1974Na11 (continued)

γ(^{135}La) (continued)

E_γ[†]	I_γ[‡ f]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[d]	δ	α[g]	Comments
									α(P)=2.9×10^{-6} *5* Additional information 11. α(K)exp=0.046 *17*.
[x]312.9 *4*	0.09 *5*					(D,E2)			Additional information 1. α(K)exp=0.020 *12*.
318.82 *8*	0.083 *9*	984.359	3/2$^+$	665.557	5/2$^+$				
326.2[#]	≈0.03[@]	1038.52	3/2$^+$,5/2$^+$	712.35	(3/2$^-$,5/2$^-$)				
339.1[ah]	0.06 *2*	604.564	3/2$^+$,5/2$^+$	265.546	3/2$^+$				I_γ: from ce(K)=0.032 *10* and mult=[M1].
343.01 *4*	0.25 *2*	1171.418	3/2$^+$	828.372	3/2$^+$	M1(+E2)	<1.8	0.0348 *25*	α(K)=0.029 *3*; α(L)=0.00430 *11*; α(M)=0.00090 *3*; α(N+..)=0.000230 *6* α(N)=0.000197 *6*; α(O)=3.14×10^{-5} *5*; α(P)=2.2×10^{-6} *3* Additional information 54. α(K)exp=0.030 *3*.
[x]357.7[c]									ce(K)=0.028 *10* (1981Ab08).
365.3[ah]	0.07 *3*	665.557	5/2$^+$	300.053	1/2$^+$				I_γ: from ce(K)=0.021 *7* and mult=[E2].
379.79 *3*	3.7 *1*	984.359	3/2$^+$	604.564	3/2$^+$,5/2$^+$	M1(+E2)	<0.7	0.0277 *11*	α(K)=0.0236 *11*; α(L)=0.00321 *5*; α(M)=0.000668 *10*; α(N+..)=0.000172 *3* α(N)=0.0001466 *21*; α(O)=2.37×10^{-5} *4*; α(P)=1.79×10^{-6} *11* Additional information 40. α(K)exp=0.025 *2*, α(L)exp=0.0034 *6*.
387.81 *3*	1.45 *3*	1171.418	3/2$^+$	783.601	3/2$^+$	M1(+E2)	<0.3	0.0269 *5*	α(K)=0.0231 *4*; α(L)=0.00305 *5*; α(M)=0.000633 *9*; α(N+..)=0.0001634 *23* α(N)=0.0001390 *20*; α(O)=2.26×10^{-5} *4*; α(P)=1.77×10^{-6} *4* Additional information 55. α(K)exp=0.025 *2*, α(L)exp=0.003 *1*.
398.05 *5*	1.19 *4*	604.564	3/2$^+$,5/2$^+$	206.504	5/2$^+$	M1(+E2)	<1.5	0.0235 *20*	α(K)=0.0199 *20*; α(L)=0.00280 *7*; α(M)=0.000585 *11*; α(N+..)=0.000150 *4* α(N)=0.000128 *3*; α(O)=2.06×10^{-5} *8*; α(P)=1.49×10^{-6} *19* Additional information 12. α(K)exp=0.020 *2*.
400.02 *8*	0.76 *3*	665.557	5/2$^+$	265.546	3/2$^+$	E2(+M1)	>1	0.0209 *15*	α(K)=0.0175 *14*; α(L)=0.00270 *6*; α(M)=0.000568 *10*; α(N+..)=0.000144 *3* α(N)=0.0001237 *24*; α(O)=1.95×10^{-5} *6*; α(P)=1.25×10^{-6} *14* Additional information 15. α(K)exp=0.017 *2*.
401.0[#]	≈0.02[@]	1439.485	3/2$^+$	1038.52	3/2$^+$,5/2$^+$	M1,E2		0.022 *3*	α(K)=0.019 *3*; α(L)=0.00272 *9*; α(M)=0.000569 *14*; α(N+..)=0.000146 *5* α(N)=0.000124 *4*; α(O)=1.99×10^{-5} *11*; α(P)=1.4×10^{-6} *3* Additional information 63. α(K)exp≈0.06 *3*.
434.0[#]	≈0.02[@]	1038.52	3/2$^+$,5/2$^+$	604.564	3/2$^+$,5/2$^+$				
[x]455.1[c]									ce(K)=0.021 *10* (1981Ab08).
459.08 *4*	0.28 *3*	665.557	5/2$^+$	206.504	5/2$^+$	M1,E2		0.0154 *24*	α(K)=0.0131 *22*; α(L)=0.00185 *14*; α(M)=0.000386 *25*;

$^{135}_{57}La_{78}$-7

^{135}Ce ε decay (17.7 h) 1975He21,1981Ab08,1974Na11 (continued)

γ(^{135}La) (continued)

E_γ [†]	I_γ [‡ f]	E_i(level)	J_i^π	E_f	J_f^π	Mult. [d]	δ	α [g]	Comments
									α(N+..)=9.9×10^{-5} *8* α(N)=8.4×10^{-5} *6*; α(O)=1.35×10^{-5} *12*; α(P)=9.7×10^{-7} *20* Additional information 16. α(K)exp=0.012 *3*.
459.1 [#]	≈0.03 [@]	1171.418	3/2$^+$	712.35	(3/2$^-$,5/2$^-$)				
465.2 *2*	0.22 *5*	1449.636	1/2$^+$,3/2$^+$	984.359	3/2$^+$	E2(+M1)	>1.5	0.0133 *8*	α(K)=0.0112 *7*; α(L)=0.00169 *5*; α(M)=0.000355 *9*; α(N+..)=9.0×10^{-5} *3* α(N)=7.74×10^{-5} *21*; α(O)=1.22×10^{-5} *4*; α(P)=8.0×10^{-7} *6* Additional information 69. α(K)exp=0.009 *3*.
483.58 *3*	4.45 *12*	783.601	3/2$^+$	300.053	1/2$^+$	M1(+E2)	<0.4	0.0153 *4*	α(K)=0.0131 *4*; α(L)=0.00172 *3*; α(M)=0.000356 *7*; α(N+..)=9.20×10^{-5} *17* α(N)=7.82×10^{-5} *14*; α(O)=1.274×10^{-5} *24*; α(P)=1.00×10^{-6} *3* Additional information 21. α(K)exp=0.015 *2*.
485.02 *6*	0.50 *5*	604.564	3/2$^+$,5/2$^+$	119.534	7/2$^+$	M1,E2		0.0133 *22*	α(K)=0.0113 *20*; α(L)=0.00159 *14*; α(M)=0.00033 *3*; α(N+..)=8.5×10^{-5} *8* α(N)=7.2×10^{-5} *6*; α(O)=1.16×10^{-5} *12*; α(P)=8.4×10^{-7} *18* Additional information 13. α(K)exp=0.011 *2*.
495.3 *4*	0.05 *2*	1479.66	1/2$^+$,3/2$^+$	984.359	3/2$^+$				
505.92 *8*	0.126 *10*	1171.418	3/2$^+$	665.557	5/2$^+$	(M1)		0.01389	α(K)=0.01193 *17*; α(L)=0.001549 *22*; α(M)=0.000321 *5*; α(N+..)=8.29×10^{-5} *12* α(N)=7.05×10^{-5} *10*; α(O)=1.151×10^{-5} *17*; α(P)=9.13×10^{-7} *13* Additional information 56. Mult.: α(K)exp=0.021 *6* exceeds α(K)(M1).
518.05 *2*	32.6 *12*	783.601	3/2$^+$	265.546	3/2$^+$	M1+E2	+0.46 *3*	0.01244 *19*	α(K)=0.01066 *17*; α(L)=0.001413 *21*; α(M)=0.000293 *5*; α(N+..)=7.56×10^{-5} *11* α(N)=6.44×10^{-5} *10*; α(O)=1.046×10^{-5} *16*; α(P)=8.08×10^{-7} *13* Additional information 22. α(K)exp=0.0117 *7*, α(L)exp=0.00150 *14*, α(M)exp=0.00029 *4*. δ: from γγ(θ) (1981BuZW) and α(K)exp.
528.35 *3*	0.30 *2*	828.372	3/2$^+$	300.053	1/2$^+$	M1		0.01247	α(K)=0.01072 *15*; α(L)=0.001389 *20*; α(M)=0.000287 *4*; α(N+..)=7.44×10^{-5} *11* α(N)=6.32×10^{-5} *9*; α(O)=1.032×10^{-5} *15*;

$^{135}_{57}La_{78}$-8

^{135}Ce ε decay (17.7 h) 1975He21,1981Ab08,1974Na11 (continued)

γ(^{135}La) (continued)

E_γ [†]	I_γ [‡ f]	E_i(level)	J_i^π	E_f	J_f^π	Mult. [d]	δ	α [g]	Comments
									α(P)=8.20×10^{-7} *12* Additional information 29. α(K)exp=0.013 *2*.
546.00 *3*	1.56 *6*	665.557	5/2$^+$	119.534	7/2$^+$	M1(+E2)	<0.35	0.01131 *25*	α(K)=0.00971 *22*; α(L)=0.001265 *23*; α(M)=0.000262 *5*; α(N+..)=6.77×10^{-5} *13* α(N)=5.76×10^{-5} *11*; α(O)=9.39×10^{-6} *18*; α(P)=7.41×10^{-7} *18* Additional information 17. α(K)exp=0.0108 *11*.
560.7[#]	≈0.02[@]	1599.25	1/2$^+$,3/2$^+$	1038.52	3/2$^+$,5/2$^+$				
562.79 *4*	0.35 *3*	828.372	3/2$^+$	265.546	3/2$^+$	M1,E2		0.0091 *16*	α(K)=0.0077 *15*; α(L)=0.00106 *13*; α(M)=0.000221 *25*; α(N+..)=5.7×10^{-5} *7* α(N)=4.8×10^{-5} *6*; α(O)=7.8×10^{-6} *11*; α(P)=5.8×10^{-7} *13* Additional information 30. α(K)exp=0.008 *2*.
566.87 *2*	1.45 *6*	1171.418	3/2$^+$	604.564	3/2$^+$,5/2$^+$	M1(+E2)	<1	0.0097 *8*	α(K)=0.0083 *8*; α(L)=0.00110 *7*; α(M)=0.000229 *13*; α(N+..)=5.9×10^{-5} *4* α(N)=5.0×10^{-5} *3*; α(O)=8.2×10^{-6} *6*; α(P)=6.3×10^{-7} *7* Additional information 57. α(K)exp=0.0086 *9*.
[x]571.0 *2*	0.23 *5*					M1,E2		0.0088 *16*	α(K)=0.0075 *14*; α(L)=0.00102 *13*; α(M)=0.000213 *25*; α(N+..)=5.5×10^{-5} *7* α(N)=4.7×10^{-5} *6*; α(O)=7.5×10^{-6} *10*; α(P)=5.6×10^{-7} *12* Additional information 2. α(K)exp=0.010 *4*.
572.26 *2*	24.8 *8*	872.313	(1/2)$^+$	300.053	1/2$^+$	M1		0.01024	α(K)=0.00880 *13*; α(L)=0.001137 *16*; α(M)=0.000235 *4*; α(N+..)=6.09×10^{-5} *9* α(N)=5.18×10^{-5} *8*; α(O)=8.45×10^{-6} *12*; α(P)=6.72×10^{-7} *10* Additional information 35. Mult.: α(K)exp=0.0091 *8* gives δ(E2/M1)<0.6 (assuming no E0), ΔJ$^\pi$ requires M1. (572γ)(300γ)(θ): A$_2$=+0.005 *17* (1974Na11).
577.09 *2*	12.3 *4*	783.601	3/2$^+$	206.504	5/2$^+$	M1+E2	−0.30 *1*	0.00978	α(K)=0.00840 *12*; α(L)=0.001094 *16*; α(M)=0.000227 *4*; α(N+..)=5.86×10^{-5} *9* α(N)=4.98×10^{-5} *7*; α(O)=8.12×10^{-6} *12*; α(P)=6.39×10^{-7} *9* Additional information 23. α(K)exp=0.0088 *6*. δ: from γγ(θ) (1972Zh03,1981BuZW) and α(K)exp.
577.3[ah]	0.12 *5*	1449.636	1/2$^+$,3/2$^+$	872.313	(1/2)$^+$	M1,E2		0.0085 *15*	α(K)=0.0073 *14*; α(L)=0.00099 *12*; α(M)=0.000207 *24*; α(N+..)=5.3×10^{-5} *7*

$^{135}_{57}La_{78}$-9

^{135}Ce ε decay (17.7 h) 1975He21,1981Ab08,1974Na11 (continued)

γ(^{135}La) (continued)

E_γ[†]	I_γ[‡ f]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[d]	δ	α[g]	Comments
									α(N)=4.5×10^{-5} *6*; α(O)=7.3×10^{-6} *10*; α(P)=5.4×10^{-7} *12* I_γ: from I(ce(K)). Additional information 70. α(K)exp=0.009 *4*.
583.9 *5*	0.11 *3*	583.9?	9/2$^+$	0.0	5/2$^+$				
[x]590.0 *8*	0.09 *5*								
604.56 *3*	6.7 *3*	604.564	3/2$^+$,5/2$^+$	0.0	5/2$^+$	M1,E2		0.0076 *14*	α(K)=0.0065 *13*; α(L)=0.00088 *12*; α(M)=0.000183 *23*; α(N+..)=4.7×10^{-5} *7* α(N)=4.0×10^{-5} *5*; α(O)=6.5×10^{-6} *9*; α(P)=4.8×10^{-7} *11* Additional information 14. α(K)exp=0.008 *3*.
606.76 *2*	45.0 *13*	872.313	(1/2)$^+$	265.546	3/2$^+$	M1+E2	−0.37 *2*	0.00854 *13*	α(K)=0.00734 *11*; α(L)=0.000957 *14*; α(M)=0.000198 *3*; α(N+..)=5.12×10^{-5} *8* α(N)=4.35×10^{-5} *7*; α(O)=7.09×10^{-6} *11*; α(P)=5.57×10^{-7} *9* Additional information 36. α(K)exp=0.0076 *7*. δ: from γγ(θ) (1972Zh03,1981BuZW) and α(K)exp.
611.2 *2*	0.05 *2*	1439.485	3/2$^+$	828.372	3/2$^+$				
621.85 *2*	0.94 *6*	828.372	3/2$^+$	206.504	5/2$^+$	M1(+E2)	<1.2	0.0076 *8*	α(K)=0.0065 *7*; α(L)=0.00086 *7*; α(M)=0.000179 *13*; α(N+..)=4.6×10^{-5} *4* α(N)=3.9×10^{-5} *3*; α(O)=6.4×10^{-6} *6*; α(P)=4.9×10^{-7} *6* Additional information 31. α(K)exp=0.0066 *7*.
651.2 *2*	0.021 *4*	1479.66	1/2$^+$,3/2$^+$	828.372	3/2$^+$				
655.9[#]	≈0.01[@]	1439.485	3/2$^+$	783.601	3/2$^+$				
663.8 *2*	0.21 *5*	783.601	3/2$^+$	119.534	7/2$^+$	(E2)		0.00492	α(K)=0.00417 *6*; α(L)=0.000595 *9*; α(M)=0.0001243 *18*; α(N+..)=3.18×10^{-5} *5* α(N)=2.71×10^{-5} *4*; α(O)=4.33×10^{-6} *6*; α(P)=3.01×10^{-7} *5* Additional information 24. Mult.: α(K)exp≤0.004 gives E2, E1; adopted ΔJ$^\pi$ requires E2.
665.6[#]	0.5[@] *1*	665.557	5/2$^+$	0.0	5/2$^+$	M1,E2		0.0060 *11*	α(K)=0.0051 *10*; α(L)=0.00069 *10*; α(M)=0.000143 *20*; α(N+..)=3.7×10^{-5} *6* α(N)=3.1×10^{-5} *5*; α(O)=5.1×10^{-6} *8*; α(P)=3.8×10^{-7} *9* Additional information 18. α(K)exp=0.007 *3*.
665.79 *6*	7.2 *5*	872.313	(1/2)$^+$	206.504	5/2$^+$	E2		0.00489	α(K)=0.00414 *6*; α(L)=0.000591 *9*; α(M)=0.0001233 *18*; α(N+..)=3.15×10^{-5} *5* α(N)=2.69×10^{-5} *4*; α(O)=4.30×10^{-6} *6*; α(P)=2.99×10^{-7} *5* Additional information 37. α(K)exp=0.0043 *6*. K/L=7.1 *10*, K/M=49 *20* (1975He21). Mult.: from γγ(θ) and α(K)exp.
666.0[#]	≈0.1[@]	1449.636	1/2$^+$,3/2$^+$	783.601	3/2$^+$				

$^{135}_{57}La_{78}$-10

^{135}Ce ε decay (17.7 h) 1975He21,1981Ab08,1974Na11 (continued)

γ(^{135}La) (continued)

E_γ [†]	I_γ [‡ f]	E_i(level)	J_i^π	E_f	J_f^π	Mult. [d]	δ	α [g]	Comments
684.33 *3*	0.91 *4*	984.359	3/2$^+$	300.053	1/2$^+$	M1(+E2)	<1	0.0061 *6*	α(K)=0.0052 *5*; α(L)=0.00069 *5*; α(M)=0.000142 *10*; α(N+..)=3.7×10^{-5} *3* α(N)=3.12×10^{-5} *21*; α(O)=5.1×10^{-6} *4*; α(P)=4.0×10^{-7} *4* Additional information 41. α(K)exp=0.0055 *7*.
693.4[#]	≈0.02[@]	993.43	1/2$^+$,3/2$^+$,5/2$^+$	300.053	1/2$^+$				
696.6 *2*	0.08 *3*	1568.9?		872.313	(1/2)$^+$				
712.35 *9*	0.072 *12*	712.35	(3/2$^-$,5/2$^-$)	0.0	5/2$^+$				
718.82 *3*	0.97 *4*	984.359	3/2$^+$	265.546	3/2$^+$	M1+E2	+0.18 *5*	0.00582	α(K)=0.00501 *8*; α(L)=0.000644 *10*; α(M)=0.0001331 *20*; α(N+..)=3.44×10^{-5} *6* α(N)=2.93×10^{-5} *5*; α(O)=4.78×10^{-6} *8*; α(P)=3.81×10^{-7} *6* Additional information 42. α(K)exp=0.0048 *5*. δ: from γγ(θ) (1981BuZW) and α(K)exp.
727.0[#]	≈0.03[@]	1599.25	1/2$^+$,3/2$^+$	872.313	(1/2)$^+$				
727.1[#]	≈0.02[@]	1439.485	3/2$^+$	712.35	(3/2$^-$,5/2$^-$)				
727.9[#]	≈0.15[@]	993.43	1/2$^+$,3/2$^+$,5/2$^+$	265.546	3/2$^+$	(M1,E2)		0.0048 *9*	α(K)=0.0041 *8*; α(L)=0.00055 *9*; α(M)=0.000114 *17*; α(N+..)=2.9×10^{-5} *5* α(N)=2.5×10^{-5} *4*; α(O)=4.0×10^{-6} *7*; α(P)=3.1×10^{-7} *7* Additional information 45. Mult.: α(K)exp<0.003 gives D,E2; but adopted Δπ requires M1,E2.
728.5[#]	≈0.05[@]	1766.98	3/2$^+$	1038.52	3/2$^+$,5/2$^+$				
738.46 *6*	0.095 *9*	1038.52	3/2$^+$,5/2$^+$	300.053	1/2$^+$	(M1,E2)		0.0047 *9*	α(K)=0.0040 *8*; α(L)=0.00053 *8*; α(M)=0.000110 *16*; α(N+..)=2.8×10^{-5} *5* α(N)=2.4×10^{-5} *4*; α(O)=3.9×10^{-6} *7*; α(P)=3.0×10^{-7} *7* Additional information 47. Mult.: α(K)exp=0.007 *3* exceeds α(K)(M1) and α(K)(E2).
[x]750.8 *2*	0.018 *5*								
771.4 *2*	0.10 *3*	1599.25	1/2$^+$,3/2$^+$	828.372	3/2$^+$				
773.0[#]	0.31[@] *3*	1038.52	3/2$^+$,5/2$^+$	265.546	3/2$^+$	(M1,E2)		0.0042 *8*	α(K)=0.0036 *7*; α(L)=0.00047 *8*; α(M)=9.8×10^{-5} *15*; α(N+..)=2.5×10^{-5} *4* α(N)=2.2×10^{-5} *4*; α(O)=3.5×10^{-6} *6*; α(P)=2.7×10^{-7} *6* Additional information 48. α(K)exp≈0.005.

$^{135}_{57}La_{78}$-11

^{135}Ce ε decay (17.7 h) 1975He21,1981Ab08,1974Na11 (continued)

γ(^{135}La) (continued)

E_γ[†]	I_γ[‡f]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[d]	δ	α[g]	Comments
773.9[#]	0.52[@] *5*	1439.485	3/2+	665.557	5/2+	(M1,E2)		0.0042 *8*	α(K)=0.0036 *7*; α(L)=0.00047 *8*; α(M)=9.8×10^{-5} *15*; α(N+..)=2.5×10^{-5} *4* α(N)=2.1×10^{-5} *4*; α(O)=3.5×10^{-6} *6*; α(P)=2.7×10^{-7} *6* Additional information 64. α(K)exp≈0.005.
777.89 *3*	0.87 *5*	984.359	3/2+	206.504	5/2+	M1+E2	0.9 *+13–6*	0.0042 *6*	α(K)=0.0036 *5*; α(L)=0.00047 *6*; α(M)=9.8×10^{-5} *11*; α(N+..)=2.5×10^{-5} *3* α(N)=2.15×10^{-5} *25*; α(O)=3.5×10^{-6} *5*; α(P)=2.7×10^{-7} *5* Additional information 43. α(K)exp=0.0036 *5*.
782.6[#]	≈0.05[@]	1766.98	3/2+	984.359	3/2+				
783.59 *2*	25.4 *8*	783.601	3/2+	0.0	5/2+	M1(+E2)	<0.25	0.00474 *8*	α(K)=0.00408 *7*; α(L)=0.000523 *9*; α(M)=0.0001080 *18*; α(N+..)=2.80×10^{-5} *5* α(N)=2.38×10^{-5} *4*; α(O)=3.88×10^{-6} *7*; α(P)=3.10×10^{-7} *6* Additional information 25. α(K)exp=0.0044 *3*; K/L=7.7 *10*, K/M=42 *21* (1975He21).
815.56 *6*	0.077 *13*	1599.25	1/2+,3/2+	783.601	3/2+				
828.38 *2*	12.3 *4*	828.372	3/2+	0.0	5/2+	M1(+E2)	<0.4	0.00410 *11*	α(K)=0.00353 *10*; α(L)=0.000452 *11*; α(M)=9.35×10^{-5} *22*; α(N+..)=2.42×10^{-5} *6* α(N)=2.06×10^{-5} *5*; α(O)=3.36×10^{-6} *8*; α(P)=2.68×10^{-7} *8* Additional information 32. α(K)exp=0.0037 *2*. K/L=7.0 *10*, K/M=28 *14* (1975He21).
832.1 *2*	0.09 *3*	1038.52	3/2+,5/2+	206.504	5/2+				
834.90 *4*	0.26 *4*	1439.485	3/2+	604.564	3/2+,5/2+				
845.06 *3*	0.31 *3*	1449.636	1/2+,3/2+	604.564	3/2+,5/2+	E2(+M1)	>0.8	0.0031 *4*	α(K)=0.0027 *4*; α(L)=0.00036 *4*; α(M)=7.4×10^{-5} *8*; α(N+..)=1.91×10^{-5} *20* α(N)=1.63×10^{-5} *17*; α(O)=2.6×10^{-6} *3*; α(P)=2.0×10^{-7} *3* Additional information 71. α(K)exp=0.0026 *5*.
871.35 *2*	7.9 *3*	1171.418	3/2+	300.053	1/2+	M1(+E2)	<1.3	0.0034 *4*	α(K)=0.0029 *4*; α(L)=0.00037 *4*; α(M)=7.7×10^{-5} *7*; α(N+..)=2.00×10^{-5} *19* α(N)=1.70×10^{-5} *16*; α(O)=2.8×10^{-6} *3*; α(P)=2.2×10^{-7} *3* Additional information 58. α(K)exp=0.0029 *3*.

$^{135}_{57}La_{78}$-12

^{135}Ce ε decay (17.7 h) 1975He21,1981Ab08,1974Na11 (continued)

γ(^{135}La) (continued)

E_γ †	I_γ ‡ f	E_i(level)	J_i^π	E_f	J_f^π	Mult. d	δ	α g	Comments
875.1 #	≈0.14 @	1479.66	1/2+,3/2+	604.564	3/2+,5/2+				
894.63 *5*	0.096 *9*	1766.98	3/2+	872.313	(1/2)+				
905.87 *2*	3.85 *13*	1171.418	3/2+	265.546	3/2+	M1(+E2)	−0.04 *2*	0.00339	α(K)=0.00292 *4*; α(L)=0.000372 *6*; α(M)=7.69×10^{-5} *11*; α(N+..)=1.99×10^{-5} *3* α(N)=1.692×10^{-5} *24*; α(O)=2.77×10^{-6} *4*; α(P)=2.22×10^{-7} *4* Additional information 59. α(K)exp=0.0034 *5*, α(L)exp=0.00036 *8*. δ: from γγ(θ) (1981BuZW) and α(exp). ce(K)=0.014 *4* (1981Ab08).
x924.8 c									
933.76 *6*	0.08 *2*	1599.25	1/2+,3/2+	665.557	5/2+				
938.5 *2*	0.037 *9*	1766.98	3/2+	828.372	3/2+				
964.89 *3*	0.79 *4*	1171.418	3/2+	206.504	5/2+	E2(+M1)	>2	0.00215 *10*	α(K)=0.00184 *8*; α(L)=0.000244 *10*; α(M)=5.06×10^{-5} *19*; α(N+..)=1.30×10^{-5} *5* α(N)=1.11×10^{-5} *5*; α(O)=1.80×10^{-6} *7*; α(P)=1.36×10^{-7} *7* Additional information 60. α(K)exp=0.0018 *3*. ce(K)≈0.011 (1981Ab08).
x969.0 c									
983.4 #	≈0.02 @	1766.98	3/2+	783.601	3/2+				
984.30 *3*	0.20 *2*	984.359	3/2+	0.0	5/2+	E2(+M1)	>2.5	0.00203 *7*	α(K)=0.00174 *6*; α(L)=0.000231 *7*; α(M)=4.78×10^{-5} *14*; α(N+..)=1.23×10^{-5} *4* α(N)=1.05×10^{-5} *3*; α(O)=1.70×10^{-6} *5*; α(P)=1.28×10^{-7} *5* Additional information 44. α(K)exp=0.0015 *3*.
993.4 #	≈0.03 @	993.43	1/2+,3/2+,5/2+	0.0	5/2+				Additional information 46.
994.7 #	≈0.02 @	1599.25	1/2+,3/2+	604.564	3/2+,5/2+				
1038.48 *4*	0.12 *2*	1038.52	3/2+,5/2+	0.0	5/2+	M1		0.00247	α(K)=0.00213 *3*; α(L)=0.000270 *4*; α(M)=5.57×10^{-5} *8*; α(N+..)=1.443×10^{-5} *21* α(N)=1.226×10^{-5} *18*; α(O)=2.01×10^{-6} *3*; α(P)=1.611×10^{-7} *23* Additional information 49. α(K)exp=0.0027 *5*.
1051.90 *3*	0.16 *2*	1171.418	3/2+	119.534	7/2+	E2		1.72×10^{-3}	α(K)=0.001471 *21*; α(L)=0.000194 *3*; α(M)=4.01×10^{-5} *6*; α(N+..)=1.033×10^{-5} *15* α(N)=8.80×10^{-6} *13*; α(O)=1.425×10^{-6} *20*; α(P)=1.077×10^{-7} *15* Additional information 61. α(K)exp=0.0014 *2*.

$^{135}_{57}La_{78}$-13

^{135}Ce ε decay (17.7 h) 1975He21,1981Ab08,1974Na11 (continued)

γ(^{135}La) (continued)

E_γ †	I_γ ‡ f	E_i(level)	J_i^π	E_f	J_f^π	Mult. d	δ	α g	Comments
1066.9 *3*	0.016 *4*	1850.74	1/2,3/2	783.601	3/2$^+$				
1101.45 *8*	0.055 *10*	1766.98	3/2$^+$	665.557	5/2$^+$	M1,E2		0.0019 *3*	α(K)=0.0016 *3*; α(L)=0.00021 *3*; α(M)=4.2×10^{-5} *7*; α(N+..)=1.13×10^{-5} *17* α(N)=9.3×10^{-6} *14*; α(O)=1.52×10^{-6} *24*; α(P)=1.19×10^{-7} *22*; α(IPF)=3.93×10^{-7} *9* Additional information 76. α(K)exp=0.0016 *5*.
1139.43 *3*	0.21 *2*	1439.485	3/2$^+$	300.053	1/2$^+$	M1(+E2)	<1	0.00186 *14*	α(K)=0.00160 *12*; α(L)=0.000204 *14*; α(M)=4.2×10^{-5} *3*; α(N+..)=1.23×10^{-5} *8* α(N)=9.3×10^{-6} *7*; α(O)=1.51×10^{-6} *11*; α(P)=1.20×10^{-7} *10*; α(IPF)=1.417×10^{-6} *23* Additional information 65. α(K)exp=0.0018 *3*.
1149.58 *2*	1.60 *6*	1449.636	1/2$^+$,3/2$^+$	300.053	1/2$^+$	M1(+E2)	<0.9	0.00184 *13*	α(K)=0.00158 *11*; α(L)=0.000201 *13*; α(M)=4.2×10^{-5} *3*; α(N+..)=1.26×10^{-5} *7* α(N)=9.1×10^{-6} *6*; α(O)=1.49×10^{-6} *10*; α(P)=1.19×10^{-7} *9*; α(IPF)=1.90×10^{-6} *3* Additional information 72. α(K)exp=0.0017 *2*.
1171.42 *3*	0.47 *2*	1171.418	3/2$^+$	0.0	5/2$^+$	M1,E2		0.0016 *3*	α(K)=0.00140 *22*; α(L)=0.00018 *3*; α(M)=3.7×10^{-5} *6*; α(N+..)=1.29×10^{-5} *14* α(N)=8.1×10^{-6} *12*; α(O)=1.32×10^{-6} *20*; α(P)=1.04×10^{-7} *18*; α(IPF)=3.36×10^{-6} *7* Additional information 62. α(K)exp=0.0015 *3*.
1173.92 *3*	0.44 *3*	1439.485	3/2$^+$	265.546	3/2$^+$	M1(+E2)	<1	0.00174 *13*	α(K)=0.00150 *12*; α(L)=0.000190 *13*; α(M)=3.9×10^{-5} *3*; α(N+..)=1.37×10^{-5} *7* α(N)=8.6×10^{-6} *6*; α(O)=1.41×10^{-6} *10*; α(P)=1.13×10^{-7} *9*; α(IPF)=3.54×10^{-6} *6* Additional information 66. α(K)exp=0.0017 *3*.
1179.49 *6*	0.086 *15*	1479.66	1/2$^+$,3/2$^+$	300.053	1/2$^+$				
1184.09 *3*	2.6 *1*	1449.636	1/2$^+$,3/2$^+$	265.546	3/2$^+$	M1+E2		0.00159 *25*	α(K)=0.00136 *22*; α(L)=0.000174 *25*; α(M)=3.6×10^{-5} *6*; α(N+..)=1.38×10^{-5} *13* α(N)=7.9×10^{-6} *12*; α(O)=1.29×10^{-6} *19*; α(P)=1.02×10^{-7} *18*; α(IPF)=4.47×10^{-6} *9* Additional information 73. α(K)exp=0.00173 *10*, α(L)exp=0.00018 *2*, α(M)exp=0.000038 *9*. δ: −0.12 *3* if J=1/2 or +0.49 *5* if J=3/2 from γγ(θ) (1981BuZW). ce data support M1.
1214.13 *3*	0.24 *3*	1479.66	1/2$^+$,3/2$^+$	265.546	3/2$^+$	M1(+E2)	<1	0.00162 *12*	α(K)=0.00139 *10*; α(L)=0.000176 *12*; α(M)=3.64×10^{-5} *25*; α(N+..)=1.72×10^{-5} *7*

$^{135}_{57}La_{78}$-14

^{135}Ce ε decay (17.7 h) 1975He21,1981Ab08,1974Na11 (continued)

γ(^{135}La) (continued)

E_γ[†]	I_γ[‡ f]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[d]	δ	α[g]	Comments
									α(N)=8.0×10^{-6} *6*; α(O)=1.31×10^{-6} *9*; α(P)=1.04×10^{-7} *9*; α(IPF)=7.78×10^{-6} *12* Additional information 74. α(K)exp=0.0018 *5*.
1232.98 *3*	0.23 *2*	1439.485	3/2$^+$	206.504	5/2$^+$	M1(+E2)	<1.5	0.00153 *16*	α(K)=0.00131 *14*; α(L)=0.000166 *16*; α(M)=3.4×10^{-5} *4*; α(N+..)=1.92×10^{-5} *8* α(N)=7.5×10^{-6} *7*; α(O)=1.23×10^{-6} *12*; α(P)=9.8×10^{-8} *11*; α(IPF)=1.031×10^{-5} *17* Additional information 67. α(K)exp=0.0015 *3*.
1243.1[#]	≈0.01[@]	1449.636	1/2$^+$,3/2$^+$	206.504	5/2$^+$				
[x]1258.4 *6*	0.09 *5*								
1273.5 *2*	0.045 *15*	1479.66	1/2$^+$,3/2$^+$	206.504	5/2$^+$				
1299.18 *3*	0.17 *2*	1599.25	1/2$^+$,3/2$^+$	300.053	1/2$^+$	M1,E2		0.00132 *19*	α(K)=0.00112 *17*; α(L)=0.000142 *20*; α(M)=2.9×10^{-5} *4*; α(N+..)=2.87×10^{-5} *10* α(N)=6.4×10^{-6} *9*; α(O)=1.05×10^{-6} *15*; α(P)=8.3×10^{-8} *14*; α(IPF)=2.11×10^{-5} *4* Additional information 75. α(K)exp=0.0010 *3*.
1334.7 *5*	0.09 *5*	1599.25	1/2$^+$,3/2$^+$	265.546	3/2$^+$				
1361.0 *9*	0.09 *5*	1479.66	1/2$^+$,3/2$^+$	119.534	7/2$^+$				
[x]1376.7 *4*	0.016 *5*								
1392.8 *4*	0.022 *5*	1599.25	1/2$^+$,3/2$^+$	206.504	5/2$^+$				
1439.57 *8*	0.14 *1*	1439.485	3/2$^+$	0.0	5/2$^+$	E2(+M1)	>1	0.00103 *7*	α(K)=0.00084 *6*; α(L)=0.000106 *8*; α(M)=2.20×10^{-5} *15*; α(N+..)=6.36×10^{-5} *10* α(N)=4.8×10^{-6} *4*; α(O)=7.9×10^{-7} *6*; α(P)=6.2×10^{-8} *5*; α(IPF)=5.80×10^{-5} *9* Additional information 68. α(K)exp=0.0007 *2*.
1449.6 *2*	0.019 *4*	1449.636	1/2$^+$,3/2$^+$	0.0	5/2$^+$				
1466.90 *3*	0.51 *3*	1766.98	3/2$^+$	300.053	1/2$^+$	E2(+M1)	>1	0.00100 *7*	α(K)=0.00081 *6*; α(L)=0.000102 *7*; α(M)=2.11×10^{-5} *14*; α(N+..)=7.22×10^{-5} *11* α(N)=4.6×10^{-6} *3*; α(O)=7.6×10^{-7} *6*; α(P)=6.0×10^{-8} *5*; α(IPF)=6.68×10^{-5} *10* Additional information 77. α(K)exp=0.00078 *10*.
1479.6 *2*	0.014 *5*	1479.66	1/2$^+$,3/2$^+$	0.0	5/2$^+$				
1497.0 *3*	0.006 *3*	1797.15	1/2$^+$,3/2	300.053	1/2$^+$				
1501.38 *8*	0.14 *2*	1766.98	3/2$^+$	265.546	3/2$^+$	M1,E2		0.00103 *12*	α(K)=0.00082 *11*; α(L)=0.000104 *13*; α(M)=2.1×10^{-5} *3*; α(N+..)=8.41×10^{-5} *15* α(N)=4.7×10^{-6} *6*; α(O)=7.7×10^{-7} *10*; α(P)=6.1×10^{-8} *9*; α(IPF)=7.86×10^{-5} *12*

$^{135}_{57}La_{78}$-15

^{135}Ce ε decay (17.7 h) 1975He21,1981Ab08,1974Na11 (continued)

γ(^{135}La) (continued)

E_γ[†]	I_γ[‡ f]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[d]	α[g]	Comments
								Additional information 78. α(K)exp=0.0010 *2*.
1531.58 *7*	0.050 *5*	1797.15	1/2$^+$,3/2	265.546	3/2$^+$			
[x]1541.9 *7*	0.015 *7*							
1550.7 *3*	0.024 *4*	1850.74	1/2,3/2	300.053	1/2$^+$			
1560.49 *5*	0.18 *2*	1766.98	3/2$^+$	206.504	5/2$^+$	(E2)	8.75×10^{-4}	α(K)=0.000668 *10*; α(L)=8.46×10^{-5} *12*; α(M)=1.746×10^{-5} *25*; α(N+..)=0.0001042 *15* α(N)=3.84×10^{-6} *6*; α(O)=6.25×10^{-7} *9*; α(P)=4.91×10^{-8} *7*; α(IPF)=9.97×10^{-5} *14* Additional information 79. α(K)exp=0.0005 *1* gives E2 but somewhat uncertain due to discrepant mult for 1767γ from α(K)exp.
1585.3 *2*	0.056 *5*	1850.74	1/2,3/2	265.546	3/2$^+$			
1599.3 *8*	0.019 *3*	1599.25	1/2$^+$,3/2$^+$	0.0	5/2$^+$			
1767.00 *4*	0.29 *3*	1766.98	3/2$^+$	0.0	5/2$^+$			Additional information 80. Mult.: α(K)exp=0.00032 *8* gives E1 but adopted ΔJ$^\pi$ requires M1 or E2.
1797.4 *3*	0.035 *4*	1797.15	1/2$^+$,3/2	0.0	5/2$^+$	D,E2		Additional information 81. α(K)exp=0.0004 *2*.
1850 *1*	0.0011 *3*	1850.74	1/2,3/2	0.0	5/2$^+$			

[†] From 1975He21, except as noted.
[‡] Weighted average of 1981Ab08, 1975He21 and 1974Na11.
[#] Observed in γγ coincidence spectra (1975He21), Eγ from level scheme.
[@] From coincidence data (1975He21).
[&] Iγ,Ice: average of 1981Ab08 and 1975Mo12.
[a] Observed by 1981Ab08 in ce spectra only. Eγ from level scheme.
[b] Not observed by 1981Ab08.
[c] From ce data of 1981Ab08 only.
[d] From α(exp).
[e] From subshell ratios.
[f] For absolute intensity per 100 decays, multiply by 0.418 *7*.
[g] 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.
[h] Placement of transition in the level scheme is uncertain.
[x] γ ray not placed in level scheme.

$^{135}_{57}La_{78}$-16

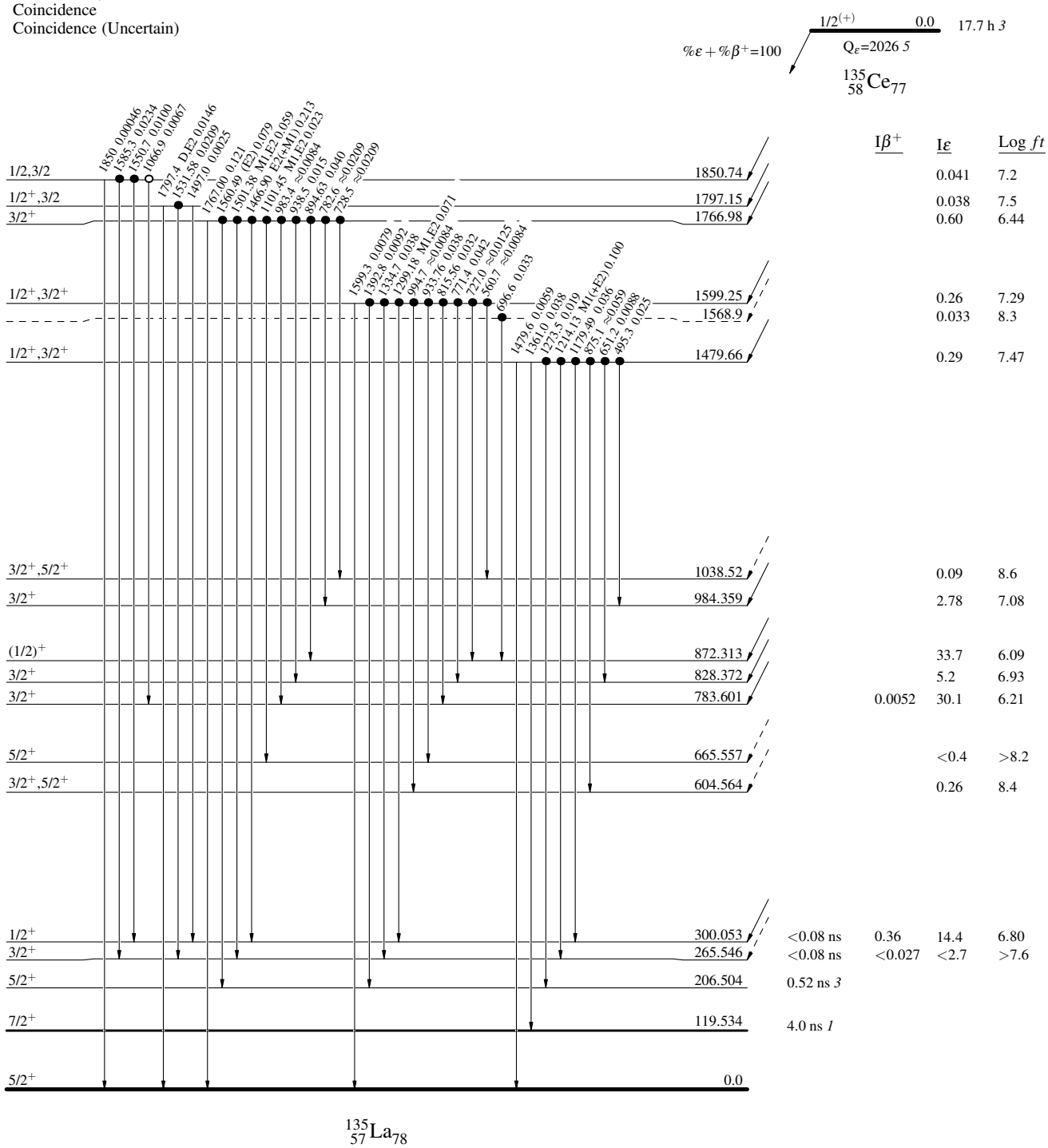
^{135}Ce ε decay (17.7 h) 1975He21,1981Ab08,1974Na11

Legend

$I_\gamma < 2\% \times I_\gamma^{max}$
$I_\gamma < 10\% \times I_\gamma^{max}$
$I_\gamma > 10\% \times I_\gamma^{max}$
Coincidence
Coincidence (Uncertain)

Decay Scheme

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



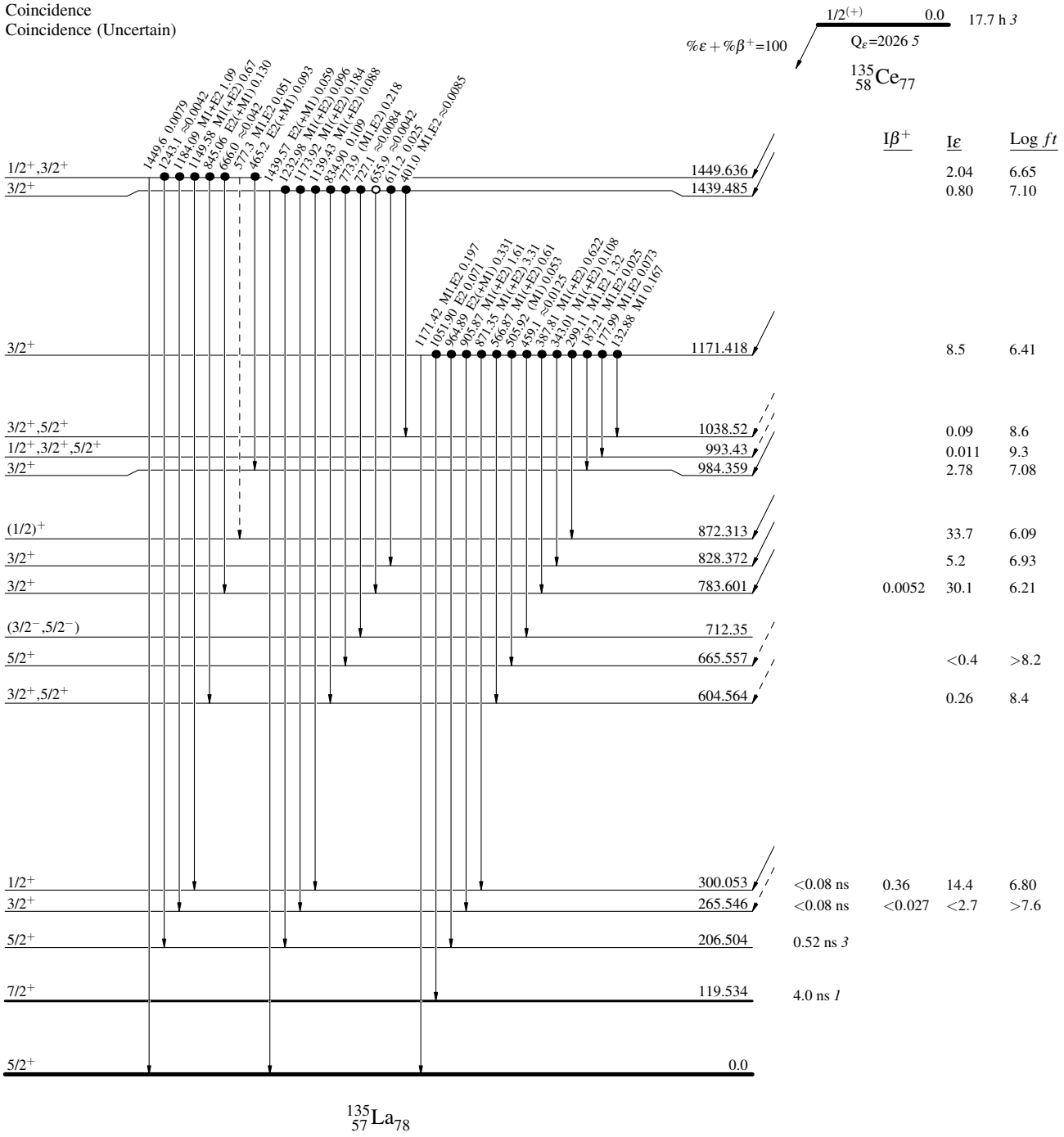
^{135}Ce ε decay (17.7 h) 1975He21,1981Ab08,1974Na11

Legend

- $I_\gamma < 2\% \times I_\gamma^{max}$
- $I_\gamma < 10\% \times I_\gamma^{max}$
- $I_\gamma > 10\% \times I_\gamma^{max}$
- γ Decay (Uncertain)
- Coincidence
- Coincidence (Uncertain)

Decay Scheme (continued)

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



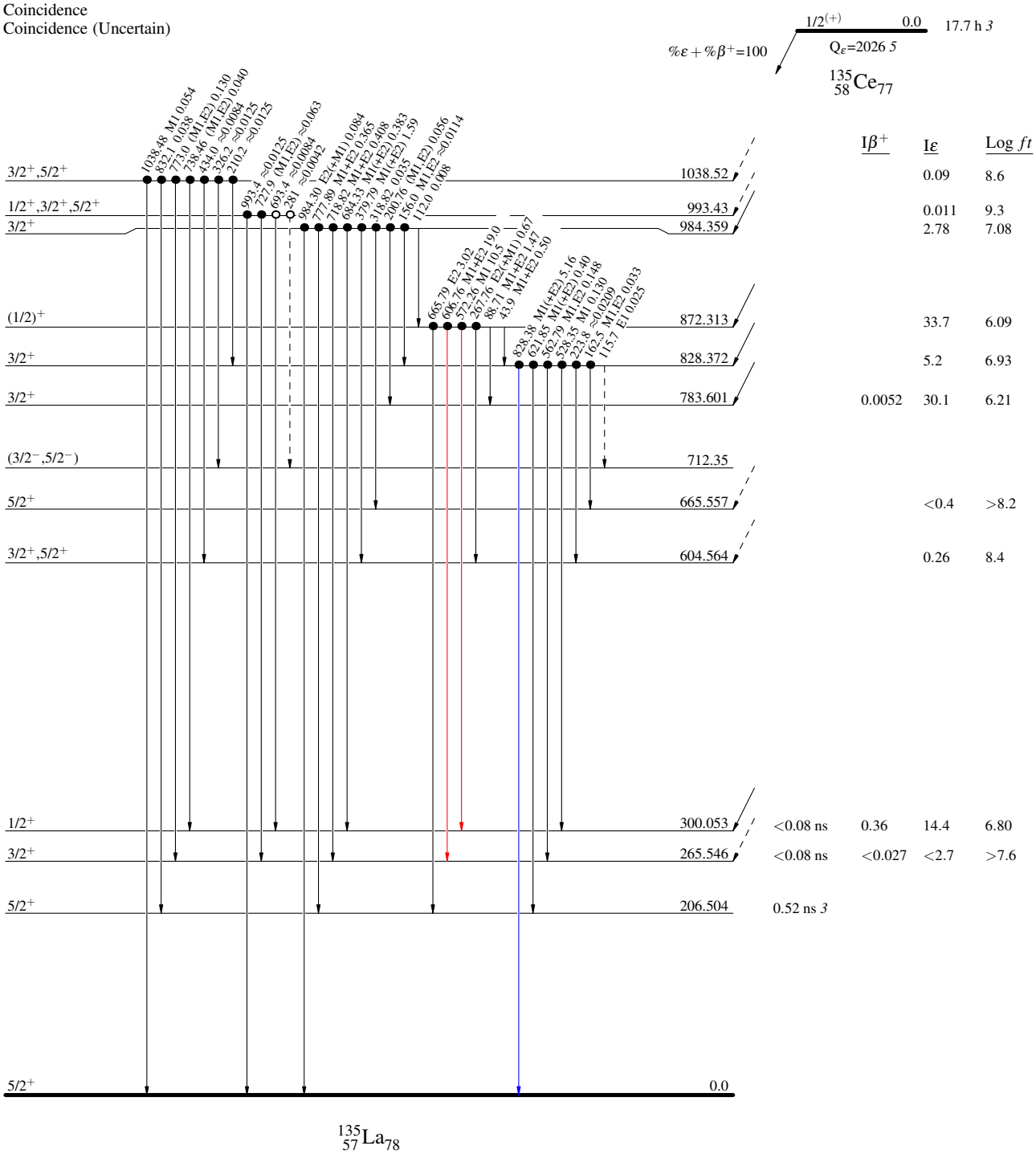
^{135}Ce ε decay (17.7 h) 1975He21,1981Ab08,1974Na11

Legend

$I_\gamma < 2\% \times I_\gamma^{max}$
$I_\gamma < 10\% \times I_\gamma^{max}$
$I_\gamma > 10\% \times I_\gamma^{max}$
γ Decay (Uncertain)
Coincidence
Coincidence (Uncertain)

Decay Scheme (continued)

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



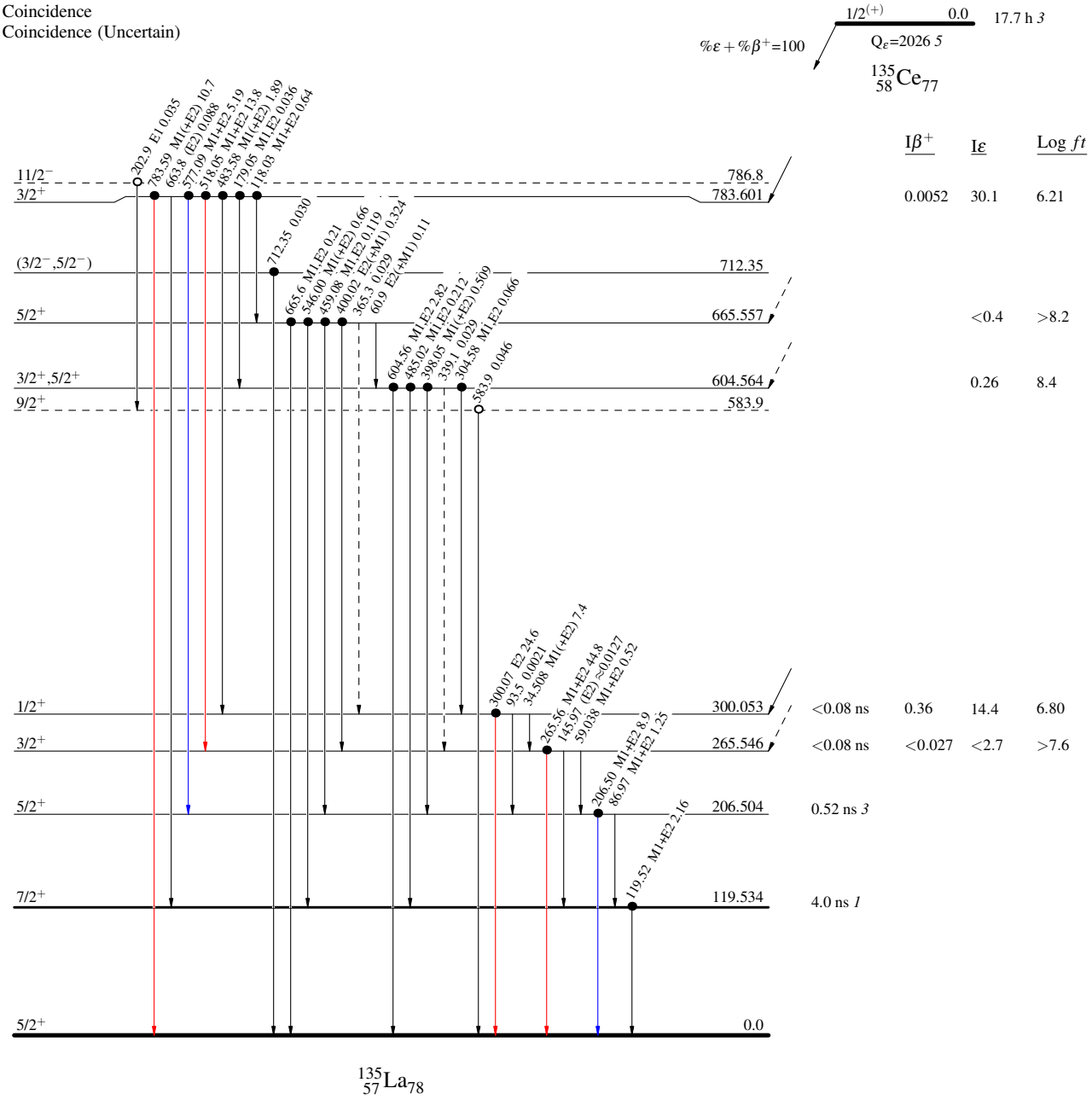
^{135}Ce ε decay (17.7 h) 1975He21,1981Ab08,1974Na11

Legend

- $I_\gamma < 2\% \times I_\gamma^{max}$
- $I_\gamma < 10\% \times I_\gamma^{max}$
- $I_\gamma > 10\% \times I_\gamma^{max}$
- γ Decay (Uncertain)
- Coincidence
- Coincidence (Uncertain)

Decay Scheme (continued)

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



		Iβ+	Iε	Log *ft*
783.601		0.0052	30.1	6.21
665.557			<0.4	>8.2
604.564			0.26	8.4
300.053	<0.08 ns	0.36	14.4	6.80
265.546	<0.08 ns	<0.027	<2.7	>7.6
206.504	0.52 ns *3*			
119.534	4.0 ns *1*			