

Adopted Levels, Gammas

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	N. Nica and B. Singh		NDS 181, 1 (2022)	9-Mar-2022

$Q(\beta^-)=3430$ 16; $S(n)=4459$ 17; $S(p)=10082$ 9; $Q(\alpha)=-502$ 11 2021Wa16
 $S(2n)=11090$ 30, $S(2p)=19076$ 12 (2021Wa16).

 ^{147}Ce Levels

Datasets containing unplaced γ 's: ^{147}La β^- decay.

Reduced $\chi^2=6.7$ is greater than critical $\chi^2=1.6$. This comes from the discrepancy between the γ 's measured with curved crystal spectrometer, and the other γ 's in the ^{147}La β^- decay dataset.

Cross Reference (XREF) Flags

- A ^{147}La β^- decay
- B ^{248}Cm SF decay
- C ^{252}Cf SF decay
- D $^{238}\text{U}(^{12}\text{C},\text{F}\gamma)$

E(level) [†]	J $\pi^{\ddagger}$	T _{1/2}	XREF	Comments
0.0	(5/2 ⁻)	56.4 s 10	ABCD	$\% \beta^- = 100$ J π : from systematics of the N=89 nuclides, ^{149}Nd (NMR, 1978LeZA; atomic beam, 1964Bu09, 1962Bu21; see also 2004Si16), and ^{151}Sm (electron paramagnetic resonance, 1978LeZA, 1971Ro21; see also 1997Si03). T _{1/2} : weighted average of 56.4 s 12 (1974Ar25), 55 s 5 (1976ScZR) 57 s 3 (1973SeYW) and 57 s 5 (1982To16).
117.711 6	(7/2 ⁻)		ABCD	J π : M1+E2 γ to (5/2 ⁻) g.s. and E1 γ from (7/2 ⁺) 401 level and consistent with $\log ft \geq 6.1$ from (5/2 ⁺).
186.341 7	(5/2 ⁻ , 7/2 ⁻)	0.4 ns	A	J π : (3/2, 5/2, 7/2) from $\log ft \geq 6.2$ from (5/2 ⁺); (5/2 ⁻ , 7/2 ⁻) from (M1) γ to (7/2 ⁻), 118 level.
215.354 16	(3/2 ⁻ , 5/2 ⁻ , 7/2 ⁻)		A	T _{1/2} : from $\gamma\gamma(t)$ and $\beta\gamma(t)$ measurements in ^{147}La β^- decay (1981ScZM). J π : (3/2, 5/2, 7/2) from $\log ft \geq 7.3$ from (5/2 ⁺); $\pi=(-)$ from E2 γ to (5/2 ⁻) g.s.
273.72 ^b 5	(3/2 ⁻ , 5/2 ⁻ , 7/2 ⁻)		A C	J π : (3/2, 5/2, 7/2) from $\log ft \geq 6.6$ from (5/2 ⁺); $\pi=(-)$ from M1 γ to 215 level ($\pi=-$), if placement on 59 γ is confirmed;
332.68 6	(5/2 ⁻ , 7/2 ⁻)		A	J π : (3/2, 5/2, 7/2) from $\log ft \geq 6.4$ from (5/2 ⁺); (5/2 ⁻ , 7/2 ⁻) from M1+E2 γ to (7/2 ⁻), 118 level.
353.215 25	(5/2 ⁻ , 7/2 ⁻)		A	J π : (3/2, 5/2, 7/2) from $\log ft \geq 6.2$ from (5/2 ⁺); (5/2 ⁻ , 7/2 ⁻) from M1+E2 γ to (7/2 ⁻), 118 level;
359.2?			A	
401.110 [@] 17	(9/2 ⁺)		ABCD	J π : (9/2 ⁺) based on E1 γ to 118 level followed by M1+E2 γ to (5/2 ⁻) g.s.. Proposed by 1997Ho11 (^{248}Cm SF decay) and sustained by 2006Ve04 ($^{238}\text{U}(^{12}\text{C},\text{F}\gamma)$), 2014Li46 and 1999Sa58 (^{252}Cf SF decay) as well as 2017Wi15 (^{252}Cf SF decay for ^{147}La) based on the fact that in nuclear fission yrast states are predominantly populated. Bandhead for the octupole structure with simplex $s=+i$ and $\pi=-$. J π : (9/2 ⁺) populated from (5/2 ⁺) g.s. β^- decay of ^{147}La parent does not agree with $\log ft \geq 6.4$ unless some unknown factors still affect the feeding of this level.
402.44 5			A	
432.83 7			A	
438.18 3	(5/2 ⁺ , 7/2 ⁺)		A	J π : (3/2, 5/2, 7/2) from $\log ft \geq 6.1$ from (5/2 ⁺); (5/2 ⁺ , 7/2 ⁺) from E1 γ to

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued) ^{147}Ce Levels (continued)

E(level) [†]	J^π [‡]	XREF	Comments
484.1 [@] 10	(13/2 ⁺)	BCD	(7/2 ⁻), 118 level; J^π : stretched E2 γ to (9/2 ⁺); $\Delta J=+2$ relative to daughter level adopted in ^{248}Cm SF decay (1997Ho11) based on the argument that fission populates predominantly yrast states.
495.08 5		A	
505.41 4		A	
508.6 ^C 10		C	
517.02 4		A	
558.240? 17		A	
597.82 5		A	
608.55 7		A	
625.34 5		A	
634.3 ^b 10		C	
673.1?		A	
676.94 6		A	
710.46 4		A	
735.5 [@] 15	(17/2 ⁺)	BCD	J^π : (E2) γ to (13/2 ⁺), and assumed band structure.
769.75 10		A	
786.01 5		A	
831.45 5		A	
861.4 ^C 15		C	
907.30 8		A	
921.11 10		A	
924.32 11		A	
1127.0 [@] 17	(21/2 ⁺)	BCD	J^π : (E2) γ to (17/2 ⁺), and assumed band structure.
1156.1 ^b 15		C	
1368.7 ^{&} 17	(19/2 ⁻)	CD	XREF: D(1364.8).
1627.8 [@] 19	(25/2 ⁺)	BCD	J^π : (E2) γ to (21/2 ⁺), and assumed band structure.
1713.5 ^{&} 18	(23/2 ⁻)	C	
1745.0 19	(23/2 ⁻)	D	
1770.5 ^b 18		C	
1869.8 ^a 17	(21/2)	C	
2153.8 ^a 18	(25/2)	C	
2194.2 ^{&} 19	(27/2 ⁻)	CD	XREF: D(2190).
2216.1 [@] 20	(29/2 ⁺)	BCD	
2614.0 ^a 19	(29/2)	C	
2702.7 ^{&} 20	(31/2 ⁻)	CD	XREF: D(2698).
2777.1 23		D	
2875.7 [@] 21	(33/2 ⁺)	BCD	XREF: D(2871).
3263.6 ^{&} 22	(35/2 ⁻)	C	
3355? 3		D	E(level): level not confirmed by 2014Li46 (^{252}Cf SF decay).
3471.8 [@] 23	(37/2 ⁺)	CD	XREF: D(3467).
3851.8 ^{&} 23	(39/2 ⁻)	C	
3955.3 [@] 25	(41/2 ⁺)	C	
4551 [@] 3	(45/2 ⁺)	C	

[†] From least-squares fit to $E\gamma$'s with $\Delta E\gamma=1.0$ keV assumed for γ 's reported with no uncertainties.[‡] Although generally the log f 's from the (5/2⁺) g.s. are rather low limits (see ^{147}La β^- decay dataset), some values were used for J^π assignments (see table comments). The resulting tentative assignments can change if new studies will modify the actual

Adopted Levels, Gammas (continued)

 ^{147}Ce Levels (continued)

feeding of the levels.

- # Spins in bands A, B, and C are built from $\Delta J=2$ in-band transitions based on $(9/2^+)$ at 401 level and $\Delta J=1$ inter-band transitions that follow from theoretical arguments – as well as their parities – mainly from the ^{252}Cf SF decay dataset.
- @ Band(A): $s=+i$, $\pi=+$ band based on $(9/2^+)$. This band and the negative-parity band based on $(15/2^-)$ are interpreted by [2014Li46](#) as an octupole structure with simplex quantum number $s=+i$. The two bands are connected by E1 transitions. Theoretical calculations by [2014Li46](#) show that the $s=+i$ octupole band structure originates from the $i_{13/2}$ $1/2[660]$ neutron orbital with $K=1/2$.
- & Band(B): $s=+i$, $\pi=-$ band based on $(19/2^-)$. This band and the positive-parity band based on $(9/2^+)$ are interpreted as an octupole structure with simplex quantum number $s=+i$. The two bands are connected by E1 transitions. See also comment for band based on $(9/2^+)$.
- ^a Band(C): Band based on $(21/2)$.
- ^b Band(b): Cascade 4.
- ^c Band(c): Cascade 5.

Adopted Levels, Gammas (continued)

$\gamma(^{147}\text{Ce})$

$E_i(\text{level})$	J_i^π	E_γ	$I_\gamma^\#$	E_f	J_f^π	Mult. @	$\delta_{\pi}^{\pm} @$	$\alpha^\dagger$	Comments
117.711	(7/2 ⁻)	117.718 & 6	100	0.0	(5/2 ⁻)	M1+E2	1.1	0.966	$\alpha(\text{K})=0.694$ 10; $\alpha(\text{L})=0.213$ 3; $\alpha(\text{M})=0.0469$ 7 $\alpha(\text{N})=0.01014$ 15; $\alpha(\text{O})=0.001479$ 21; $\alpha(\text{P})=4.45 \times 10^{-5}$ 7
186.341	(5/2 ⁻ , 7/2 ⁻)	69.09 ^{ad} 8	7.0 10	117.711	(7/2 ⁻)	(M1)		3.43	$\alpha(\text{K})=2.92$ 5; $\alpha(\text{L})=0.402$ 6; $\alpha(\text{M})=0.0842$ 13 $\alpha(\text{N})=0.0187$ 3; $\alpha(\text{O})=0.00302$ 5; $\alpha(\text{P})=0.000227$ 4 B(M1)(W.u.)=0.0076 9
		186.320 & 7	100 2	0.0	(5/2 ⁻)	E2		0.234	$\alpha(\text{K})=0.1748$ 25; $\alpha(\text{L})=0.0463$ 7; $\alpha(\text{M})=0.01012$ 15 $\alpha(\text{N})=0.00219$ 3; $\alpha(\text{O})=0.000322$ 5; $\alpha(\text{P})=1.058 \times 10^{-5}$ 15 B(E2)(W.u.)=88.5 3
215.354	(3/2 ⁻ , 5/2 ⁻ , 7/2 ⁻)	97.4 ^{af} 3 215.418 ^{e&d} 17	17 9 100 ^e 7	117.711	(7/2 ⁻) (5/2 ⁻)	E2		0.1432	$\alpha(\text{K})=0.1101$ 16; $\alpha(\text{L})=0.0261$ 4; $\alpha(\text{M})=0.00567$ 8 $\alpha(\text{N})=0.001229$ 18; $\alpha(\text{O})=0.000183$ 3; $\alpha(\text{P})=6.86 \times 10^{-6}$ 10
273.72	(3/2 ⁻ , 5/2 ⁻ , 7/2 ⁻)	58.7 ^{af}	16	215.354	(3/2 ⁻ , 5/2 ⁻ , 7/2 ⁻)	M1		5.51	$\alpha(\text{K})=4.69$ 7; $\alpha(\text{L})=0.647$ 9; $\alpha(\text{M})=0.1354$ 19 $\alpha(\text{N})=0.0300$ 5; $\alpha(\text{O})=0.00486$ 7; $\alpha(\text{P})=0.000364$ 5
		156.10 ^a 7 273.8 ^a 1	27 3 100 21	117.711	(7/2 ⁻) (5/2 ⁻)				
332.68	(5/2 ⁻ , 7/2 ⁻)	118 ^{af} 215.0 ^a 1	100 9	215.354	(3/2 ⁻ , 5/2 ⁻ , 7/2 ⁻) (7/2 ⁻)	M1+E2		0.142 3	$\alpha(\text{K})=0.115$ 5; $\alpha(\text{L})=0.021$ 5; $\alpha(\text{M})=0.0045$ 12 $\alpha(\text{N})=0.00099$ 25; $\alpha(\text{O})=0.00015$ 4; $\alpha(\text{P})=8.1 \times 10^{-6}$ 12
		332.8 ^a 1 235.55 ^a 5	21 3 100.0 5	0.0	(5/2 ⁻) (7/2 ⁻)	M1+E2		0.1080 22	$\alpha(\text{K})=0.088$ 6; $\alpha(\text{L})=0.016$ 3; $\alpha(\text{M})=0.0033$ 7 $\alpha(\text{N})=0.00073$ 15; $\alpha(\text{O})=0.000112$ 18; $\alpha(\text{P})=6.2 \times 10^{-6}$ 10
		353.22 ^a 3 359.2 ^f	73 5 100	0.0	(5/2 ⁻) (5/2 ⁻)				
401.110	(9/2 ⁺)	283.400 & 16	100	117.711	(7/2 ⁻)	E1		0.01442	$\alpha(\text{K})=0.01238$ 18; $\alpha(\text{L})=0.001620$ 23; $\alpha(\text{M})=0.000337$ 5 $\alpha(\text{N})=7.42 \times 10^{-5}$ 11; $\alpha(\text{O})=1.185 \times 10^{-5}$ 17; $\alpha(\text{P})=8.36 \times 10^{-7}$ 12 Mult.: from DCO and linear polarization in ²⁴⁸ Cm SF decay (1997Ho11).
402.44		215.3 ^{ea} 3 402.46 ^a 5	37 ^e 7 100 42	186.341	(5/2 ⁻ , 7/2 ⁻) (5/2 ⁻)				

Adopted Levels, Gammas (continued)

$\gamma(^{147}\text{Ce})$ (continued)

$E_i(\text{level})$	J_i^π	E_γ	$I_\gamma^\#$	E_f	J_f^π	Mult. @	$\alpha^\dagger$	Comments
432.83		217.6 ^a 1	100 9	215.354	(3/2 ⁻ , 5/2 ⁻ , 7/2 ⁻)			
		246.39 ^a 9	97 15	186.341	(5/2 ⁻ , 7/2 ⁻)			
438.18	(5/2 ⁺ , 7/2 ⁺)	320.47 ^a 6	11 2	117.711	(7/2 ⁻)			
		438.17 ^a 3	100 5	0.0	(5/2 ⁻)	E1	0.00488	$\alpha(\text{K})=0.00420$ 6; $\alpha(\text{L})=0.000540$ 8; $\alpha(\text{M})=0.0001121$ 16 $\alpha(\text{N})=2.48\times 10^{-5}$ 4; $\alpha(\text{O})=3.98\times 10^{-6}$ 6; $\alpha(\text{P})=2.91\times 10^{-7}$ 4
484.1	(13/2 ⁺)	83.0 ^b	100	401.110	(9/2 ⁺)	(E2)	4.02	$\alpha(\text{K})=2.07$ 3; $\alpha(\text{L})=1.525$ 22; $\alpha(\text{M})=0.342$ 5 $\alpha(\text{N})=0.0731$ 11; $\alpha(\text{O})=0.01022$ 15; $\alpha(\text{P})=0.0001062$ 15 Mult.: based on $\alpha(\text{exp})$ in ²⁴⁸ Cm SF decay; M1+E2 not excluded by 1997Ho11.
495.08		141.8 ^a 2	31 8	353.215	(5/2 ⁻ , 7/2 ⁻)			
		279.9 ^a 1	100 21	215.354	(3/2 ⁻ , 5/2 ⁻ , 7/2 ⁻)			
		308.56 ^a 7	72 8	186.341	(5/2 ⁻ , 7/2 ⁻)			
		377.49 ^a 8	59 3	117.711	(7/2 ⁻)			
505.41		152.3 ^a 1	19 8	353.215	(5/2 ⁻ , 7/2 ⁻)			
		290.06 ^a 8	46 2	215.354	(3/2 ⁻ , 5/2 ⁻ , 7/2 ⁻)			
		318.69 ^{ad} 8	81 10	186.341	(5/2 ⁻ , 7/2 ⁻)			
		387.94 ^{ad} 7	100 4	117.711	(7/2 ⁻)			
		505.5 ^a	21	0.0	(5/2 ⁻)			
508.6		234.9 ^b		273.72	(3/2 ⁻ , 5/2 ⁻ , 7/2 ⁻)			
517.02		184.4 ^a 1	4 1	332.68	(5/2 ⁻ , 7/2 ⁻)			
		399.33 ^a 5	100.0 5	117.711	(7/2 ⁻)			
		516.99 ^a 5	51 4	0.0	(5/2 ⁻)			
558.240?		155.86 ^{af}	50	402.44				
		225.5 ^{af}	100	332.68	(5/2 ⁻ , 7/2 ⁻)			
597.82		159.2 ^a 2	93 11	438.18	(5/2 ⁺ , 7/2 ⁺)			
		382.629 ^{&d} 47	32 4	215.354	(3/2 ⁻ , 5/2 ⁻ , 7/2 ⁻)			
		410.9 ^{ad} 1	100 9	186.341	(5/2 ⁻ , 7/2 ⁻)			
		480.0 ^a 2	14 7	117.711	(7/2 ⁻)			
608.55		170.2 ^a 2	<33	438.18	(5/2 ⁺ , 7/2 ⁺)			
		207.5 ^a 1	7 17	401.110	(9/2 ⁺)			
		334.8 ^a 1	100 13	273.72	(3/2 ⁻ , 5/2 ⁻ , 7/2 ⁻)			
625.34		292.9 ^a 2	25.9 12	332.68	(5/2 ⁻ , 7/2 ⁻)			
		507.61 ^a 5	100.0 12	117.711	(7/2 ⁻)			
634.3		360.6 ^b	100	273.72	(3/2 ⁻ , 5/2 ⁻ , 7/2 ⁻)			
673.1?		272.5 ^{af}	100	401.110	(9/2 ⁺)			
676.94		461.8 ^a 1	69 13	215.354	(3/2 ⁻ , 5/2 ⁻ , 7/2 ⁻)			
		490.52 ^a 6	100 13	186.341	(5/2 ⁻ , 7/2 ⁻)			
710.46		495.17 ^{ad} 3	100 6	215.354	(3/2 ⁻ , 5/2 ⁻ , 7/2 ⁻)			

Adopted Levels, Gammas (continued)

$\gamma(^{147}\text{Ce})$ (continued)

$E_i(\text{level})$	J_i^π	E_γ	$I_\gamma^\#$	E_f	J_f^π	Mult. @	$\alpha^\dagger$	Comments
710.46		523.55 ^{ad} 9	40 4	186.341	(5/2 ⁻ , 7/2 ⁻)			
		709.8 ^{af}	25	0.0	(5/2 ⁻)			
735.5	(17/2 ⁺)	251.4 ^b	100	484.1	(13/2 ⁺)	(E2)	0.0860	$\alpha(\text{K})=0.0676$ 10; $\alpha(\text{L})=0.01444$ 21; $\alpha(\text{M})=0.00312$ 5 $\alpha(\text{N})=0.000679$ 10; $\alpha(\text{O})=0.0001020$ 15; $\alpha(\text{P})=4.33\times 10^{-6}$ 6 Mult.: stretched Q, (E2) from ²⁴⁸ Cm SF decay (DCO, 1997Ho11).
769.75		416.5 ^a 1	22 4	353.215	(5/2 ⁻ , 7/2 ⁻)			
		437.2 ^a 2	100 4	332.68	(5/2 ⁻ , 7/2 ⁻)			
786.01		432.95 ^a 9	12 3	353.215	(5/2 ⁻ , 7/2 ⁻)			
		570.75 ^a 6	95 7	215.354	(3/2 ⁻ , 5/2 ⁻ , 7/2 ⁻)			
		599.2 ^{ad} 1	100 20	186.341	(5/2 ⁻ , 7/2 ⁻)			
831.45		393.6 ^a 3	65 31	438.18	(5/2 ⁺ , 7/2 ⁺)			
		557.79 ^a 5	100 8	273.72	(3/2 ⁻ , 5/2 ⁻ , 7/2 ⁻)			
		644.99 ^a 6	67 6	186.341	(5/2 ⁻ , 7/2 ⁻)			
861.4		352.8 ^b	100	508.6				
907.30		469.1 ^a 1	<100	438.18	(5/2 ⁺ , 7/2 ⁺)			
		506.2 ^a 1	10 10	401.110	(9/2 ⁺)			
921.11		520.0 ^a 1	22 11	401.110	(9/2 ⁺)			
		647.4 ^a 3	100 11	273.72	(3/2 ⁻ , 5/2 ⁻ , 7/2 ⁻)			
924.32		571.1 ^a 1	100	353.215	(5/2 ⁻ , 7/2 ⁻)			
1127.0	(21/2 ⁺)	391.5 ^b	100	735.5	(17/2 ⁺)	(E2)	0.0216	$\alpha(\text{K})=0.01775$ 25; $\alpha(\text{L})=0.00304$ 5; $\alpha(\text{M})=0.000648$ 9 $\alpha(\text{N})=0.0001418$ 20; $\alpha(\text{O})=2.19\times 10^{-5}$ 3; $\alpha(\text{P})=1.216\times 10^{-6}$ 17 Mult.: stretched Q from ²⁴⁸ Cm SF decay (DCO, 1997Ho11); (E2) as member of $\Delta J=2$ rotational band.
1156.1		521.8 ^b	100	634.3				
1368.7	(19/2 ⁻)	241.7 ^b	29 2	1127.0	(21/2 ⁺)			
		633.2 ^b	100 7	735.5	(17/2 ⁺)			
1627.8	(25/2 ⁺)	500.8 ^b	100	1127.0	(21/2 ⁺)	(E2)	0.01074	$\alpha(\text{K})=0.00896$ 13; $\alpha(\text{L})=0.001404$ 20; $\alpha(\text{M})=0.000297$ 5 $\alpha(\text{N})=6.53\times 10^{-5}$ 10; $\alpha(\text{O})=1.024\times 10^{-5}$ 15; $\alpha(\text{P})=6.29\times 10^{-7}$ 9 Mult.: stretched Q from ²⁴⁸ Cm SF decay (DCO, 1997Ho11); (E2) as member of $\Delta J=2$ rotational band.
1713.5	(23/2 ⁻)	344.8 ^b	100 7	1368.7	(19/2 ⁻)			
		586.5 ^{bf}	<36	1127.0	(21/2 ⁺)			
1745.0	(23/2 ⁻)	618	100	1127.0	(21/2 ⁺)			
1770.5		614.4 ^b	100	1156.1				
1869.8	(21/2)	501.1 ^b	49 3	1368.7	(19/2 ⁻)			
		742.8 ^b	100 5	1127.0	(21/2 ⁺)			
2153.8	(25/2)	284.0 ^b	≈100	1869.8	(21/2)			
		440.3 ^b	80 10	1713.5	(23/2 ⁻)			

Adopted Levels, Gammas (continued)

$\gamma(^{147}\text{Ce})$ (continued)

<u>E_i(level)</u>	<u>J_i^{π}</u>	<u>E_{γ}</u>	<u>I_{γ}[#]</u>	<u>E_f</u>	<u>J_f^{π}</u>	<u>Comments</u>
2194.2	(27/2 ⁻)	480.7 ^{bf}	<10	1713.5 (23/2 ⁻)		
		566.4 ^b	100 6	1627.8 (25/2 ⁺)		
2216.1	(29/2 ⁺)	588.3 ^b	100	1627.8 (25/2 ⁺)		
2614.0	(29/2)	419.8 ^b	100 9	2194.2 (27/2 ⁻)		
		460.2 ^b	64 9	2153.8 (25/2)		
2702.7	(31/2 ⁻)	486.6 ^b	100 6	2216.1 (29/2 ⁺)		
		508.5 ^b	31 3	2194.2 (27/2 ⁻)		
2777.1		561 ^c		2216.1 (29/2 ⁺)		
2875.7	(33/2 ⁺)	659.6 ^b	100	2216.1 (29/2 ⁺)		
3263.6	(35/2 ⁻)	387.9 ^b	100 8	2875.7 (33/2 ⁺)		
		560.9 ^b	77 8	2702.7 (31/2 ⁻)		
3355?		484.6 ^{cf}	100	2875.7 (33/2 ⁺)		γ relocated to 2703 level by 2014Li46 (²⁵² Cf SF decay).
3471.8	(37/2 ⁺)	596.1 ^b	100	2875.7 (33/2 ⁺)		
3851.8	(39/2 ⁻)	380.0 ^b	≈100	3471.8 (37/2 ⁺)		
		588.2 ^b	≈100	3263.6 (35/2 ⁻)		
3955.3	(41/2 ⁺)	483.5 ^b	100	3471.8 (37/2 ⁺)		
4551	(45/2 ⁺)	595.8 ^b	100	3955.3 (41/2 ⁺)		

[†] Additional information 1.

[‡] Additional information 2.

[#] From ¹⁴⁷La β^- and ²⁵²Cf SF decay.

[@] From ¹⁴⁷La β^- decay ([1981ScZM](#)) based on γ , ce and K/L data, except where noted.

[&] From ¹⁴⁷La β^- decay ([1979Bo26](#)) (measured with curved crystal spectrometers).

^a From ¹⁴⁷La β^- decay.

^b From ²⁵²Cf SF decay.

^c From ²³⁸U(¹²C,F γ).

^d Differs by 3 σ or more from calculated value.

^e Multiply placed with intensity suitably divided.

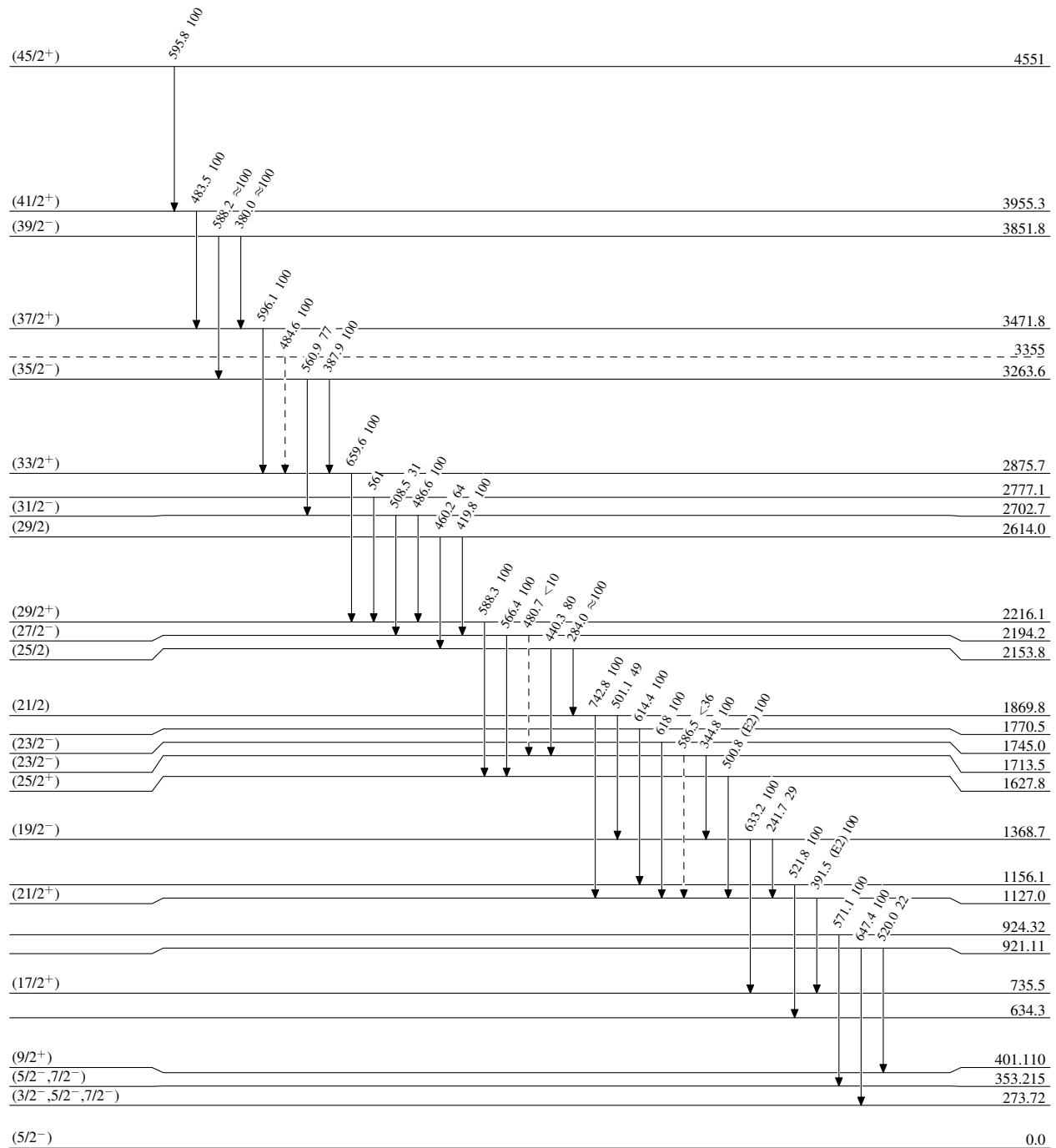
^f Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas

Legend

Level Scheme

Intensities: Relative photon branching from each level

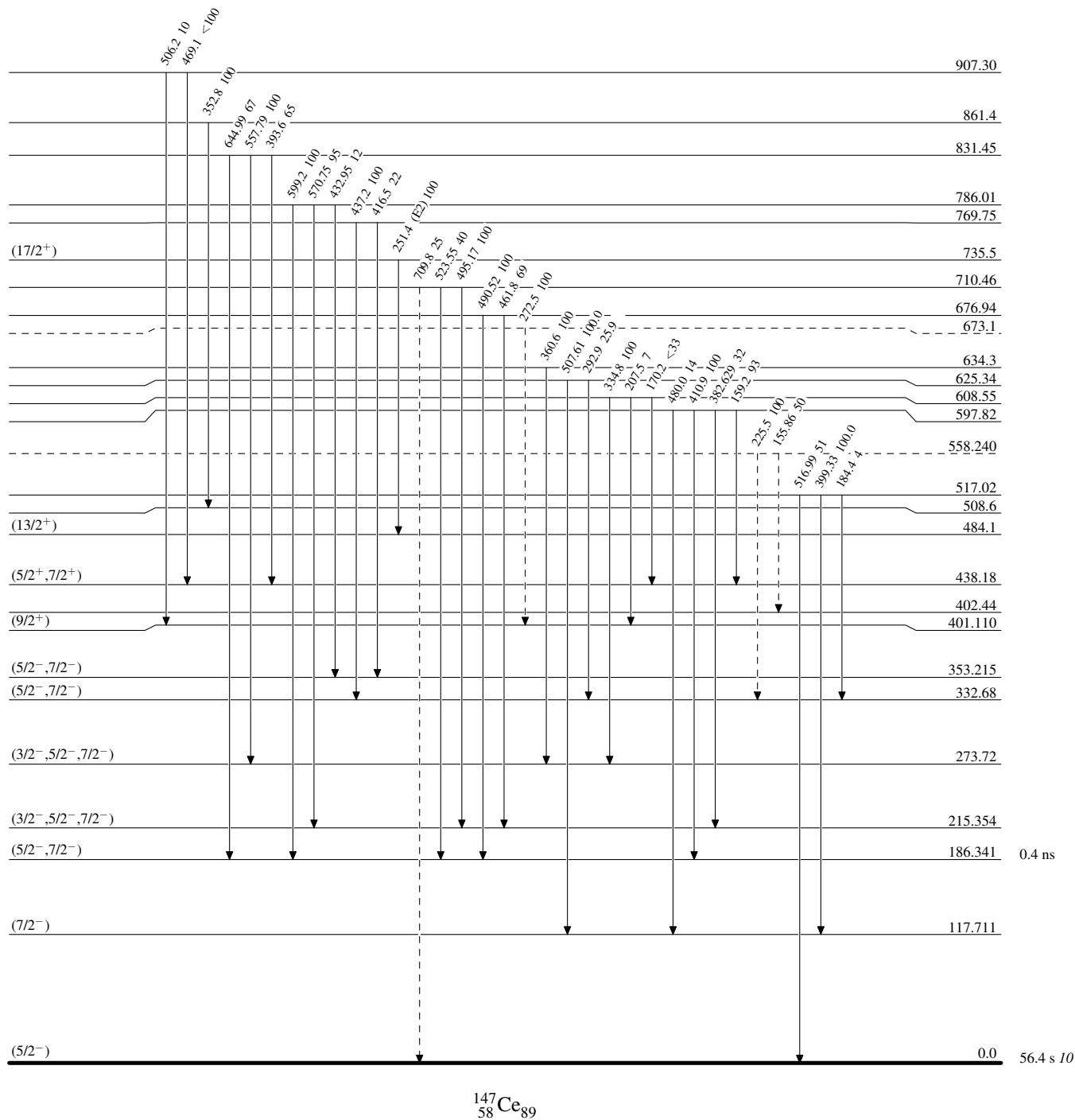
-----► γ Decay (Uncertain)

Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

-----> γ Decay (Uncertain)

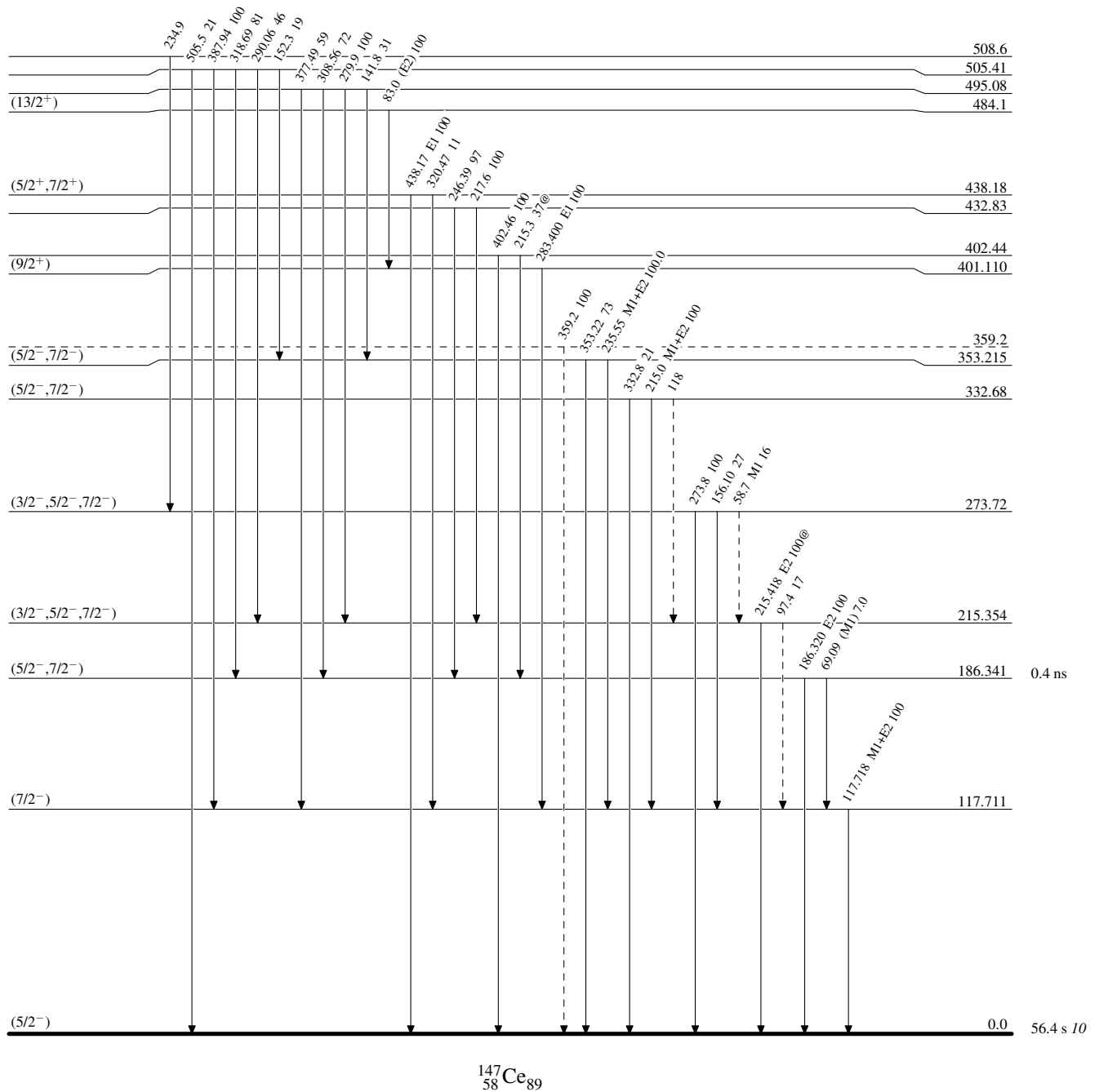
Adopted Levels, Gammas

Legend

Level Scheme (continued)

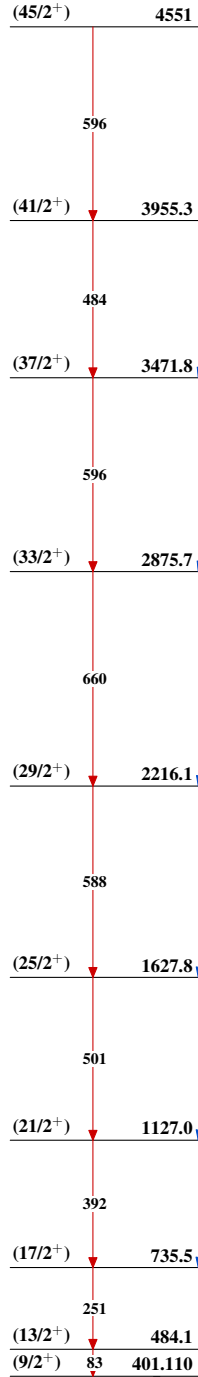
Intensities: Relative photon branching from each level

@ Multiply placed: intensity suitably divided

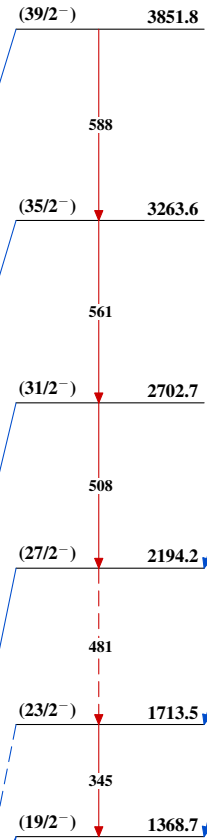
-----► γ Decay (Uncertain)


Adopted Levels, Gammas

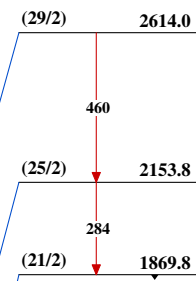
Band(A): s=+i, $\pi=+$ band
based on $(9/2^+)$



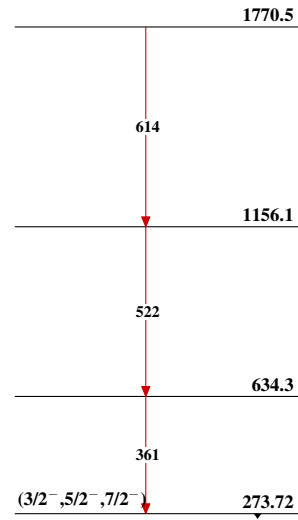
Band(B): s=+i, $\pi=-$ band
based on $(19/2^-)$



Band(C): Band based on
 $(21/2)$



Band(b): Cascade 4



Band(c): Cascade 5

