

Adopted Levels, Gammas

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

$Q(\beta^-)=5336$ 14; $S(n)=5529$ 11; $S(p)=9101$ 11; $Q(\alpha)=-1428$ 13 2021Wa16
 $S(2n)=9986$ 16, $S(2p)=21202$ 14, $Q(\beta^-n)=876$ 18 (2021Wa16).

 ^{147}La Levels

Although generally the log ft 's are approximate and tentative (see ^{147}Ba β^- decay dataset), few values were used for J^π assignments (see table comments). All assignments are tentative.

Cross Reference (XREF) Flags

A ^{147}Ba β^- decay
 B ^{248}Cm SF decay
 C ^{252}Cf SF decay

E(level) [†]	J^π [#]	$T_{1/2}$ [‡]	XREF	Comments
0.0	(5/2 ⁺)	4.06 s 4	ABC	$\% \beta^- = 100$; $\% \beta^- n = 0.041$ 4 J^π : Proposed by (1981ScZM) to justify β^- feeding from (3/2 ⁻) g.s. of ^{147}Ba parent to (5/2 ⁺) g.s., (1/2 ⁺), 74, and (3/2 ⁻), 167 levels in the ^{147}La daughter. However with the newly (5/2 ⁻) adopted in this evaluation for ^{147}Ba g.s. (based on 2013Rz01), the 1996Ur02 proposed assignment for ^{147}La low-spin structure adopted in this evaluation satisfies both the β decay properties as well as the newly added high-spin structure discovered by 1996Ur02, 2017Wi15, and 2017Wa50: (5/2 ⁺) g.s., (7/2 ⁺), 74, and (7/2 ⁻), 167 levels respectively. J^π : (5/2 ⁺) currently adopted for ^{147}La g.s. supersedes (3/2 ⁺) previously proposed by 1989Ro20 based on systematics, and adopted by the previous evaluation (2009Ni02). $T_{1/2}$: unweighted average of 4.015 s 8 (1986Wa17; supersedes 4.02 s 1 (1986ReZR)) and 4.100 s 21 (1993Ru01), which are discrepant. Others: 4.48 s 8 (1981ShZH), 4.10 s 25 (1981En05), 4.4 s 4 (1982Ga24). $\% \beta^- n$: weighted average of 0.035 6 (1986Wa17, supersedes 0.041 17 (1986ReZR), and 0.033 6 (1983Re10)). Others: 0.50 17 (1981En05), <0.01 (1982Ga24).
15.7 4	(3/2 ⁺)		ABC	J^π : E2 γ from (7/2 ⁺), 212 level; E1 γ from (5/2 ⁻), 265 level.
74.4 4	(7/2 ⁺)	3 ns	ABC	J^π : (5/2 ⁺ , 7/2 ⁺) from M1(+E2) γ to (5/2 ⁺) g.s. and E1 γ from (7/2 ⁻), 169 level; (5/2 ⁺) excluded by M1+E2 γ from (9/2 ⁺), 233 level.
120.8 4	(5/2 ⁺)	1.4 ns	ABC	J^π : M1+E2 γ to (3/2 ⁺), 16 level; (E1) γ from (7/2 ⁻), 168 level.
167.5 4	(7/2 ⁻)	2.4 ns 11	ABC	J^π : (3/2 ⁻ , 7/2 ⁻) from stretched E1 γ to (5/2 ⁺) g.s.; (3/2 ⁻) excluded by 1996Ur02 (^{248}Cm SF decay) because the resulting (7/2 ⁻) for 229 level (from E2, 61.8 γ to (3/2 ⁻)) would be directly populated via β^- decay from (5/2 ⁻) g.s. of ^{147}Ba parent, and would γ decay to (5/2 ⁺) g.s. of ^{147}La , with none of these actually observed.
211.7 4	(7/2 ⁺)		A	J^π : M1+E2 γ to (5/2 ⁺) g.s.
229.2 @ 5	(11/2 ⁻)	10.2 ns 9	ABC	J^π : E2 γ to (7/2 ⁻), 168 level; bandhead of s=+i, $\pi=-$ band.
233.1 4	(9/2 ⁺)		A C	J^π : (E2) γ to (5/2 ⁺) g.s.
252.3 8			A	
265.0 4	(5/2 ⁻)	0.3 ns	A	J^π : M1 to (7/2 ⁻), 168 level.
278.6 5			A	
307.9 5			A	
317.6 8			A	
342.5 6			A	
362.5 6			A	
371.8 a 4	(11/2 ⁺)		C	J^π : E2 γ to (7/2 ⁺), 74 level; (D+Q) γ to (9/2 ⁺), 233 level; bandhead of s=-i, $\pi=+$

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

E(level) [†]	J ^π #	XREF	Comments
379.2 5		A	band.
380.1 5		A	
419.6 6		A	
440.0 7		A	
441.6 @ 4	(15/2 ⁻)	BC	J ^π : E2 γ to (11/2 ⁻), 229 level; band member.
474.1 5		A	
476.9 4	(-)	A	J ^π : π from M1+E2 γ to (5/2 ⁻), 265 level.
493.5 7		A	
510.5 6		A	
523.4 8		A	
542.1 5		A	
588.9 5	(13/2 ⁺)	C	J ^π : postulated by 2017Wa50 in ^{252}Cf SF decay dataset based on the feeding and decay pattern (possible band or γ sequence).
603.0 5		A	
611.0 b 4	(13/2 ⁻)	C	J ^π : (E2) γ to (15/2 ⁻), 441 level; (D+Q) γ to (11/2 ⁻), 229 level; bandhead of s=-i, π=- band.
620.1 6		A	
697.2 & 6	(13/2 ⁺)	C	J ^π : (D) γ to (11/2 ⁻), 229 level; bandhead of s=+i, π=+ band.
703.3 5		A	
734.3 6		A	
766.5 8		A	
777.7 8		A	
786.1 a 4	(15/2 ⁺)	C	J ^π : E2 γ to (11/2 ⁺), 372 level; (D+Q) γ to (13/2 ⁺), 589 level; band member.
787.6 @ 4	(19/2 ⁻)	BC	J ^π : E2 γ to (15/2 ⁻), 442 level; band member.
810.3 6		A	
825.5 11		A	
836.7 11		A	
844.9 11		A	
856.4 5		A	
866.2 11		A	
910.8 6		A	
920.0 11		A	
953.9 12		A	
954.3 b 4	(17/2 ⁻)	C	J ^π : (E2) γ to (13/2 ⁻), 611 level; band member.
964.4 11		A	
996.9 11		A	
1014.5 11		A	
1016.7 11		A	
1022.3 8		A	
1030.5 & 4	(17/2 ⁺)	C	J ^π : E2 γ to (13/2 ⁺), 698 level; band member.
1109.7?		B	
1120.2 8		A	
1158.8 8		A	
1190.0 7		A	
1190.4 8		A	
1207.7 a 4	(19/2 ⁺)	C	J ^π : (E2) γ to (15/2 ⁺), 786 level; band member.
1242.0 @ 4	(23/2 ⁻)	BC	J ^π : (E2) γ to (19/2 ⁻), 788 level; band member.
1243.5 8		A	
1275.6 8		A	
1299.8 11		A	
1301.5 8		A	
1346.6 6		C	
1358.0 & 4	(21/2 ⁺)	BC	J ^π : (E2) γ to (17/2 ⁺), 1031 level; band member.
1384.3 11		A	

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

E(level) [†]	J ^π #	XREF	Comments
1390.8 ^b 4	(21/2 ⁻)	C	J ^π : (E2) γ to (17/2 ⁻), 954 level; band member.
1415.6 7		A	
1501.5 11		A	
1532.9 5		A	
1552.6 6		A	
1557.0 7		C	
1568.6 8		A	
1588.6 5		A	
1589.3 ^a 4	(23/2 ⁺)	BC	J ^π : (E2) γ to (19/2 ⁺), 1208 level; band member.
1618.0 11		A	
1619.4 8		A	
1648.5 7		A	
1660.9 11		A	
1671.9 11		A	
1701.1 11		A	
1715.2 11		A	
1729.8 ^{&} 4	(25/2 ⁺)	BC	J ^π : E2 γ to (21/2 ⁺), 1358 level; band member.
1741.5 8		A	
1757.7 6		A	
1766.4 11		A	
1770.6 [@] 4	(27/2 ⁻)	BC	J ^π : E2 γ to (23/2 ⁻), 1241 level; band member.
1776.9 11		A	
1794.8 7		C	
1883.9 8		C	
1895.5 ^b 5	(25/2 ⁻)	C	J ^π : (D+Q) γ to (23/2 ⁻), 1242 level; band member.
1949.1 11		A	
1964.4 ^a 4	(27/2 ⁺)	BC	J ^π : (E2) γ to (23/2 ⁺), 1589 level; band member.
2116.0 ^{&} 4	(29/2 ⁺)	BC	J ^π : (E2) γ to (25/2 ⁺), 1830 level; band member.
2309.4 [@] 4	(31/2 ⁻)	BC	J ^π : E2 γ to (27/2 ⁻), 1771 level; band member.
2311.1 ^a 4	(31/2 ⁺)	BC	J ^π : E2 γ to (29/2 ⁺), 1964 level; band member.
2426.9 5		C	
2519.4 ^{&} 4	(33/2 ⁺)	BC	J ^π : E2 γ to (29/2 ⁺), 2309 level; band member.
2732.0 ^a 5	(35/2 ⁺)	C	J ^π : (E2) γ to (31/2 ⁺), 372 level; band member.
2752.7 [@] 4	(35/2 ⁻)	BC	J ^π : E2 γ to (31/2 ⁻), 2309 level; band member.
2989.7 ^{&} 5	(37/2 ⁺)	C	J ^π : (E2) γ to (33/2 ⁺), 2519 level; band member.
3176.2 [@] 5	(39/2 ⁻)	C	J ^π : (E2) γ to (35/2 ⁻), 2752 level; band member.
3549 ^{&} 1	(41/2 ⁺)	C	J ^π : (E2) γ to (37/2 ⁺), 2990 level; band member.
3675.7 [@] 5	(43/2 ⁻)	C	J ^π : (E2) γ to (39/2 ⁻), 3176 level; band member.
4266.7 [@] 7	(47/2 ⁻)	C	J ^π : band member.

[†] From least-squares fit to E γ 's.[‡] From β^- dataset (1981ScZM), except as noted.[#] From γ multiplicities for levels populated in β^- decay; from γ multiplicities and band structure from ^{248}Cm SF decay for band 1; from systematics (^{144}Ba , ^{146}Ba , ^{145}La) from ^{252}Cm SF decay for bands 2 and 3 (specific arguments are given in table comments).[@] Band(A): Band s=+i, $\pi=-$.[&] Band(a): Band s=+i, $\pi=+$.^a Band(B): Band s=-i, $\pi=+$.^b Band(b): Band s=-i, $\pi=-$. Tentative negative parity branch proposed by 2017Wi15 due to close proximity to the 697.5, 1030.4 and 1357.9 keV levels.

Adopted Levels, Gammas (continued)

$\gamma(^{147}\text{La})$									
$E_i(\text{level})$	J_i^π	$E_\gamma^\#$	$I_\gamma^\#$	E_f	J_f^π	Mult. @	$\delta^\dagger\&$	$\alpha^\ddagger$	Comments
15.7	(3/2 ⁺)	(15.7)		0.0	(5/2 ⁺)	[M1]		36.6 5	$\alpha(\text{L})=29.0$ 4; $\alpha(\text{M})=6.04$ 8 $\alpha(\text{N})=1.325$ 19; $\alpha(\text{O})=0.2146$ 30; $\alpha(\text{P})=0.01644$ 23
74.4	(7/2 ⁺)	74.3	100	0.0	(5/2 ⁺)	M1(+E2)		2.54 4	B(M1)(W.u.)=0.00506 $\alpha(\text{K})=2.167$ 30; $\alpha(\text{L})=0.295$ 4; $\alpha(\text{M})=0.0613$ 9 $\alpha(\text{N})=0.01347$ 19; $\alpha(\text{O})=0.002188$ 31; $\alpha(\text{P})=0.0001690$ 24
120.8	(5/2 ⁺)	46.6	2.27	74.4	(7/2 ⁺)	[M1+E2]		22 12	$\alpha(\text{K})=7.7$ 7; $\alpha(\text{L})=11$ 10; $\alpha(\text{M})=2.5$ 23 $\alpha(\text{N})=0.5$ 5; $\alpha(\text{O})=0.07$ 7; $\alpha(\text{P})=0.00054$ 12
		105.2	100	15.7	(3/2 ⁺)	M1+E2	0.65	1.151 16	B(M1)(W.u.)=0.0034; B(E2)(W.u.)=72 $\alpha(\text{K})=0.872$ 12; $\alpha(\text{L})=0.2198$ 31; $\alpha(\text{M})=0.0475$ 7 $\alpha(\text{N})=0.01021$ 14; $\alpha(\text{O})=0.001526$ 21; $\alpha(\text{P})=6.07\times 10^{-5}$ 8
		120.8	7.73	0.0	(5/2 ⁺)	[M1+E2]		0.83 19	$\alpha(\text{K})=0.61$ 7; $\alpha(\text{L})=0.17$ 10; $\alpha(\text{M})=0.037$ 21 $\alpha(\text{N})=0.008$ 5; $\alpha(\text{O})=0.0012$ 6; $\alpha(\text{P})=4.01\times 10^{-5}$ 20
167.5	(7/2 ⁻)	46.6	5.9	120.8	(5/2 ⁺)	(E1)		1.862 26	B(E1)(W.u.)= 4.5×10^{-5} +35-16 $\alpha(\text{K})=1.556$ 22; $\alpha(\text{L})=0.2434$ 34; $\alpha(\text{M})=0.0504$ 7 $\alpha(\text{N})=0.01077$ 15; $\alpha(\text{O})=0.001623$ 23; $\alpha(\text{P})=8.57\times 10^{-5}$ 12 Mult.: (M1,E1,E2) compatible with RUL; (E1) from intensity balance on 120 level (M1 and E2 results in negative balance).
		93.0	7.1	74.4	(7/2 ⁺)	E1		0.287 4	B(E1)(W.u.)= 6.8×10^{-6} +53-25 $\alpha(\text{K})=0.2446$ 34; $\alpha(\text{L})=0.0339$ 5; $\alpha(\text{M})=0.00701$ 10 $\alpha(\text{N})=0.001516$ 21; $\alpha(\text{O})=0.0002365$ 33; $\alpha(\text{P})=1.480\times 10^{-5}$ 21
		167.4	100	0.0	(5/2 ⁺)	E1		0.0567 8	B(E1)(W.u.)= 1.6×10^{-5} +13-5 $\alpha(\text{N})=0.000289$ 4; $\alpha(\text{O})=4.60\times 10^{-5}$ 6; $\alpha(\text{P})=3.16\times 10^{-6}$ 4 $\alpha(\text{K})=0.0486$ 7; $\alpha(\text{L})=0.00644$ 9; $\alpha(\text{M})=0.001330$ 19
211.7	(7/2 ⁺)	90.9	4.6	120.8	(5/2 ⁺)	[M1+E2]		2.1 7	$\alpha(\text{K})=1.41$ 20; $\alpha(\text{L})=0.5$ 4; $\alpha(\text{M})=0.12$ 9 $\alpha(\text{N})=0.026$ 18; $\alpha(\text{O})=0.0037$ 25; $\alpha(\text{P})=9.0\times 10^{-5}$ 5
		196.1	100	15.7	(3/2 ⁺)	E2		0.1902 27	$\alpha(\text{K})=0.1454$ 20; $\alpha(\text{L})=0.0353$ 5; $\alpha(\text{M})=0.00762$ 11 $\alpha(\text{N})=0.001634$ 23; $\alpha(\text{O})=0.0002433$ 34; $\alpha(\text{P})=9.02\times 10^{-6}$ 13
		211.7	16.1	0.0	(5/2 ⁺)	M1+E2		0.140 7	$\alpha(\text{K})=0.1142$ 16; $\alpha(\text{L})=0.021$ 5; $\alpha(\text{M})=0.0044$ 12 $\alpha(\text{N})=9.5\times 10^{-4}$ 26; $\alpha(\text{O})=0.000147$ 34; $\alpha(\text{P})=8.0\times 10^{-6}$ 9
229.2	(11/2 ⁻)	61.8	100	167.5	(7/2 ⁻)	E2		11.50 16	B(E2)(W.u.)=107+12-10 $\alpha(\text{K})=4.41$ 6; $\alpha(\text{L})=5.55$ 8; $\alpha(\text{M})=1.238$ 17 $\alpha(\text{N})=0.261$ 4; $\alpha(\text{O})=0.0364$ 5; $\alpha(\text{P})=0.0002280$ 32

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Adopted Levels, Gammas (continued)

$\gamma(^{147}\text{La})$ (continued)							
$E_i(\text{level})$	J_i^π	$E_\gamma^\#$	$I_\gamma^\#$	E_f	J_f^π	Mult. @	$\alpha^\ddagger$
Comments							
233.1	(9/2 ⁺)	158.6	100	74.4	(7/2 ⁺)	M1+E2	0.34 5
		232.9	96.4	0.0	(5/2 ⁺)	(E2)	0.1068 15
252.3		236.6	100	15.7	(3/2 ⁺)		
265.0	(5/2 ⁻)	97.4	22.9	167.5	(7/2 ⁻)	M1	1.166
		144.0	15.9	120.8	(5/2 ⁺)	[E1]	0.0858 12
		190.5	17.7	74.4	(7/2 ⁺)	[E1]	0.0398 6
		249.3	100	15.7	(3/2 ⁺)	E1	0.01933 27
		264.8	19.5	0.0	(5/2 ⁺)	[E1]	0.01649 23
278.6		157.7	100	120.8	(5/2 ⁺)		
		262.8	95.2	15.7	(3/2 ⁺)		
		278.3	39.7	0.0	(5/2 ⁺)		
307.9		140.6	6.2	167.5	(7/2 ⁻)		
		292.3	59.3	15.7	(3/2 ⁺)		
		307.9	100	0.0	(5/2 ⁺)		
317.6		149.9	100	167.5	(7/2 ⁻)		
342.5		175.0	100	167.5	(7/2 ⁻)		
		268.2	50.9	74.4	(7/2 ⁺)		
		342.5	26.3	0.0	(5/2 ⁺)		
362.5		150.2		211.7	(7/2 ⁺)		
		241.7	13.0	120.8	(5/2 ⁺)		
		362.6	100	0.0	(5/2 ⁺)		
371.8	(11/2 ⁺)	138.6 2	50 12	233.1	(9/2 ⁺)	(D+Q)	
		297.4 1	100 25	74.4	(7/2 ⁺)	E2	0.0483 7
379.2		61.3	19.4	317.6		E1	0.897 13

Mult.: from ^{248}Cm SF decay (1996Ur02) based on $\alpha(\text{exp})$, $\alpha(\text{K})\text{exp}$.
 $\alpha(\text{K})=0.270$ 18; $\alpha(\text{L})=0.059$ 25; $\alpha(\text{M})=0.013$ 6
 $\alpha(\text{N})=0.0027$ 12; $\alpha(\text{O})=4.1\times 10^{-4}$ 16;
 $\alpha(\text{P})=1.84\times 10^{-5}$ 13
 $\alpha(\text{K})=0.0839$ 12; $\alpha(\text{L})=0.01808$ 25;
 $\alpha(\text{M})=0.00388$ 5
 $\alpha(\text{N})=0.000835$ 12; $\alpha(\text{O})=0.0001258$ 18;
 $\alpha(\text{P})=5.37\times 10^{-6}$ 8
 $\text{B}(\text{M1})(\text{W.u.})=0.0088$
 $\alpha(\text{K})=0.995$ 14; $\alpha(\text{L})=0.1350$ 19; $\alpha(\text{M})=0.0281$ 4
 $\alpha(\text{N})=0.00617$ 9; $\alpha(\text{O})=0.001002$ 14;
 $\alpha(\text{P})=7.76\times 10^{-5}$ 11
 $\text{B}(\text{E1})(\text{W.u.})=2.08\times 10^{-5}$
 $\alpha(\text{K})=0.0734$ 10; $\alpha(\text{L})=0.00982$ 14;
 $\alpha(\text{M})=0.002028$ 28
 $\alpha(\text{N})=0.000441$ 6; $\alpha(\text{O})=6.98\times 10^{-5}$ 10;
 $\alpha(\text{P})=4.70\times 10^{-6}$ 7
 $\text{B}(\text{E1})(\text{W.u.})=1.00\times 10^{-5}$
 $\alpha(\text{K})=0.0342$ 5; $\alpha(\text{L})=0.00450$ 6;
 $\alpha(\text{M})=0.000929$ 13
 $\alpha(\text{N})=0.0002024$ 28; $\alpha(\text{O})=3.23\times 10^{-5}$ 5;
 $\alpha(\text{P})=2.254\times 10^{-6}$ 32
 $\text{B}(\text{E1})(\text{W.u.})=2.52\times 10^{-5}$
 $\alpha(\text{K})=0.01661$ 23; $\alpha(\text{L})=0.002163$ 30;
 $\alpha(\text{M})=0.000447$ 6
 $\alpha(\text{N})=9.75\times 10^{-5}$ 14; $\alpha(\text{O})=1.562\times 10^{-5}$ 22;
 $\alpha(\text{P})=1.124\times 10^{-6}$ 16
 $\text{B}(\text{E1})(\text{W.u.})=4.1\times 10^{-6}$
 $\alpha(\text{K})=0.01417$ 20; $\alpha(\text{L})=0.001842$ 26;
 $\alpha(\text{M})=0.000380$ 5
 $\alpha(\text{N})=8.30\times 10^{-5}$ 12; $\alpha(\text{O})=1.331\times 10^{-5}$ 19;
 $\alpha(\text{P})=9.63\times 10^{-7}$ 13

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Adopted Levels, Gammas (continued)

$\gamma(^{147}\text{La})$ (continued)								
$E_i(\text{level})$	J_i^π	E_γ #	I_γ #	E_f	J_f^π	Mult. @	$\alpha^\ddagger$	Comments
								$\alpha(\text{N})=0.00495$ 7; $\alpha(\text{O})=0.000758$ 11; $\alpha(\text{P})=4.32\times 10^{-5}$ 6
379.2		100.6	19.4	278.6				
		149.9		229.2	(11/2 ⁻)			
		211.7		167.5	(7/2 ⁻)			
		304.8	100	74.4	(7/2 ⁺)			
380.1		115.1	22.9	265.0	(5/2 ⁻)			
		127.8	8.3	252.3				
		168.4	6.9	211.7	(7/2 ⁺)			
		259.5	6.9	120.8	(5/2 ⁺)			
		364.5	100	15.7	(3/2 ⁺)			
		379.9	25.0	0.0	(5/2 ⁺)			
419.6		140.6	41.7	278.6				
		251.4	100	167.5	(7/2 ⁻)			
		298.5	41.7	120.8	(5/2 ⁺)			
		344.6	41.7	74.4	(7/2 ⁺)			
440.0		319.3	38.1	120.8	(5/2 ⁺)			
		365.3		74.4	(7/2 ⁺)			
		424.5	100	15.7	(3/2 ⁺)			
441.6	(15/2 ⁻)	212.2	100	229.2	(11/2 ⁻)	E2	0.1457 20	$\alpha(\text{N})=0.001197$ 17; $\alpha(\text{O})=0.0001792$ 25; $\alpha(\text{P})=7.11\times 10^{-6}$ 10 $\alpha(\text{K})=0.1129$ 16; $\alpha(\text{L})=0.0259$ 4; $\alpha(\text{M})=0.00558$ 8
474.1		208.9	10.3	265.0	(5/2 ⁻)			
		261.8	35.9	211.7	(7/2 ⁺)			
		355.2	4.3	120.8	(5/2 ⁺)			
		399.4	37.6	74.4	(7/2 ⁺)			
		458.1	17.1	15.7	(3/2 ⁺)			
		473.7	100	0.0	(5/2 ⁺)			
476.9	(⁻)	97.4	6.8	379.2				
		134.5	2.7	342.5				
		198.2	8.1	278.6				
		211.7	47.3	265.0	(5/2 ⁻)	M1+E2	0.140 7	$\alpha(\text{K})=0.1142$ 16; $\alpha(\text{L})=0.021$ 5; $\alpha(\text{M})=0.0044$ 12 $\alpha(\text{N})=9.5\times 10^{-4}$ 26; $\alpha(\text{O})=0.000147$ 34; $\alpha(\text{P})=8.0\times 10^{-6}$ 9
		243.9	5.4	233.1	(9/2 ⁺)			
		309.5	64.2	167.5	(7/2 ⁻)			
		356.1	100	120.8	(5/2 ⁺)			
		401.9	3.4	74.4	(7/2 ⁺)			
		477.0	27.0	0.0	(5/2 ⁺)			
493.5		260.3		233.1	(9/2 ⁺)			
		372.7		120.8	(5/2 ⁺)			
		419.3		74.4	(7/2 ⁺)			
510.5		130.6	100	380.1		M1+E2	0.64 13	$\alpha(\text{K})=0.48$ 5; $\alpha(\text{L})=0.12$ 7; $\alpha(\text{M})=0.027$ 15 $\alpha(\text{N})=0.0057$ 31; $\alpha(\text{O})=9.\text{E}-4$ 4; $\alpha(\text{P})=3.21\times 10^{-5}$ 17
		147.6		362.5				
		203.3	15.2	307.9				
		298.5	57.6	211.7	(7/2 ⁺)			
523.4		294.1		229.2	(11/2 ⁻)			
		355.9		167.5	(7/2 ⁻)			
542.1		277.0	30.0	265.0	(5/2 ⁻)			
		309.5	20.0	233.1	(9/2 ⁺)			
		374.4	76.0	167.5	(7/2 ⁻)			
		421.2	16.0	120.8	(5/2 ⁺)			
		467.6	44.0	74.4	(7/2 ⁺)			
		541.9	100	0.0	(5/2 ⁺)			

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Adopted Levels, Gammas (continued)

$\gamma(^{147}\text{La})$ (continued)								
$E_i(\text{level})$	J_i^π	$E_\gamma^\#$	$I_\gamma^\#$	E_f	J_f^π	Mult. @	$\alpha^\ddagger$	Comments
588.9	(13/2 ⁺)	359.7 1	100	229.2	(11/2 ⁻)			
603.0		337.9	15.4	265.0	(5/2 ⁻)			
		370.2	100	233.1	(9/2 ⁺)			
		482.3		120.8	(5/2 ⁺)			
		528.7		74.4	(7/2 ⁺)			
		602.5	19.2	0.0	(5/2 ⁺)			
611.0	(13/2 ⁻)	169.5 2	100 33	441.6	(15/2 ⁻)	(E2)	0.313 5	$\alpha(\text{K})=0.2324$ 34; $\alpha(\text{L})=0.0634$ 9; $\alpha(\text{M})=0.01377$ 20 $\alpha(\text{N})=0.00295$ 4; $\alpha(\text{O})=0.000434$ 6; $\alpha(\text{P})=1.399\times 10^{-5}$ 20
		381 ^a 1	33 33	229.2	(11/2 ⁻)	(D+Q)		
620.1		240.9		379.2				
		387.4	18.5	233.1	(9/2 ⁺)			
		452.4	59.3	167.5	(7/2 ⁻)			
		545.7	100	74.4	(7/2 ⁺)			
697.2	(13/2 ⁺)	468.0 3	100	229.2	(11/2 ⁻)	(D)		
703.3		226.2	100	476.9	(-)			
		323.2	90.0	380.1				
		340.8	66.7	362.5				
		395.4	56.7	307.9				
		438.2	26.7	265.0	(5/2 ⁻)			
		491.5	36.7	211.7	(7/2 ⁺)			
		536.0	80.0	167.5	(7/2 ⁻)			
734.3		455.5	60.0	278.6				
		567.2		167.5	(7/2 ⁻)			
		613.4	100	120.8	(5/2 ⁺)			
		659.9		74.4	(7/2 ⁺)			
766.5		645.7		120.8	(5/2 ⁺)			
		692.1		74.4	(7/2 ⁺)			
777.7		566.1	100	211.7	(7/2 ⁺)			
		656.8	80.0	120.8	(5/2 ⁺)			
786.1	(15/2 ⁺)	175.0 2	13 7	611.0	(13/2 ⁻)	(D+Q)		
		197.2 5		588.9	(13/2 ⁺)			
		414.3 1	100 20	371.8	(11/2 ⁺)	E2	0.01755 25	$\alpha(\text{K})=0.01455$ 20; $\alpha(\text{L})=0.002377$ 33; $\alpha(\text{M})=0.000502$ 7 $\alpha(\text{N})=0.0001089$ 15; $\alpha(\text{O})=1.702\times 10^{-5}$ 24; $\alpha(\text{P})=1.013\times 10^{-6}$ 14
787.6	(19/2 ⁻)	346.1 1	100	441.6	(15/2 ⁻)	E2	0.0301 4	$\alpha(\text{K})=0.02460$ 35; $\alpha(\text{L})=0.00431$ 6; $\alpha(\text{M})=0.000915$ 13 $\alpha(\text{N})=0.0001981$ 28; $\alpha(\text{O})=3.06\times 10^{-5}$ 4; $\alpha(\text{P})=1.677\times 10^{-6}$ 24
810.3		502.3	36.1	307.9				
		598.6	100	211.7	(7/2 ⁺)			
		642.8		167.5	(7/2 ⁻)			
		689.5		120.8	(5/2 ⁺)			
825.5		658.0	100	167.5	(7/2 ⁻)			
836.7		669.2	100	167.5	(7/2 ⁻)			
844.9		677.4	100	167.5	(7/2 ⁻)			
856.4		548.4	12.2	307.9				
		577.8	36.6	278.6				
		591.7	100	265.0	(5/2 ⁻)			
		644.6		211.7	(7/2 ⁺)			
		689.0	97.6	167.5	(7/2 ⁻)			
		735.7		120.8	(5/2 ⁺)			
866.2		698.7	100	167.5	(7/2 ⁻)			

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Adopted Levels, Gammas (continued)

$\gamma(^{147}\text{La})$ (continued)								
$E_i(\text{level})$	J_i^π	$E_\gamma^\#$	$I_\gamma^\#$	E_f	J_f^π	Mult. [@]	$\alpha^\ddagger$	Comments
910.8		645.5	23.7	265.0	(5/2 ⁻)			
		743.5	100	167.5	(7/2 ⁻)			
920.0		752.5	100	167.5	(7/2 ⁻)			
953.9		534.3	100	419.6				
954.3	(17/2 ⁻)	166.7 2	23 8	787.6	(19/2 ⁻)	(D+Q)		
		169.0 3	15 8	786.1	(15/2 ⁺)	(D+Q)		
		343.5 3	15 8	611.0	(13/2 ⁻)	(E2)	0.0308 4	$\alpha(\text{K})=0.0252$ 4; $\alpha(\text{L})=0.00443$ 6; $\alpha(\text{M})=0.000939$ 13 $\alpha(\text{N})=0.0002033$ 29; $\alpha(\text{O})=3.14\times 10^{-5}$ 4; $\alpha(\text{P})=1.713\times 10^{-6}$ 24
		512.7 2	100 8	441.6	(15/2 ⁻)	D+Q		Mult.: stronger D+Q mixing found by 2017Wa50 (²⁵² Cf SF decay) suggests (M1+E2) compatible with level scheme: $\delta=-0.19$ or -6.5 (2017Wa50 in ²⁵² Cf SF dataset); other: $\delta=-0.02$ 3 (2017Wa50).
964.4		796.9	100	167.5	(7/2 ⁻)			
996.9		829.4	100	167.5	(7/2 ⁻)			
1014.5		785.3	100	229.2	(11/2 ⁻)			
1016.7		849.2	100	167.5	(7/2 ⁻)			
1022.3		757.3		265.0	(5/2 ⁻)			
		810.6		211.7	(7/2 ⁺)			
1030.5	(17/2 ⁺)	333 ^a 1	17 17	697.2	(13/2 ⁺)	(E2)	0.0339 6	$\alpha(\text{K})=0.0276$ 5; $\alpha(\text{L})=0.00492$ 9; $\alpha(\text{M})=0.001046$ 18 $\alpha(\text{N})=0.000226$ 4; $\alpha(\text{O})=3.49\times 10^{-5}$ 6; $\alpha(\text{P})=1.873\times 10^{-6}$ 31
		588.9 1	100 17	441.6	(15/2 ⁻)	D		
1109.7?		668.7 ^a		441.6	(15/2 ⁻)			
1120.2		855.3		265.0	(5/2 ⁻)			
		908.4		211.7	(7/2 ⁺)			
1158.8		737.3		419.6				
		949.0		211.7	(7/2 ⁺)			
1190.0		925.1	100	265.0	(5/2 ⁻)			
		978.1	34.8	211.7	(7/2 ⁺)			
		1022.7	52.2	167.5	(7/2 ⁻)			
1190.4		810.3		380.1				
		811.3		379.2				
1207.7	(19/2 ⁺)	177.0 2	10 5	1030.5	(17/2 ⁺)	(D+Q)		
		253.5 1	43 5	954.3	(17/2 ⁻)	(D)		
		421.5 1	100 10	786.1	(15/2 ⁺)	(E2)	0.01669 23	$\alpha(\text{K})=0.01385$ 19; $\alpha(\text{L})=0.002250$ 32; $\alpha(\text{M})=0.000474$ 7 $\alpha(\text{N})=0.0001031$ 14; $\alpha(\text{O})=1.612\times 10^{-5}$ 23; $\alpha(\text{P})=9.67\times 10^{-7}$ 14
1242.0	(23/2 ⁻)	454.4 1	100	787.6	(19/2 ⁻)	(E2)	0.01346 19	$\alpha(\text{K})=0.01122$ 16; $\alpha(\text{L})=0.001776$ 25; $\alpha(\text{M})=0.000374$ 5 $\alpha(\text{N})=8.13\times 10^{-5}$ 11; $\alpha(\text{O})=1.276\times 10^{-5}$ 18; $\alpha(\text{P})=7.89\times 10^{-7}$ 11
1243.5		864.1		379.2				
		1076.3		167.5	(7/2 ⁻)			
1275.6		798.6		476.9	(⁻)			
		1108.3		167.5	(7/2 ⁻)			
1299.8		1132.3	100	167.5	(7/2 ⁻)			
1301.5		1036.7		265.0	(5/2 ⁻)			
		1089.6		211.7	(7/2 ⁺)			
1346.6		560.5 5	100	786.1	(15/2 ⁺)			
1358.0	(21/2 ⁺)	327.4 3	18 9	1030.5	(17/2 ⁺)	(E2)	0.0357 5	$\alpha(\text{K})=0.0291$ 4; $\alpha(\text{L})=0.00522$ 7;

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Adopted Levels, Gammas (continued)

$\gamma(^{147}\text{La})$ (continued)								
$E_i(\text{level})$	J_i^π	$E_\gamma^\#$	$I_\gamma^\#$	E_f	J_f^π	Mult. @	$\alpha^\ddagger$	Comments
								$\alpha(\text{M})=0.001110$ 16 $\alpha(\text{N})=0.0002400$ 34; $\alpha(\text{O})=3.70\times 10^{-5}$ 5; $\alpha(\text{P})=1.966\times 10^{-6}$ 28 $\delta=-0.06$ 7 (2017Wa50 in ^{252}Cf SF dataset).
1358.0	(21/2 ⁺)	570.3 1	100 9	787.6 (19/2 ⁻)		D		
1384.3		1216.8	100	167.5 (7/2 ⁻)				
1390.8	(21/2 ⁻)	183 ^a 1	11 11	1207.7 (19/2 ⁺)		(D)		
		436.6 1	100 11	954.3 (17/2 ⁻)		(E2)	0.01508 21	$\alpha(\text{K})=0.01254$ 18; $\alpha(\text{L})=0.002012$ 28; $\alpha(\text{M})=0.000424$ 6 $\alpha(\text{N})=9.21\times 10^{-5}$ 13; $\alpha(\text{O})=1.444\times 10^{-5}$ 20; $\alpha(\text{P})=8.78\times 10^{-7}$ 12
1415.6		603.1 2	56 11	787.6 (19/2 ⁻)		D+Q		
		1150.7		265.0 (5/2 ⁻)				
		1248.1		167.5 (7/2 ⁻)				
		1341.1		74.4 (7/2 ⁺)				
1501.5		1334.0	100	167.5 (7/2 ⁻)				
1532.9		621.4		910.8				
		1055.8	41.3	476.9 (⁻)				
		1059.1	15.8	474.1				
		1154.0		379.2				
		1268.0	14.2	265.0 (5/2 ⁻)				
		1365.4	30.4	167.5 (7/2 ⁻)				
		1517.3	100	15.7 (3/2 ⁺)				
1552.6		1173.3		379.2				
		1319.4		233.1 (9/2 ⁺)				
		1385.8	61.8	167.5 (7/2 ⁻)				
		1431.2	100	120.8 (5/2 ⁺)				
1557.0		769.4 5	100	787.6 (19/2 ⁻)				
1568.6		1091.8		476.9 (⁻)				
		1401.0		167.5 (7/2 ⁻)				
1588.6		678.4	37.8	910.8				
		885.1	100	703.3				
		1323.4	32.4	265.0 (5/2 ⁻)				
		1467.7	100	120.8 (5/2 ⁺)				
		1588.7	70.3	0.0 (5/2 ⁺)				
1589.3	(23/2 ⁺)	198.5 1	71 6	1390.8 (21/2 ⁻)		(D)		
		231.3 1	18 2	1358.0 (21/2 ⁺)		(D+Q)		
		381.5 1	100 6	1207.7 (19/2 ⁺)		(E2)	0.02239 31	$\alpha(\text{K})=0.01845$ 26; $\alpha(\text{L})=0.00311$ 4; $\alpha(\text{M})=0.000658$ 9 $\alpha(\text{N})=0.0001427$ 20; $\alpha(\text{O})=2.218\times 10^{-5}$ 31; $\alpha(\text{P})=1.273\times 10^{-6}$ 18
1618.0		914.7	100	703.3				
1619.4		1239.2	100	380.1				
		1354.6	100	265.0 (5/2 ⁻)				
1648.5		838.2	56.3	810.3				
		1383.8	100	265.0 (5/2 ⁻)				
		1436.5	56.3	211.7 (7/2 ⁺)				
1660.9		1449.2	100	211.7 (7/2 ⁺)				
1671.9		1406.9	100	265.0 (5/2 ⁻)				
1701.1		1533.6	100	167.5 (7/2 ⁻)				
1715.2		1503.5	100	211.7 (7/2 ⁺)				
1729.8	(25/2 ⁺)	371.8 1	17 2	1358.0 (21/2 ⁺)		E2	0.02418 34	$\alpha(\text{K})=0.01990$ 28; $\alpha(\text{L})=0.00339$ 5; $\alpha(\text{M})=0.000717$ 10 $\alpha(\text{N})=0.0001554$ 22; $\alpha(\text{O})=2.413\times 10^{-5}$ 34; $\alpha(\text{P})=1.369\times 10^{-6}$ 19 $\delta=-0.10$ 7 (2017Wa50 in ^{252}Cf SF dataset).

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Adopted Levels, Gammas (continued) $\gamma(^{147}\text{La})$ (continued)

$E_i(\text{level})$	J_i^π	E_γ #	I_γ #	E_f	J_f^π	Mult. @	$\alpha^\ddagger$	Comments
1729.8	(25/2 ⁺)	487.8 1	100 9	1242.0	(23/2 ⁻)	D		
1741.5		1476.3		265.0	(5/2 ⁻)			
		1530.1		211.7	(7/2 ⁺)			
1757.7		1589.3		167.5	(7/2 ⁻)			
		1636.5	24.4	120.8	(5/2 ⁺)			
		1683.1	11.0	74.4	(7/2 ⁺)			
		1759.3	100	0.0	(5/2 ⁺)			
1766.4		1501.4	100	265.0	(5/2 ⁻)			
1770.6	(27/2 ⁻)	528.7 1	100	1242.0	(23/2 ⁻)	E2	0.00886 12	$\alpha(\text{K})=0.00744$ 10; $\alpha(\text{L})=0.001125$ 16; $\alpha(\text{M})=0.0002359$ 33 $\alpha(\text{N})=5.14\times 10^{-5}$ 7; $\alpha(\text{O})=8.13\times 10^{-6}$ 11; $\alpha(\text{P})=5.30\times 10^{-7}$ 7
1776.9		1609.4	100	167.5	(7/2 ⁻)			
1794.8		237.8 1	100	1557.0				
1883.9		537.3 5	100	1346.6				
1895.5	(25/2 ⁻)	306.0 ^a 4	50 50	1589.3	(23/2 ⁺)	(D)		
		653.5 2	100 50	1242.0	(23/2 ⁻)	(D+Q)		
1949.1		1781.6	100	167.5	(7/2 ⁻)			
1964.4	(27/2 ⁺)	234.7 2	48 5	1729.8	(25/2 ⁺)	D+Q		$\delta=0.42$ or 2.3 (2017Wa50 in ^{252}Cf SF dataset).
		375.1 1	100 8	1589.3	(23/2 ⁺)	(E2)	0.02355 33	$\alpha(\text{K})=0.01939$ 27; $\alpha(\text{L})=0.00329$ 5; $\alpha(\text{M})=0.000696$ 10 $\alpha(\text{N})=0.0001509$ 21; $\alpha(\text{O})=2.344\times 10^{-5}$ 33; $\alpha(\text{P})=1.335\times 10^{-6}$ 19
2116.0	(29/2 ⁺)	345.6 1	100 10	1770.6	(27/2 ⁻)	(D)		
		386.1 1	55 7	1729.8	(25/2 ⁺)	(E2)	0.02160 30	$\alpha(\text{K})=0.01782$ 25; $\alpha(\text{L})=0.00299$ 4; $\alpha(\text{M})=0.000632$ 9 $\alpha(\text{N})=0.0001371$ 19; $\alpha(\text{O})=2.133\times 10^{-5}$ 30; $\alpha(\text{P})=1.232\times 10^{-6}$ 17
2309.4	(31/2 ⁻)	193.3 1	80 10	2116.0	(29/2 ⁺)	(D)		
		538.8 1	100 10	1770.6	(27/2 ⁻)	E2	0.00842 12	$\alpha(\text{K})=0.00708$ 10; $\alpha(\text{L})=0.001064$ 15; $\alpha(\text{M})=0.0002231$ 31 $\alpha(\text{N})=4.86\times 10^{-5}$ 7; $\alpha(\text{O})=7.70\times 10^{-6}$ 11; $\alpha(\text{P})=5.05\times 10^{-7}$ 7
2311.1	(31/2 ⁺)	195.0 3	65 32	2116.0	(29/2 ⁺)	(D+Q)		
		346.7 2	100 19	1964.4	(27/2 ⁺)	(E2)	0.0299 4	$\alpha(\text{K})=0.02447$ 35; $\alpha(\text{L})=0.00429$ 6; $\alpha(\text{M})=0.000909$ 13 $\alpha(\text{N})=0.0001969$ 28; $\alpha(\text{O})=3.04\times 10^{-5}$ 4; $\alpha(\text{P})=1.668\times 10^{-6}$ 24
2426.9		656.3 5		1770.6	(27/2 ⁻)			
		697.2 5		1729.8	(25/2 ⁺)			
2519.4	(33/2 ⁺)	210.0 1	64 10	2309.4	(31/2 ⁻)	(D)		
		403.4 1	100 20	2116.0	(29/2 ⁺)	E2	0.01898 27	$\alpha(\text{N})=0.0001188$ 17; $\alpha(\text{O})=1.852\times 10^{-5}$ 26; $\alpha(\text{P})=1.090\times 10^{-6}$ 15 $\alpha(\text{K})=0.01570$ 22; $\alpha(\text{L})=0.00259$ 4; $\alpha(\text{M})=0.000547$ 8
2732.0	(35/2 ⁺)	420.9 2	100	2311.1	(31/2 ⁺)	(E2)	0.01676 24	$\alpha(\text{K})=0.01391$ 20; $\alpha(\text{L})=0.002260$ 32; $\alpha(\text{M})=0.000477$ 7 $\alpha(\text{N})=0.0001035$ 15; $\alpha(\text{O})=1.619\times 10^{-5}$ 23; $\alpha(\text{P})=9.70\times 10^{-7}$ 14
2752.7	(35/2 ⁻)	233.3 2	57 11	2519.4	(33/2 ⁺)	(D+Q)		
		443.4 2	100 14	2309.4	(31/2 ⁻)	E2	0.01443 20	$\alpha(\text{K})=0.01201$ 17; $\alpha(\text{L})=0.001917$ 27; $\alpha(\text{M})=0.000404$ 6 $\alpha(\text{N})=8.78\times 10^{-5}$ 12; $\alpha(\text{O})=1.376\times 10^{-5}$ 19; $\alpha(\text{P})=8.42\times 10^{-7}$ 12

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Adopted Levels, Gammas (continued)

$\gamma(^{147}\text{La})$ (continued)								
$E_i(\text{level})$	J_i^π	$E_\gamma^{\#}$	$I_\gamma^{\#}$	E_f	J_f^π	Mult. @	$\alpha^{\ddagger}$	Comments
2989.7	(37/2 ⁺)	470.3 2	100	2519.4	(33/2 ⁺)	(E2)	0.01222 17	$\alpha(\text{K})=0.01020$ 14; $\alpha(\text{L})=0.001597$ 22; $\alpha(\text{M})=0.000336$ 5 $\alpha(\text{N})=7.31\times 10^{-5}$ 10; $\alpha(\text{O})=1.149\times 10^{-5}$ 16; $\alpha(\text{P})=7.20\times 10^{-7}$ 10
3176.2	(39/2 ⁻)	423.5 1	100	2752.7	(35/2 ⁻)	(E2)	0.01647 23	$\alpha(\text{K})=0.01367$ 19; $\alpha(\text{L})=0.002216$ 31; $\alpha(\text{M})=0.000467$ 7 $\alpha(\text{N})=0.0001015$ 14; $\alpha(\text{O})=1.588\times 10^{-5}$ 22; $\alpha(\text{P})=9.54\times 10^{-7}$ 13
3549	(41/2 ⁺)	559 ^a 1	100	2989.7	(37/2 ⁺)	(E2)	0.00764 11	$\alpha(\text{K})=0.00643$ 9; $\alpha(\text{L})=0.000957$ 14; $\alpha(\text{M})=0.0002005$ 30 $\alpha(\text{N})=4.37\times 10^{-5}$ 7; $\alpha(\text{O})=6.93\times 10^{-6}$ 10; $\alpha(\text{P})=4.60\times 10^{-7}$ 7
3675.7	(43/2 ⁻)	499.5 2	100	3176.2	(39/2 ⁻)	(E2)	0.01034 15	$\alpha(\text{K})=0.00866$ 12; $\alpha(\text{L})=0.001331$ 19; $\alpha(\text{M})=0.000279$ 4 $\alpha(\text{N})=6.09\times 10^{-5}$ 9; $\alpha(\text{O})=9.60\times 10^{-6}$ 13; $\alpha(\text{P})=6.14\times 10^{-7}$ 9
4266.7	(47/2 ⁻)	591.0 5	100	3675.7	(43/2 ⁻)			

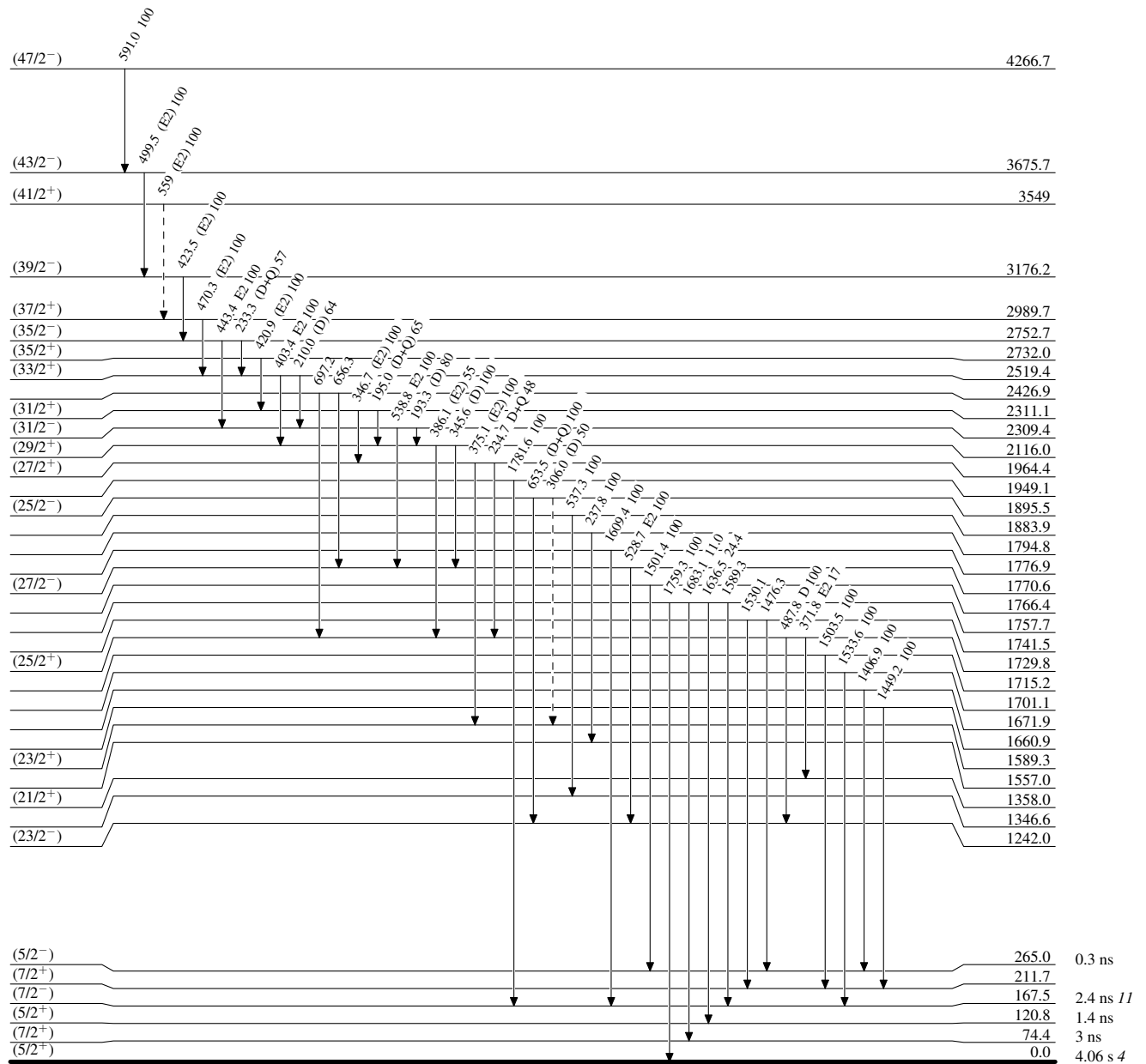
[†] Additional information 1.[‡] Additional information 2.[#] From ^{147}La β^- decay for γ 's observed in this decay and γ 's common to ^{147}La β^- decay and ^{252}Cf SF decay; from ^{252}Cf SF decay for all the other γ 's.[@] From $\alpha(\text{K})\text{exp}'\text{s}$ for γ 's in ^{147}Ba β^- decay; from angular correlations for γ 's measured in ^{252}Cf SF and ^{248}Cm SF decays (Q, most likely (E2) was adopted).[&] From measured K/L ratios for γ 's in ^{147}Ba β^- decay (1981ScZM) unless noted otherwise.^a Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas

Legend

Level Scheme

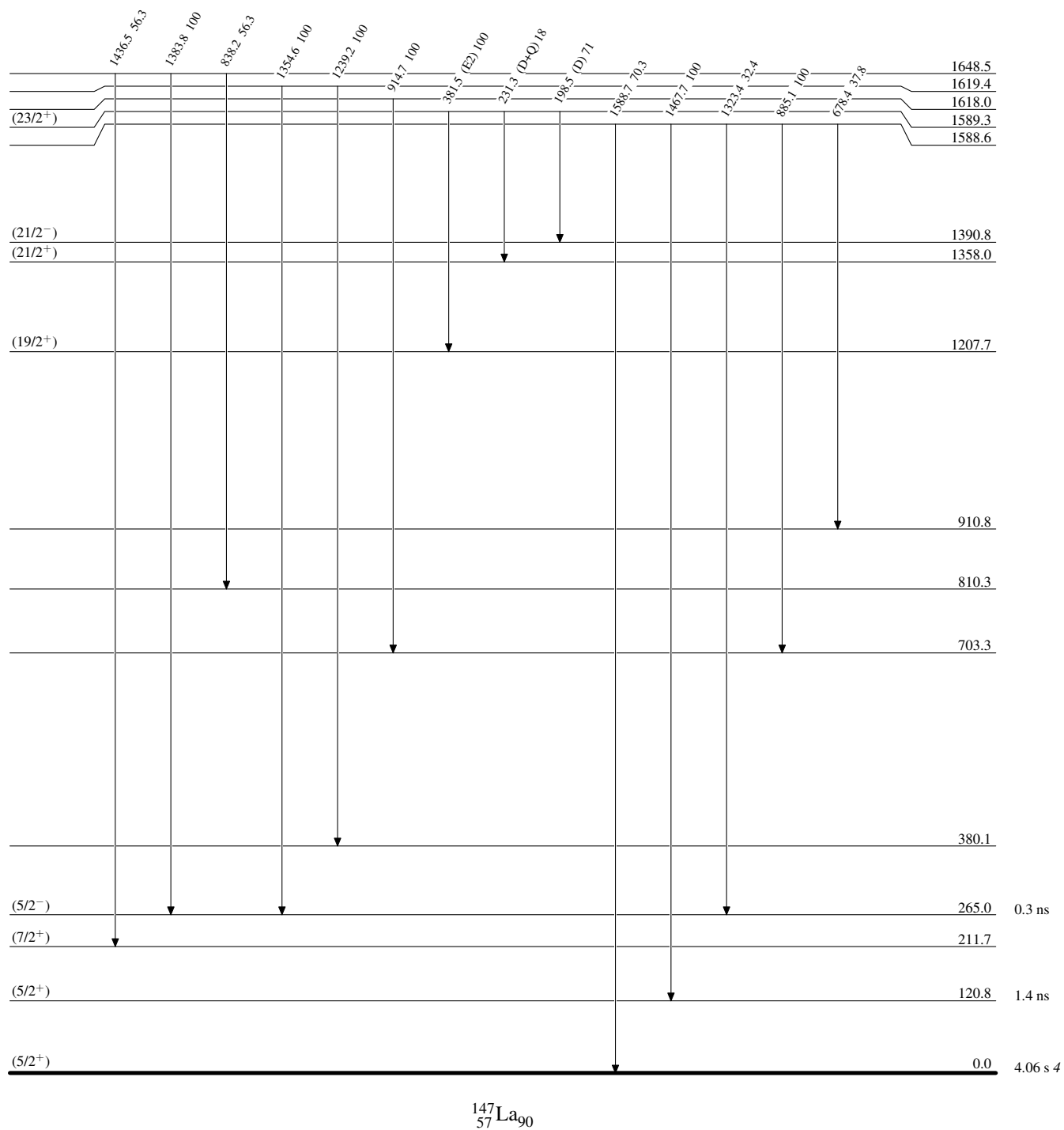
Intensities: Relative photon branching from each level

-----► γ Decay (Uncertain)

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

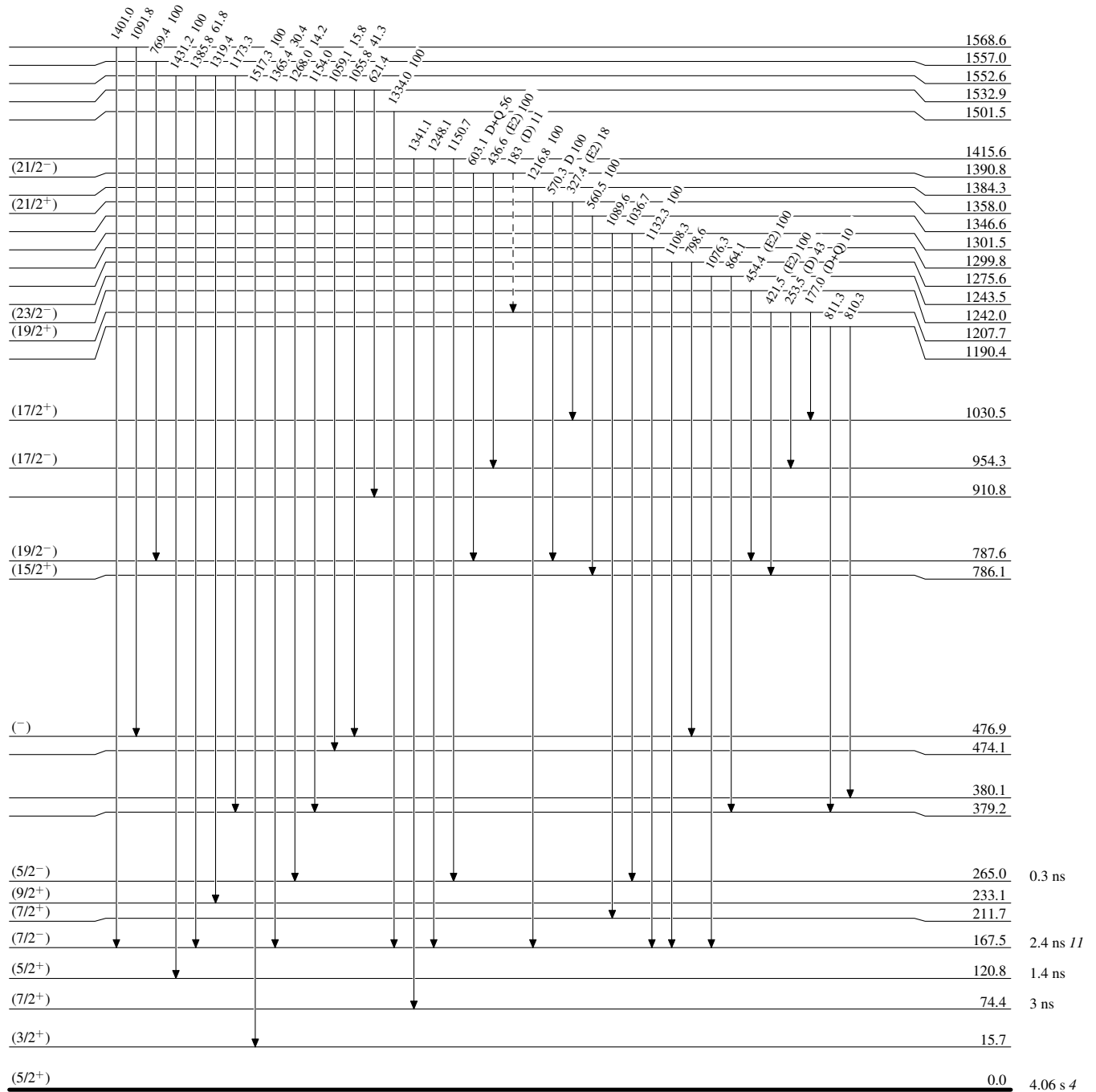


Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

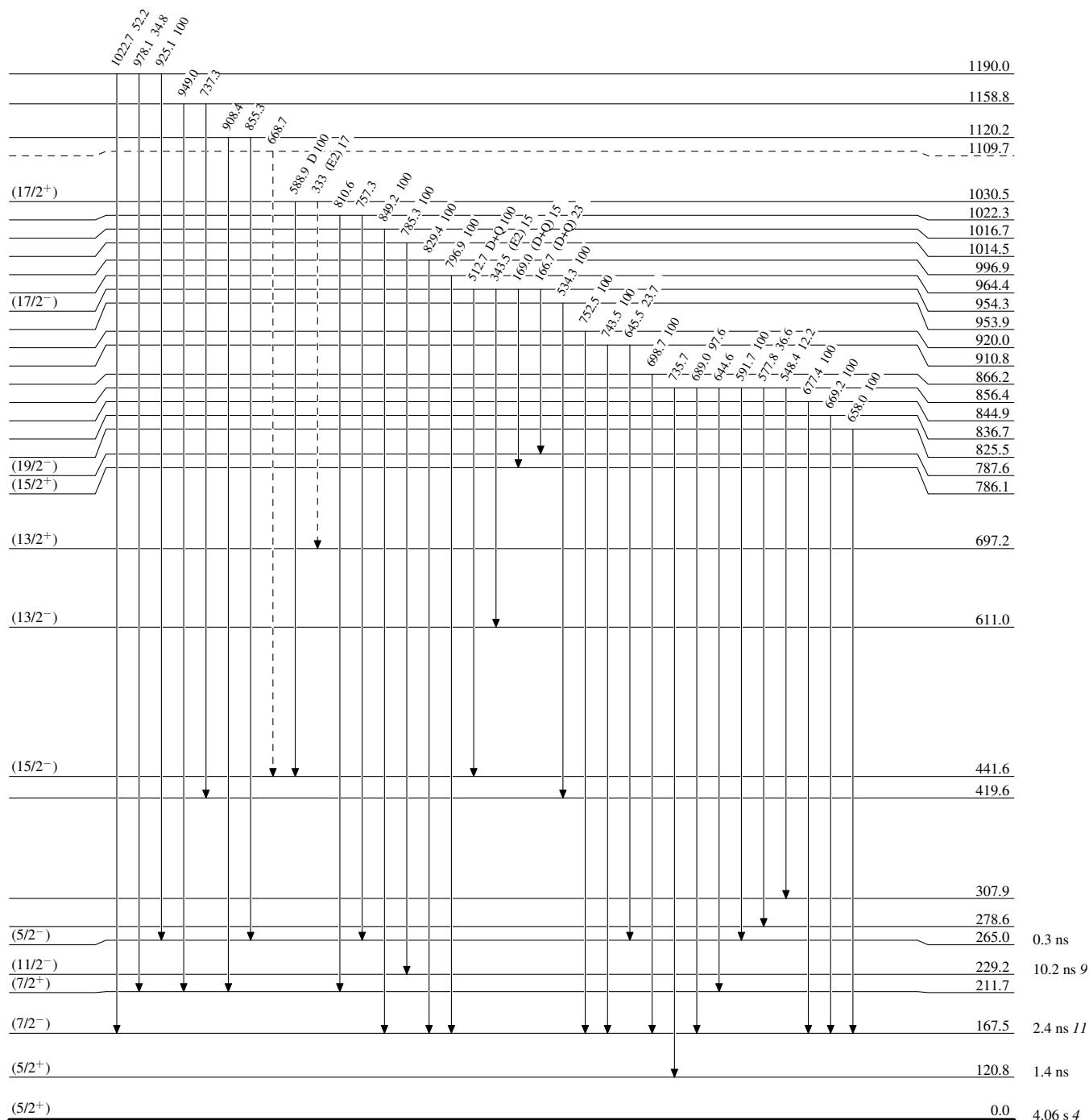
-----► γ Decay (Uncertain)

Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

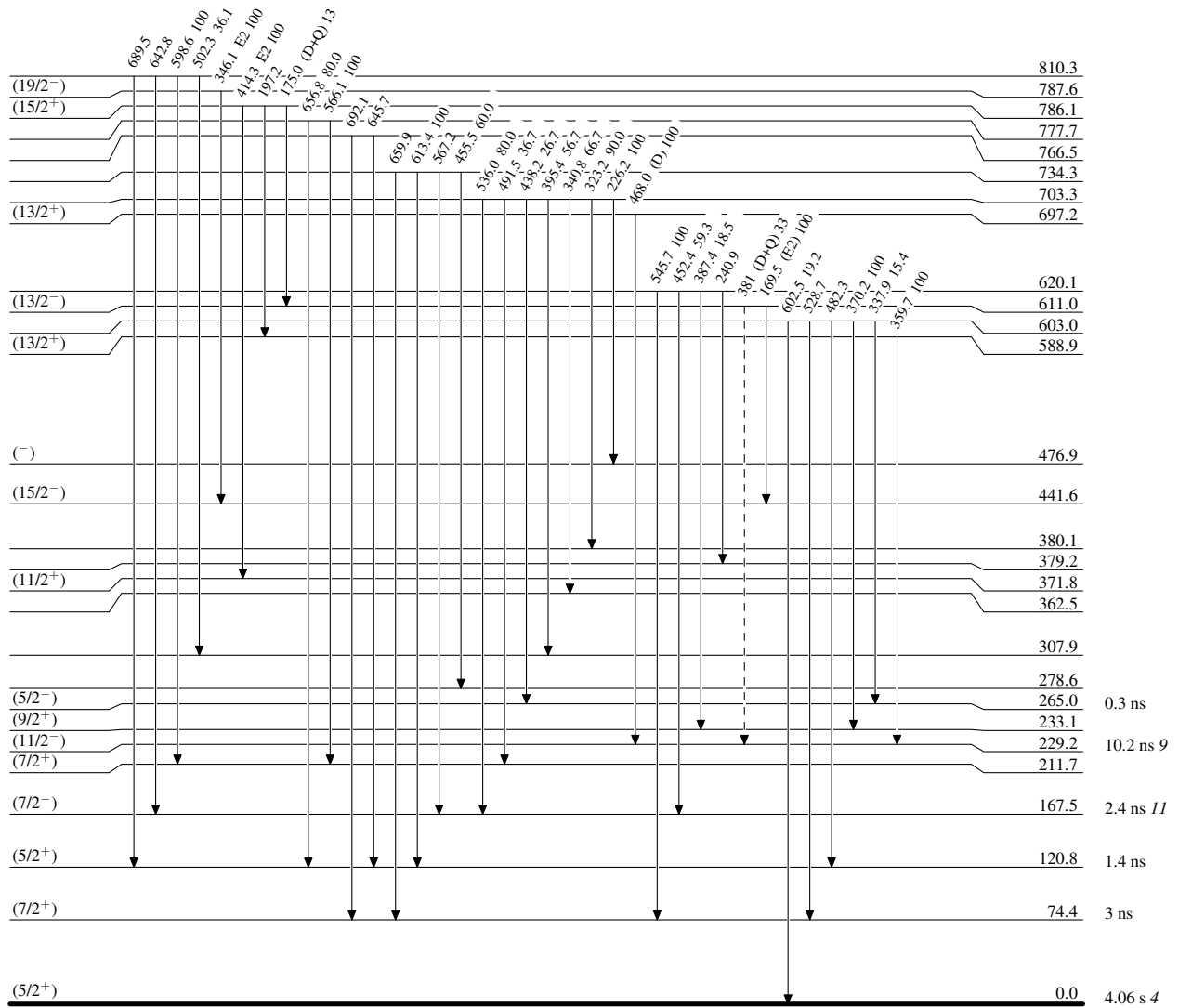
-----► γ Decay (Uncertain)


Adopted Levels, Gammas

Legend

Level Scheme (continued)

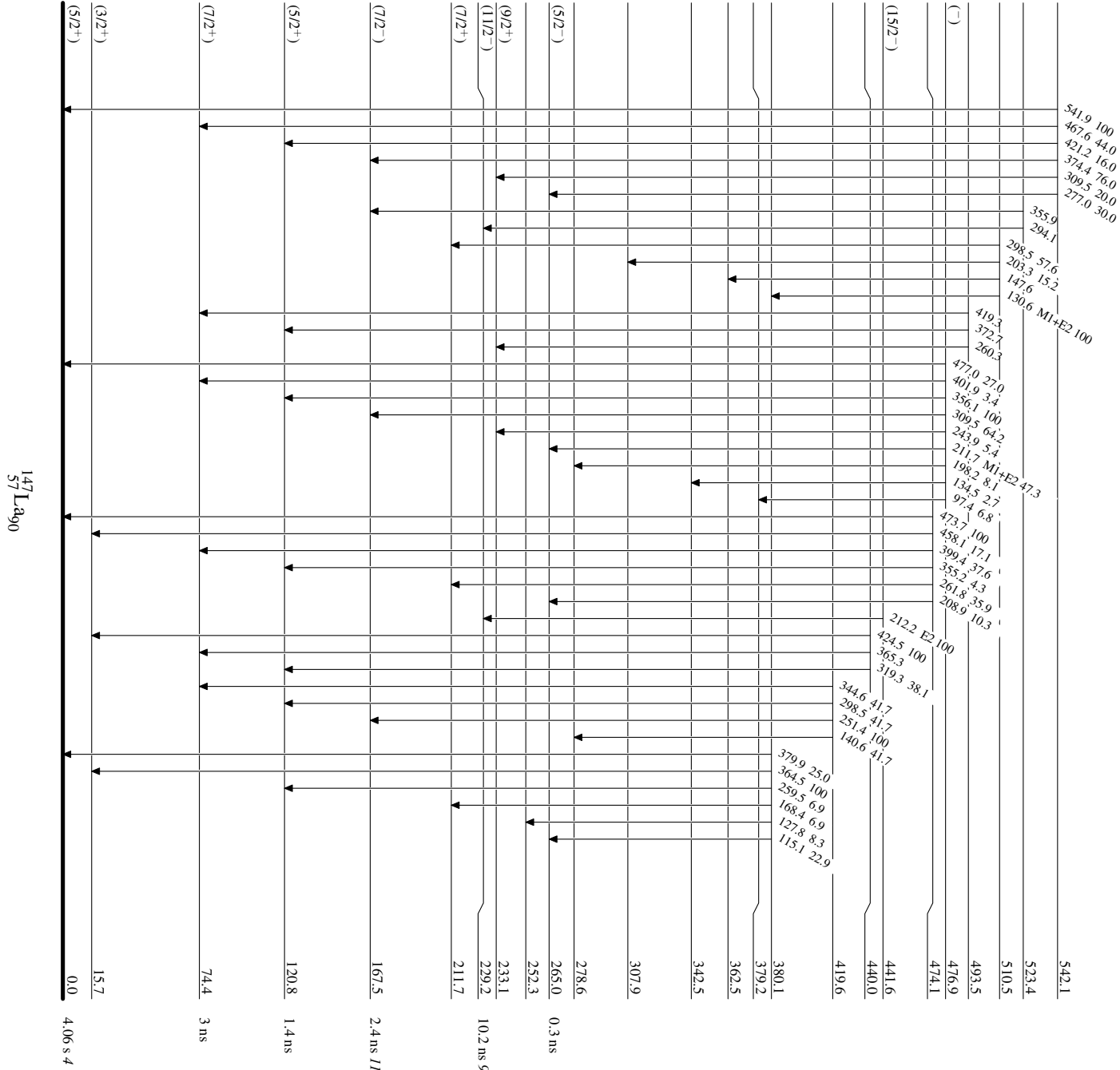
Intensities: Relative photon branching from each level

-----► γ Decay (Uncertain)

 $^{147}_{57}\text{La}_{90}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



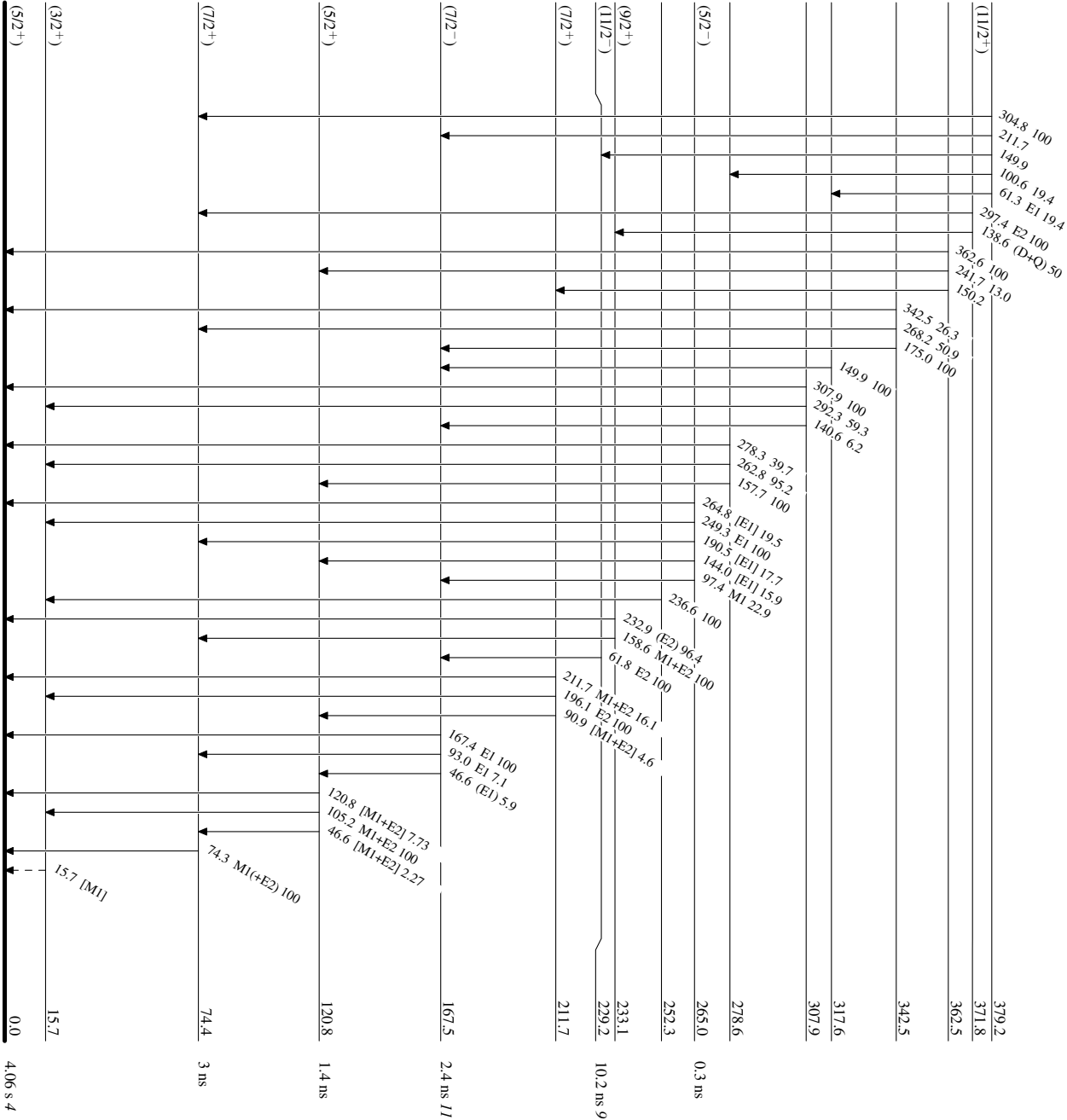
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

-----▶ γ Decay (Uncertain)



Adopted Levels, GammasBand(A): Band s=+i, $\pi=-$ $(47/2^-)$ 4266.7

591

 $(43/2^-)$ 3675.7

500

 $(39/2^-)$ 3176.2

424

 $(35/2^-)$ 2752.7

443

 $(31/2^-)$ 2309.4

539

 $(27/2^-)$ 1770.6

529

 $(23/2^-)$ 1242.0

454

 $(19/2^-)$ 787.6

346

 $(15/2^-)$ 441.6

212

 $(11/2^-)$ 229.2Band(a): Band s=+i, $\pi=+$ $(41/2^+)$ 3549

559

 $(37/2^+)$ 2989.7

470

 $(33/2^+)$ 2519.4

403

 $(29/2^+)$ 2116.0

386

 $(25/2^+)$ 1729.8

372

 $(21/2^+)$ 1358.0

327

 $(17/2^+)$ 1030.5

333

 $(13/2^+)$ 697.2Band(B): Band s=-i, $\pi=+$ $(35/2^+)$ 2732.0

421

 $(31/2^+)$ 2311.1

347

 $(27/2^+)$ 1964.4

375

 $(23/2^+)$ 1589.3

382

 $(19/2^+)$ 1207.7

422

 $(15/2^+)$ 786.1

414

 $(11/2^+)$ 371.8Band(b): Band s=-i, $\pi=-$ $(25/2^-)$ 1895.5 $(21/2^-)$ 1390.8 $(17/2^-)$ 954.3 $(13/2^-)$ 611.0 $^{147}_{57}\text{La}_{90}$