^{140}La β^- decay 1982Ad02,1991Ch05

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	N. Nica	NDS 154, 1 (2018)	20-Nov-2018

Parent: ^{140}La: E=0.0; $J^\pi=3^-$; $T_{1/2}$=1.67858 d *21*; Q(β^-)=3760.2 *17*; %β^- decay=100.0

^{140}La-E,J^π,$T_{1/2}$: from ^{140}La Adopted Levels.

^{140}La-Q(β^-): from 2017Wa10.

2013Oh03 compiled for XUNDL compilation by by J. Chen (NSCL, MSU).

Measured: γ (1991Ch05,1986Ha20,1982Ad02,1980Ka32,1977De34,1970Ka18,1968Ba18), $\gamma\gamma$ (1991Ch05,1984Ol08,1982Ad02,1980Ka32,1986Ha20) $\gamma\gamma(\theta)$ (1991Ch05,1982Mi03,1982Ad02,1980Ka32,1976Ga12,1973Sa01,1971Wi23), linear pol, $\gamma\gamma(\theta$,H,t,t) (1965Le16), $\gamma(\theta$,t) (1972KlZU), $\beta\gamma$(t), $\gamma\gamma$(t) (1993Gr08,1990PeZR,1982ZhZV,1971Bo13,1963Do16,1962Cu02), ce (1991Ch05,1967Ka12), pair conversion (1968Be57), $T_{1/2}$ by fast timing $\beta\gamma\gamma$(t) (1995Ma75), $\gamma\gamma(\theta)$, time-differential perturbed angular correlation (TDPAC) (2013Oh03).

Level scheme is that of 1982Ad02.

^{140}Ce Levels

E(level)	J^π[†]	$T_{1/2}$	Comments
0.0	0^+	stable	
1596.24 *3*	2^+		
1903.32 *6*	0^+	0.27 ns *5*	$T_{1/2}$: from 1966Bu19. Other: <0.6 ns (1965Sa03).
2083.26 *3*	4^+	3.474 ns *10*	g=+1.11 *4* (1963Ko07) μ=+4.00 *20* (2013Oh03) Q=+0.202 *26* (1972KlZU) g: Others: 1.17 *8* (1971Ni09), 1.14 *38* (1965Le16), 1.16 *8* (1963Ka03). μ: deduced by 2013Oh03 with the TDPAC method using the known value of hyperfine field of −41 T *2* at ^{141}Ce in Fe. Q: Other: from $\gamma(\theta$,t) (1972KlZU), see also 1974He16. $T_{1/2}$: from 1995Ma75. Other values: 3.44 ns *6* (1962Cu02), 3.46 ns *3* (1963Do16), 3.45 ns *9* (1971Bo13), 3.41 ns *4* (1963Ko07); 3.3 ns *3* (1990PeZR); 3.3 ns *3* (1993Gr08).
2107.86 *3*	6^+		
2347.89 *3*	2^+	≤0.2 ns	$T_{1/2}$: from 1990PeZR,1993Gr08.
2349.81 *3*	5^+	≤12 ps	$T_{1/2}$: from 1995Ma75; others: ≤0.2 ns from 1990PeZR; ≤10 ns from 1982ZhZV;
2412.02 *3*	3^+	1.3 ps *4*	$T_{1/2}$: from 1995Ma75; other: 55 ps *15* from 1972Bo33 (see comment of 1995Ma75); also see 1990PeZR.
2464.09 *4*	3^-		$T_{1/2}$: ≤1 ns (1993Gr08).
2480.93 *3*	4^+	22 ps *7*	$T_{1/2}$: from 1995Ma75; other: 3.2 ns *3* from 1990PeZR.
2515.77 *3*	4^+	≤2.5 ps	$T_{1/2}$: from 1995Ma75; 1972Bo33 report $T_{1/2}$=42 ps *11* for 2516, 2521 or 2547 levels.
2521.43 *3*	2^+	≤2.4 ps	$T_{1/2}$: from 1995Ma75; others: ≤0.1 ns (1966Bu19); ≤0.15 ns (1990PeZR). 1972Bo33 report $T_{1/2}$=42 ps 11 for 2516, 2521 or 2547 levels.
2547.24 *4*	1^+	≤4.0 ps	$T_{1/2}$: from 1995Ma75; 1972Bo33 report $T_{1/2}$=42 ps *11* for 2516, 2521 or 2547 levels.
2899.66 *15*	2^+		
3001.12 *14*	2^+		
3118.55 *16*	2^+		
3320.4 *6*	2^+		
3394.86 *25*	(4^-)		
3473.58 *18*	3^-		
3520.87 *14*	(4^+)		

[†] From Adopted Levels.

^{140}La β^- decay 1982Ad02,1991Ch05 (continued)

β^- radiations

E(decay)	E(level)	Iβ^-[†]	Log *ft*	Comments
(239.3 *17*)	3520.87	0.0134 *19*	8.53 *7*	av Eβ=66.54 *52*
(286.6 *17*)	3473.58	0.054 *7*	8.18 *6*	av Eβ=81.19 *54*
(365.3 *17*)	3394.86	0.025 *15*	8.9 *3*	av Eβ=106.54 *57*
(439.8 *18*)	3320.4	0.0038 *3*	9.94 *4*	av Eβ=131.52 *62*
(641.6 *17*)	3118.55	0.0248 *10*	9.685 *18*	av Eβ=203.47 *64*
(759.1 *17*)	3001.12	0.082 *9*	9.42 *5*	av Eβ=247.71 *66*
(860.5 *17*)	2899.66	0.109 *7*	9.49 *3*	av Eβ=287.07 *67* E(decay): 857 *15* from 1972Na04. E(decay): from 1972Na04.
(1213.0 *17*)	2547.24	0.622 *8*	9.964[1u] *7*	av Eβ=438.21 *69*
(1238.8 *17*)	2521.43	11.05 *8*	8.067 *4*	av Eβ=441.18 *72* E(decay): 1244 *20* from 1967Ka12. E(decay): from 1967Ka12.
(1244.4 *17*)	2515.77	5.63 *5*	8.368 *5*	av Eβ=443.55 *72*
(1279.3 *17*)	2480.93	1.124 *20*	9.112 *8*	av Eβ=458.22 *72*
(1296.1 *17*)	2464.09	5.52 *7*	8.443 *6*	av Eβ=465.32 *72*
(1348.2 *17*)	2412.02	43.9 *4*	7.607 *5*	av Eβ=487.36 *73* E(decay): 1365 *10* from 1972Na04. E(decay): from 1972Na04.
(1410.4 *17*)	2349.81	0.207 *25*	10.80[1u] *6*	av Eβ=518.58 *70*
(1412.3 *17*)	2347.89	4.97 *5*	8.630 *5*	av Eβ=514.73 *73*
(1676.9 *17*)	2083.26	20.2 *9*	8.309 *20*	av Eβ=629.48 *75* E(decay): 1680 *7* from 1972Na04. From 1972Na04.
(1856.9[‡] *17*)	1903.32	<0.002	>12.5	av Eβ=708.83 *76*
2164 *2*	1596.24	5.9 *16*	9.28 *12*	av Eβ=846.17 *77*
(3760.2 *17*)	0.0	4×10^{-4} *2*	14.45 *22*	av Eβ=1580.21 *80* E(decay): 3850 *100* from 1960Dz05. Iβ^-: from 1960Dz05.

[†] Absolute intensity per 100 decays.
[‡] Existence of this branch is questionable.

^{140}La β^- decay 1982Ad02,1991Ch05 (continued)

$\gamma(^{140}Ce)$

Iγ normalization: I(1596γ)=95.40% *8* (1977De34).

E_γ ‡*a*	I_γ †*ad*	E_i(level)	J_i^π	E_f	J_f^π	Mult. #&	δ @*c*	α *b*	$I_{(\gamma+ce)}$ *e*	Comments
24.595 *4*	<0.003	2107.86	6^+	2083.26	4^+	E2		697	<2.00	ce(L)/(γ+ce)=0.782 *8*; ce(M)/(γ+ce)=0.175 *4* ce(N)/(γ+ce)=0.0371 *8*; ce(O)/(γ+ce)=0.00505 *10*; ce(P)/(γ+ce)=1.36×10^{-6} *3* α(L)=545 *8*; α(M)=122.0 *18* α(N)=25.9 *4*; α(O)=3.52 *5*; α(P)=0.000945 *14* E_γ: from 1967Ka12. I_γ: from 1982Ad02. Mult.: L1:L2:L3=<0.02:0.68 *3*:1.00 (1967Ka12). $I_{(\gamma+ce)}$: from Iγ and calculated α. 1967Ka12 report I(γ+ce)=0.32% *4* presumably from ce(L); however, value of ce(L) is not given.
64.135 *10*	0.015 *2*	2412.02	3^+	2347.89	2^+	M1		4.26		α(K)=3.63 *5*; α(L)=0.499 *7*; α(M)=0.1046 *15* α(N)=0.0232 *4*; α(O)=0.00375 *6*; α(P)=0.000281 *4* Mult.: α(K)exp=2.3 *10*; K/L=5.5 *25*, L1:L2:L3=1:<0.33:<0.22 (1967Ka12). E_γ: from 1966Ba36.
68.916 *6*	0.079 *2*	2480.93	4^+	2412.02	3^+	M1		3.46		α(K)=2.95 *5*; α(L)=0.405 *6*; α(M)=0.0848 *12* α(N)=0.0188 *3*; α(O)=0.00304 *5*; α(P)=0.000228 *4* Mult.: α(K)exp=2.0 *5*; K/L=6.0 *23*, L:L2:L3=1:<0.15:<0.05 (1967Ka12).
109.422 *11*	0.230 *4*	2521.43	2^+	2412.02	3^+	M1+E2	+0.26 *2*	0.952 *15*		α(K)=0.790 *12*; α(L)=0.128 *4*; α(M)=0.0271 *8* α(N)=0.00597 *18*; α(O)=0.000939 *25*; α(P)=5.98×10^{-5} *9* Mult.: α(K)exp=0.82 *6*; K/L=5.6 *4*, L:L2:L3=13 *3*:1.5 *5*:1.0 (1967Ka12).
131.117 *8*	0.49 *1*	2480.93	4^+	2349.81	5^+	M1+E2	−0.13 +*2*−*5*	0.553 *9*		α(K)=0.470 *7*; α(L)=0.0661 *22*; α(M)=0.0139 *5* α(N)=0.00307 *11*; α(O)=0.000495 *15*; α(P)=3.61×10^{-5} *6* Mult.: α(K)exp=0.50 *3*; K/L=5.6 *6*, L:L2:L3=8.9 *25*:0.9 *2*:1.0 (1967Ka12). δ: from 1982Mi03. Others: +0.15 *18* (1991Ch05), −0.33 *4* (1976Ga12).
173.543 *9*	0.133 *4*	2521.43	2^+	2347.89	2^+	M1		0.252		E_γ: from 1966Ba36. α(K)=0.215 *3*; α(L)=0.0291 *4*; α(M)=0.00609 *9* α(N)=0.001351 *19*; α(O)=0.000219 *3*; α(P)=1.658×10^{-5} *24* Mult.: α(K)exp=0.19 *4*; K/L=8.1 *13* (1967Ka12).
241.933 *30*	0.434 *8*	2349.81	5^+	2107.86	6^+	M1+E2	−0.60 +*35*−*30*	0.1008 *17*		α(K)=0.084 *3*; α(L)=0.0130 *11*; α(M)=0.00276 *25* α(N)=0.00061 *5*; α(O)=9.6×10^{-5} *7*;

$^{140}_{58}Ce_{82}$-3

^{140}La β^- decay 1982Ad02,1991Ch05 (continued)

$\gamma(^{140}Ce)$ (continued)

E_γ ‡a	I_γ †ad	E_i(level)	J_i^π	E_f	J_f^π	Mult.#&	δ@c	α b	Comments
									α(P)=6.2×10^{-6} *4* E_γ: others: 241.966 *12* (1966Ba36), 241.961 *22* (1967Ka12). Mult.: α(K)exp=0.07 *1*; K/L=7.4 *10* (1967Ka12).
266.543 *12*	0.488 *8*	2349.81	5$^+$	2083.26	4$^+$	M1+E2	−0.14 *12*	0.0786 *12*	α(K)=0.0671 *11*; α(L)=0.00906 *18*; α(M)=0.00190 *4* α(N)=0.000420 *9*; α(O)=6.81×10^{-5} *12*; α(P)=5.14×10^{-6} *10* Mult.: α(K)exp=0.06 *1*; K/L=6.5 *10* (1967Ka12). Mult.: E1+M2 from linear pol-γγ(θ) (1976Ga12) was based on value of δ=+0.39 *5*. δ: others: +0.39 *5* (1976Ga12); however, +20 *+43−8* (1982Mi03).
306.9 *2*	0.026 *7*	1903.32	0$^+$	1596.24	2$^+$	[E2]		0.0454	α(K)=0.0365 *6*; α(L)=0.00697 *10*; α(M)=0.001498 *22* α(N)=0.000327 *5*; α(O)=4.98×10^{-5} *7*; α(P)=2.42×10^{-6} *4*
328.762 *8*	21.3 *3*	2412.02	3$^+$	2083.26	4$^+$	M1+E2	−0.049 *6*	0.0453	α(K)=0.0388 *6*; α(L)=0.00516 *8*; α(M)=0.001078 *15* α(N)=0.000239 *4*; α(O)=3.88×10^{-5} *6*; α(P)=2.97×10^{-6} *5* E_γ: others: 328.746 *25* (1979Bo26), 328.752 *30* (1968Gu05), 328.745 *15* (1970Ke06). Mult.: α(K)exp=0.038 *2*, α(L)exp=0.0046 *5*, α(M+N)exp=0.0010 *2* (1991Ch05); K/L=7.4 *3*, K:L1:M1=100:16:3 (1967Ka12). δ: from 1982Mi03. Others: −0.04 *1* or −0.07 *1* (1991Ch05), −0.04 *2* (1973Sa01). I_γ: Iγ=21.74 *19* in 1977De34.
397.52 *5*	0.077 *5*	2480.93	4$^+$	2083.26	4$^+$	(E2)		0.0206	α(K)=0.01699 *24*; α(L)=0.00289 *4*; α(M)=0.000616 *9* α(N)=0.0001349 *19*; α(O)=2.09×10^{-5} *3*; α(P)=1.166×10^{-6} *17* Mult.: α(K)exp=0.03 *2*.
432.493 *12*	3.04 *3*	2515.77	4$^+$	2083.26	4$^+$	M1+E2	−0.04 *2*	0.0224	α(K)=0.0192 *3*; α(L)=0.00253 *4*; α(M)=0.000527 *8* α(N)=0.0001170 *17*; α(O)=1.90×10^{-5} *3*; α(P)=1.461×10^{-6} *21* Mult.: α(K)exp=0.019 *1* (1991Ch05,1967Ka12); K/L=6.7 *9* (1967Ka12). δ: adopted value (from (n,n′γ), 1993Go23); others: −0.54 *5* 1982Mi03 (for J=3); −0.57 *5* (1976Ga12), −0.55 *1* (1973Sa01), −0.36 *2* (1971Wi23); −0.37 *8* or −0.41 *6* (1991Ch05) (for J=3$^+$); δ=+0.05 *1* or +0.13 *+18−15* (1991Ch05) (for J=4$^+$).
438.5 *5*	0.041 *10*	2521.43	2$^+$	2083.26	4$^+$				Iγ≤0.0014 from 1982Ad02. Others: 0.006 *3* (1980Ka32), 0.021 *10* (1970Ka18).
445.5 *5*	0.003 *1*	2347.89	2$^+$	1903.32	0$^+$				
487.021 *12*	47.7 *6*	2083.26	4$^+$	1596.24	2$^+$	E2		0.01159	α(K)=0.00966 *14*; α(L)=0.001527 *22*; α(M)=0.000324 *5* α(N)=7.11×10^{-5} *10*; α(O)=1.113×10^{-5} *16*; α(P)=6.77×10^{-7} *10* Mult.: α(K)exp=0.0095 *5*, α(L)exp=0.0013 *1*, α(M+...)exp=0.00040 *4* (1991Ch05); K/L=6.0 *4* (1967Ka12). δ: δ=−0.005 *20* (E2+(M3)) (1991Ch05). E_γ: 487.15 *25* (1979Bo26). I_γ: Iγ=48.16 *40*, Iγ=45.9% *4* in 1977De34, 0.045 *3* (1980Ka32).
618.12 *5*	0.039 *4*	2521.43	2$^+$	1903.32	0$^+$				I_γ: others: 0.049 *6* (1980Ka32), ≈0.045 (1970Ka18), 0.044 *22*

$^{140}_{58}Ce_{82}$-4

^{140}La β^- decay 1982Ad02,1991Ch05 (continued)

$\gamma(^{140}Ce)$ (continued)

E_γ ‡a	I_γ †ad	E_i(level)	J_i^π	E_f	J_f^π	Mult.#&	δ@c	α b	Comments
									(1968Ba18), 0.014 *3* (1982Ad02).
									Mult.: α(K)exp<0.16.
751.637 *18*	4.54 *4*	2347.89	2+	1596.24	2+	M1+E2	+0.38 *4*	0.00548 *9*	α(K)=0.00471 *8*; α(L)=0.000613 *10*; α(M)=0.0001277 *20* α(N)=2.83×10^{-5} *5*; α(O)=4.60×10^{-6} *8*; α(P)=3.54×10^{-7} *6* Mult.: α(K)exp=0.0042 *4* (1991Ch05); K/L>4.6 (1967Ka12); K/L=3.6 (1958Ba39). δ: others: +0.36 *3* (1982Mi03), 0.30 *+7−2* (1973Sa01), +0.37 *6* (1980Ka32).
815.772 *19*	24.4 *2*	2412.02	3+	1596.24	2+	M1+(E2)	−0.03 *1*	0.00470	α(K)=0.00404 *6*; α(L)=0.000521 *8*; α(M)=0.0001085 *16* α(N)=2.41×10^{-5} *4*; α(O)=3.92×10^{-6} *6*; α(P)=3.05×10^{-7} *5* E_γ: other: 815.735 *40* (1970Ke06). Mult.: α(K)exp=0.0042 *4*; α(L)exp=0.0006 *1* (1991Ch05), K/L=7.0 *12* (1967Ka12). δ: others: +0.007 *9* (1982Mi03), −0.04 *1* (1976Ga12,1973Sa01), −0.031 *5* (1971Wi23), −0.0 (1980Ka32). I_γ: Iγ=24.78 *18* in 1977De34.
867.846 *20*	5.77 *7*	2464.09	3−	1596.24	2+	E1+M2		0.00120 *10*	α(K)=0.00104 *8*; α(L)=0.000131 *12*; α(M)=2.72×10^{-5} *24* α(N)=6.0×10^{-6} *6*; α(O)=9.8×10^{-7} *9*; α(P)=7.4×10^{-8} *7* Mult.: α(K)exp=0.0010 *2* (1991Ch05). δ: M2 mixing not adopted because is incompatible with the recommended upper limit (RUL) for B(M2)(W.u.). Values: −0.044 *20* (1991Ch05), +0.04 *2* (1982Mi03), −0.034 *7* (1976Ga12), +0.25 *2* (1973Sa01), −0.031 *5* (1971Wi23), −0.00 *5* (1980Ka32).
919.550 *23*	2.79 *3*	2515.77	4+	1596.24	2+	E2		0.00242	α(K)=0.00207 *3*; α(L)=0.000281 *4*; α(M)=5.87×10^{-5} *9* α(N)=1.298×10^{-5} *19*; α(O)=2.08×10^{-6} *3*; α(P)=1.496×10^{-7} *21* Mult.: adopted value (from (n,n′γ), 1993Go23); M1+E2 from a(K)exp=0.0025 *6* (1991Ch05) not adopted becasue it results in ambiguous J^π for parent level. δ: if M1+E2: +2.6 *4* (1982Mi03, for J=3); +1.9 *+5−4* (1991Ch05) (for J=3+); δ=+0.07 *10* (1991Ch05) (for J=4+); −0.08 *+6−2* (1973Sa01).
925.189 *21*	7.23 *7*	2521.43	2+	1596.24	2+	E2+M1	−0.22 *4*	0.00344 *6*	α(K)=0.00296 *5*; α(L)=0.000381 *6*; α(M)=7.92×10^{-5} *12* α(N)=1.76×10^{-5} *3*; α(O)=2.86×10^{-6} *5*; α(P)=2.22×10^{-7} *4* Mult.: α(K)exp=0.0026 *3* (1991Ch05); K/L=9 *3* (1967Ka12); α(pair)/α(K)exp=1.82 *10* (1968Be57). δ: others: −0.10 *4* (1982Mi03), −0.15 *7* (1973Sa01), −0.16 *+7−6* (1980Ka32).
950.987 *26*	0.544 *7*	2547.24	1+	1596.24	2+	M1+(E2)	+0.01 *7*	0.00327	α(K)=0.00282 *4*; α(L)=0.000361 *5*; α(M)=7.52×10^{-5} *11* α(N)=1.669×10^{-5} *24*; α(O)=2.72×10^{-6} *4*; α(P)=2.12×10^{-7} *3* Mult.: α(K)exp=0.0025 *9*. δ: from 1982Mi03. Others: +0.06 *7* (1991Ch05), +0.10 *3* (1976Ga12), +0.06 *+3−1* (1980Ka32).
992.9 *5*	0.014 *5*	3473.58	3−	2480.93	4+				

$^{140}_{58}Ce_{82}$-5

^{140}La β^- decay 1982Ad02,1991Ch05 (continued)

$\gamma(^{140}Ce)$ (continued)

E_γ ‡[a]	I_γ †[ad]	E_i(level)	J_i^π	E_f	J_f^π	Mult.#&	α[b]	$I_{(\gamma+ce)}$[e]	Comments
1045.05 *24*	0.026 *15*	3394.86	(4^-)	2349.81	5^+				I_γ: others: 0.016 *4* (1982Ad02), 0.024 *4* (1980Ka32).
1097.20 *23*	0.024 *5*	3001.12	2^+	1903.32	0^+				
1303.5 *4*	0.044 *7*	2899.66	2^+	1596.24	2^+				
1405.20 *17*	0.062 *7*	3001.12	2^+	1596.24	2^+				
1596.21 *4*	100.0 *15*	1596.24	2^+	0.0	0^+	E2	8.98×10^{-4}		%Iγ=95.40 *8* (1977De34) α(K)=0.000676 *10*; α(L)=8.63×10^{-5} *12*; α(M)=1.79×10^{-5} *3* α(N)=3.97×10^{-6} *6*; α(O)=6.45×10^{-7} *9*; α(P)=4.92×10^{-8} *7*; α(IPF)=0.0001128 *16* E_γ: from 1982Ad02. Others: 1596.170 *25* (1970Ke06), 1596.20 *4* (1968Gu05). Mult.: α(K)=0.00069, α(L)exp=0.000071 *11*, α(M+...)exp=0.000012 *3* (1991Ch05), K/L=8.2 *10*, α(K)exp(pair)/α(K)exp=0.156 *15* (1968Be57). I_γ: Iγ=100 *8* in 1977De34.
1877.29 *19*	0.043 *4*	3473.58	3^-	1596.24	2^+				
1903.5		1903.32	0^+	0.0	0^+	E0		0.0146 *15*	I_γ,Mult.: ce(K)=0.013 *1*, ce(L)=0.0013 *2*, ce(M+N)=0.00035 *6*, K/L=10 *1* (1991Ch05); ce(K)=0.0152 *15*; K/L=8.4 *14*; α(K)exp>11 (1967Ka12) (if ce(K)(1596γ)=0.069 *3*); Iγ<0.0014 (1982Ad02).
1924.62 *13*	0.014 *2*	3520.87	(4^+)	1596.24	2^+				I_γ: others: 0.006 *2* (1982Ad02), 0.014 *3* (1980Ka32).
2083.2 *5*	0.0121 *7*	2083.26	4^+	0.0	0^+	E4	1.36×10^{-3}		α(K)=0.001162 *17*; α(L)=0.0001598 *23*; α(M)=3.35×10^{-5} *5* α(N)=7.43×10^{-6} *11*; α(O)=1.198×10^{-6} *17*; α(P)=8.83×10^{-8} *13* I_γ: from I(2083γ)/I(487γ)=0.000254 *15* (1978Fa03); others: Iγ=0.031 *2* (1991Ch05), 0.007 *2* (1982Ad02), 0.045 *3* (1980Ka32). Mult.: α(K)exp=9.78×10^{-3} *84*, K:L1:M1=63:9:2 (1958Ba39).
2347.88 *5*	0.89 *3*	2347.89	2^+	0.0	0^+	E2	8.45×10^{-4}		α(K)=0.000333 *5*; α(L)=4.15×10^{-5} *6*; α(M)=8.60×10^{-6} *12* α(N)=1.91×10^{-6} *3*; α(O)=3.11×10^{-7} *5*; α(P)=2.42×10^{-8} *4*; α(IPF)=0.000460 *7* Mult.: α(K)exp=0.00037 *6*; K/L+=6.5 *15* (1967Ka12); α(pair)/α(K)exp=1.28 *19* (1968Be57).
2464.1 *5*	0.012 *2*	2464.09	3^-	0.0	0^+				
2521.40 *5*	3.63 *4*	2521.43	2^+	0.0	0^+	E2	8.81×10^{-4}		α(K)=0.000293 *5*; α(L)=3.65×10^{-5} *6*; α(M)=7.55×10^{-6} *11* α(N)=1.676×10^{-6} *24*; α(O)=2.73×10^{-7} *4*; α(P)=2.13×10^{-8} *3*; α(IPF)=0.000542 *8* Mult.: α(K)exp=0.00034 *4*; K/L=7.7 *14* (1967Ka12).
2547.34 *11*	0.106 *3*	2547.24	1^+	0.0	0^+	M1	9.62×10^{-4}		α(K)=0.000318 *5*; α(L)=3.97×10^{-5} *6*; α(M)=8.24×10^{-6} *12* α(N)=1.83×10^{-6} *3*; α(O)=2.99×10^{-7} *5*; α(P)=2.36×10^{-8} *4*; α(IPF)=0.000593 *9* Mult.: α(K)exp=0.00032 *8*.
2899.61 *16*	0.070 *2*	2899.66	2^+	0.0	0^+	E2	9.79×10^{-4}		α(K)=0.000230 *4*; α(L)=2.84×10^{-5} *4*; α(M)=5.88×10^{-6} *9* α(N)=1.306×10^{-6} *19*; α(O)=2.13×10^{-7} *3*; α(P)=1.669×10^{-8} *24*; α(IPF)=0.000714 *10* Mult.: α(K)exp=0.00026 *6*.

$^{140}_{58}Ce_{82}$-6

^{140}La β^- decay 1982Ad02,1991Ch05 (continued)

$\gamma(^{140}Ce)$ (continued)

E_γ ‡ [a]	I_γ † [a,d]	E_i(level)	J_i^π	E_f	J_f^π	Mult. #&	α [b]	Comments
3118.51 *16*	0.026 *1*	3118.55	2^+	0.0	0^+	(E2)	1.04×10^{-3}	α(K)=0.000203 *3*; α(L)=2.50×10^{-5} *4*; α(M)=5.18×10^{-6} *8* α(N)=1.149×10^{-6} *16*; α(O)=1.87×10^{-7} *3*; α(P)=1.472×10^{-8} *21*; α(IPF)=0.000808 *12* Mult.: α(K)exp=0.00025 *10*; α(pair)/α(K)exp=2.77 *78* (1968Be57).
3320.4 *6*	0.0040 *3*	3320.4	2^+	0.0	0^+	(E2)	1.10×10^{-3}	α(K)=0.000182 *3*; α(L)=2.24×10^{-5} *4*; α(M)=4.64×10^{-6} *7* α(N)=1.030×10^{-6} *15*; α(O)=1.680×10^{-7} *24*; α(P)=1.322×10^{-8} *19*; α(IPF)=0.000892 *13* Mult.: α(K)exp=0.00021 *15*; α(pair)/α(K)exp=4.2 *28* (1968Be57).

† From 1991Ch05, except where noted.
‡ From 1982Ad02, except where noted.
# K/L, L1:L2:L3, M1:M2:M3 from 1967Ka12.
@ From $\gamma\gamma(\theta)$ and α(K)exp (1991Ch05).
& α(K)exp from 1991Ch05 were normalized to α(K)(E2)=0.000696 for 1596γ.
[a] 1986Ha20 also reported additional γ's: 20.7 (0.011 *1*), 167.89, 411.9 (0.054 *2*), 468.6 (0.004 *2*), 668.85 (0.038 *1*), 700.29 (0.014 *1*), 721.09 (0.030 *1*), 976.69 (0.044 *1*), 995.7 (0.020 *1*), 1009.8 (0.014 *1*), 1061.88 (0.045 *1*), 1150.18 (0.023 *1*), 1214.9 (0.076 *2*) not included in the present adopted β^- decay scheme.
[b] Additional information 1.
[c] If no value given it was assumed δ=1.00 for E2/M1, δ=1.00 for E3/M2 and δ=0.10 for the other multipolarities.
[d] For absolute intensity per 100 decays, multiply by 0.9540 *8*.
[e] Absolute intensity per 100 decays.

$^{140}_{58}Ce_{82}$-7

^{140}La β^- decay 1982Ad02,1991Ch05

Decay Scheme

Intensities: Relative I_γ