Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Yu. Khazov, A. Rodionov and G. Shulyak	NDS 136, 163 (2016)	14-Jul-2016

Q(β^-)=6590 *30*; S(n)=4280 *40*; S(p)=8820 *30*; Q(α)=−950 *30* 2012Wa38

Produced and identified by 1970Wa05 (1969WiZX,1966WaZX) in the products of the ^{252,254}Cf SF decay. The experimental results obtained in the ^{146}La β^- decay using different properties of three on-line separators OSTIN, LOHENGRIN and JOSEF clearly indicate the existence of the two levels in ^{146}La with lower and higher spins and $T_{1/2}$=6.2 s and $T_{1/2}$=10 s, correspondingly (1978Mo33 and 1978MoYW). Their availability were suggested by other searches (1974Ar17,1977Sk02,1979En02,1979Ke02,1982Br23,1981De25,1993Sh10). J=(6$^-$) for the 10 s isomeric state was firmly established by 1979Ke02 when studying the β- decay of ^{146}La. No electron peaks corresponding to the E4 or M5 transitions of unplaced γ rays had been observed, therefore IT transition must be very weak if present (1993Sh10).

^{146}La Levels

Cross Reference (XREF) Flags

- A ^{146}Ba β^- decay
- B ^{252}Cf,^{254}Cf SF decay
- C ^{235}U(n,Fγ) E=thermal

E(level)†	Jπ‡	$T_{1/2}$#	XREF	Comments
0.0	(2$^-$)	6.1 s *3*	AB	%β^-=100; %β^-n≤0.007 (1983Re10) Jπ: from direct strong β^- feeding (>3%) to 2$^+$, 1$^-$, 3$^-$ levels of ^{146}Ce at 258.5, 924.6, 960.8 keV, correspondingly, shell model. $T_{1/2}$: weighted average of 6.2 s *6* (Iγ(t), 1978MoYW) and 6.0 s *4* (Iγ(t), 1981GoZN). Other: 7 s *2* (1973SeYW).
0.0+x	(6$^-$)	9.8 s *4*	ABC	%β^-=100; %IT=? Additional information 1. %IT: no electron peaks corresponding to the E4 or M5 transitions of unplaced γ rays had been observed, therefore IT transition must be very weak if present (1993Sh10). E(level): x=130 keV *130* evaluated by 2012Au07. Jπ: from strong β^- feeding to known 6$^+$, (5$^-$) levels of ^{146}Ce in ^{146}La β^- decay, shell model (1993Sh10). $T_{1/2}$: weighted average of 10.0 s *4* (Iγ(t), 1978MoYW), 11 s *1* (Iγ(t), 1974Ar17), 9.0 s *6* (Iβ(t), 1979En02). Others: 8.8 s *4* (1969WiZX), 8.5 s *10* (1977Sk02); some of $T_{1/2}$ could be for the admixture of two isomers.
121.16 *5*	1$^-$,2$^-$		A	Jπ: 121.2γ M1+E2 from $\gamma\gamma(\theta)$ to (2$^-$), g.s., small A_2 value for 251γ-212γ cascade in $\gamma\gamma(\theta)$ (1985Ch16), log *ft*>6.2 from 0$^+$.
130.87+x *19*		15 ns *3*	BC	$T_{1/2}$: from coincidence with fission fragment (1981SeZW).
140.84 *5*	(2$^-$)		A	Jπ: 140.7γ M1+E2 from $\gamma\gamma(\theta)$ to (2$^-$), g.s., $\gamma\gamma(\theta)$ correlation analysis (1985Ch16).
144.60 *7*	(3$^-$)		A	Jπ: 144.7γ M1+E2 from $\gamma\gamma(\theta)$ to (2$^-$), g.s. $\gamma\gamma(\theta)$ correlation analysis (1985Ch16).
197.08 *5*	(1$^-$)		A	Jπ: 197.0γ M1+E2 from $\gamma\gamma(\theta)$ to (2$^-$), g.s., direct population (log *ft*=5.7) in β^- decay from 0$^+$.
213.31+x *25*		12 ns *2*	BC	$T_{1/2}$: from coincidence with fission fragment (1981SeZW).
279.0+x *3*			B	
289.75+x *20*		12 ns *2*	B	$T_{1/2}$: from coincidence with fission fragment (1981SeZW).
294.93 *5*	(2)		A	Jπ: 77.7γ from 1$^+$, 144.1γ from 1$^-$, the lack of β feeding to the level (Iβ=0.3% *3*).
326.70 *7*	(3)		A	Jπ: 185.9γ D+Q from $\gamma\gamma(\theta)$ to (2$^-$).
372.51 *4*	1$^+$		A	Jπ: from direct population (log *ft*=4.75) in β^- decay from 0$^+$, 372.5γ to (2$^-$).
392.55 *5*	(2$^+$)		A	Jπ: no direct population in the β-decay but populated by 18 transitions from levels above 600 keV (1985Ch16).
409.89 *8*	(3)		A	Jπ: 114.9γ (M1) to (2), no γ feedings from 1$^+$ levels.
417.56 *6*	(2)		A	Jπ: 272.9γ to (3$^-$), 462.6γ from 1$^+$, 220.7γ to 1$^-$.
429.17 *5*	2$^-$		A	Jπ: 429.3γ M1+E2 to (2$^-$) from $\gamma\gamma(\theta)$.
438.98 *5*	1$^-$		A	Jπ: log *ft*=6.02 value and ground-state γ branch suggest J^π=1$^-$ assignment

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Adopted Levels, Gammas (continued)

^{146}La Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$[#]	XREF	Comments
				(1985Ch16).
443.58 *11*	(1⁻)		A	Jπ: from direct population (log *ft*=6.0) in β^- decay from 0^+, 436.4γ from 1^+.
466.54 *5*	2^+		A	Jπ: 413.6γ M1+E2 from $\gamma\gamma(\theta)$ from 1^+.
488.12 *7*	(1⁻,2⁻)		A	Jπ: 735.8γ from 1^+, 290.6γ to (1⁻), 343.7γ to (3⁻); direct population (log *ft*=6.44) in β^- decay from 0^+.
500.09 *6*	(1⁻,2⁻)		A	Jπ: 380.1γ from 1^+, 355.6γ to (3⁻), direct population (log *ft*=7.1) in β^- decay from 0^+.
574.52 *5*	(1⁻,2)		A	Jπ: 489.8γ from 1^+, 247.8γ to (3), 377.5γ to (1⁻).
577.42+x *25*			B	
619.8+x *4*		≈20 ns	B	$T_{1/2}$: from 1998Hw08, $\gamma\gamma$(T), GAMMASPHERE.
647.09 *5*	1		A	Jπ: population (log *ft*=5.7) in β^- decay from 0^+, decay pattern.
675.13 *7*	(1⁻,2⁻)		A	Jπ: 389.7γ from 1^+, 530.6γ to (3⁻), 478.8γ to (1⁻), direct population (log *ft*=6.35) in β^- decay from 0^+.
686.81 *8*	(1,2⁻)		A	Jπ: 314.0γ to 1^+, 247.5γ to 1⁻, 360.2γ to (3), direct population (log *ft*=6.8) in β^- decay from 0^+.
708.79 *7*	1^+		A	Jπ: 316.3γ D from $\gamma\gamma(\theta)$ to (2^+), 279.5γ, D to 2^-; direct population (log *ft*=5.1) in β^- decay from 0^+.
722.38 *7*	(1⁻,2⁻)		A	Jπ: 283.2γ to 1⁻, 349.5γ to 1^+; direct population (log *ft*=6.11) in β^- decay from 0^+.
757.78 *10*	(1,2⁻)		A	Jπ: 385.4γ to 1^+, 347.6γ to (3), direct population (log *ft*=6.64) in β^- decay from 0^+.
758.1+x *5*			B	
880.22 *5*	1^+		A	Jπ: 413.6γ M1+E2 from $\gamma\gamma(\theta)$ to 2^+, log *ft*=5.0 in β feeding from 0^+.
1005.4 *3*	(1)		A	Jπ: log *ft*=6.4 in β feeding from 0^+.
1028.2+x *5*			B	
1041.37 *10*	(1)		A	Jπ: log *ft*=6.1 in β feeding from 0^+.
1064.50 *5*	1^+		A	Jπ: log *ft*=5.0 in β feeding from 0^+, 598.4γ to 2^+, 635.2γ to 2^-.
1181.76 *8*	1^+		A	Jπ: log *ft*=5.3 in β feeding from 0^+, 715.3γ to 2^+, 752.6γ to 2^-.
1190.38 *8*	1^+		A	
1224.06 *9*	1^+		A	
1268.94 *6*	1^+		A	
1308.43 *15*	(1)		A	
1415.73 *9*	(1)		A	
1425.3+x *6*			B	
1443.44 *6*	1^+		A	
1469.12 *6*	1^+		A	
1481.45 *7*	1^+		A	
1507.68 *11*			A	
1534.39 *6*	1^+		A	
1606.43 *24*			A	
1624.35 *7*	1^+		A	
1650.77 *8*			A	
1693.31 *12*			A	
1722.30 *14*			A	
1777.68 *14*	1^+		A	
1882.08 *19*			A	
1935.1+x *7*			B	
2060.51 *24*			A	
2165.88 *17*	1^+		A	
2541.2+x *8*			B	

[†] From a least-squares fit to Eγ's, normalized χ^2=1.6. If ΔEγ not given, ±0.50 keV assumed by the evaluators. Eleven transition energies were not used in the fitting because their values differ from the intervals between the corresponding levels by more than three uncertainties. See the commentary to the transitions.

[‡] Based on 4.8≤log *ft*≤6.2 values in ^{146}Ba, $J^\pi=0^+$ β^- decay, decay pattern and/or angular correlations (1985Ch16), unless

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Adopted Levels, Gammas (continued)

^{146}La Levels (continued)

indicated otherwise.
[#] From Iγ(t) in ^{254}Cf SF decay (1981SeZW) except as noted.

Adopted Levels, Gammas (continued)

γ(^{146}La)

E_i(level)	J_i^π	E_γ[†]	I_γ[#]	E_f	J_f^π	Mult.[@]	δ[b]	α[a]	Comments
121.16	1⁻,2⁻	121.2 *1*	100	0.0	(2⁻)	M1+E2	+0.04 *10*	0.627 *12*	E_γ: 121.169 *3* (1979Bo26, curved cryst).
130.87+x		130.73 *22*	100	0.0+x	(6⁻)	E2		0.771	
140.84	(2⁻)	140.7 *1*	100	0.0	(2⁻)	M1+E2	−0.66 *+11−15*	0.468 *19*	E_γ: 140.511 *14* (1979Bo26, curved cryst).
144.60	(3⁻)	(4.0)	0.20 *6*	140.84	(2⁻)				
		144.7 *1*	100 *3*	0.0	(2⁻)	M1+E2	+0.61 *10*	0.424 *12*	
197.08	(1⁻)	56.4 *1*	6.0 *6*	140.84	(2⁻)	(M1+E2)		11 *6*	
		75.9 *1*	1.0 *1*	121.16	1⁻,2⁻				
		197.0 *1*	100 *3*	0.0	(2⁻)	M1+E2	−0.10 *+13−15*	0.1630 *25*	E_γ: 197.316 *7* (1979Bo26, curved cryst).
213.31+x		82.23 *21*	100	130.87+x		D,E2[&]			
279.0+x		148.2 *3*	100	130.87+x		D,E2[&]			
289.75+x		158.91 *15*		130.87+x					
		290.0 *3*		0.0+x	(6⁻)				
294.93	(2)	97.7 *1*	6.8 *5*	197.08	(1⁻)				
		294.9 *3*	100 *3*	0.0	(2⁻)				
326.70	(3)	182.2 *2*	18 *5*	144.60	(3⁻)				
		185.9 *1*	100 *3*	140.84	(2⁻)	D+Q	−0.01 *+10−9*		
		326.3 *2*	23 *7*	0.0	(2⁻)				
372.51	1⁺	77.7 *1*	4.6 *5*	294.93	(2)				
		175.3 *1*	24.5 *6*	197.08	(1⁻)	(E1)		0.0500	E_γ: 175.338 *6* (1979Bo26, curved cryst).
		231.6 *1*	55.0 *12*	140.84	(2⁻)	(E1)		0.0235	E_γ: 231.805 *2* (1979Bo26, curved cryst).
		251.2 *1*	100 *3*	121.16	1⁻,2⁻	(E1)		0.0189	E_γ: 251.144 *17* (1979Bo26, curved cryst).
		372.5 *1*	5.1 *7*	0.0	(2⁻)	(E1)		0.00690	
392.55	(2⁺)	392.5 *1*	100	0.0	(2⁻)	D+Q			E_γ: 393.251 *32* (1979Bo26, curved cryst).
409.89	(3)	114.9 *1*	100	294.93	(2)	(M1)		0.728	
417.56	(2)	220.7 *1*	17 *1*	197.08	(1⁻)				
		272.9 *3*	20 *4*	144.60	(3⁻)				
		417.5 *1*	100 *6*	0.0	(2⁻)				
429.17	2⁻	284.5 *3*	45.0 *14*	144.60	(3⁻)	M1+E2	+0.39 *+15−35*	0.0601 *11*	
		429.3 *2*	100 *3*	0.0	(2⁻)	M1+E2	+0.66 *+10−12*	0.0194 *5*	
438.98	1⁻	144.1 *1*	7.3 *11*	294.93	(2)				
		241.8 *3*	66 *2*	197.08	(1⁻)	M1+E2	−0.22 *8*	0.0936	E_γ: 241.652 *37* (1979Bo26, curved cryst).
		298.0 *1*	100.0 *23*	140.84	(2⁻)	D(+Q)	−0.009 *+10−9*		E_γ: 298.794 *16* (1979Bo26, curved cryst).
		317.9 *3*	9.3 *20*	121.16	1⁻,2⁻				
		439.0 *1*	32.0 *13*	0.0	(2⁻)				
443.58	(1⁻)	148.7	12.5 *21*	294.93	(2)				
		246.6 *3*	100 *6*	197.08	(1⁻)				
		322.2 *2*	52 *8*	121.16	1⁻,2⁻				
		443.5 *2*	46 *8*	0.0	(2⁻)				
466.54	2⁺	94.0 *1*	3.0 *3*	372.51	1⁺				
		139.8 *1*	21.0 *7*	326.70	(3)				
		171.6 *1*	9.0 *13*	294.93	(2)				
		269.6 *3*	100 *3*	197.08	(1⁻)	D			E_γ: 269.519 *45* (1979Bo26, curved cryst).

$^{146}_{57}La_{89}$-4

Adopted Levels, Gammas (continued)

γ(^{146}La) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[#]	E_f	J_f^π	Mult.[@]	Comments
466.54	2^+	466.8[c] *1*	20[c] *7*	0.0	(2^-)		
488.12	$(1^-,2^-)$	193.3	5 *1*	294.93	(2)		
		290.6 *3*	42 *5*	197.08	(1^-)		
		343.7 *3*	11 *1*	144.60	(3^-)		
		488.0 *1*	100 *9*	0.0	(2^-)		
500.09	$(1^-,2^-)$	173.3	13.0 *14*	326.70	(3)		
		355.6[c] *3*	100[c] *6*	144.60	(3^-)		
		359.1 *2*	35 *7*	140.84	(2^-)		
		500.1 *1*	37 *6*	0.0	(2^-)		
574.52	$(1^-,2)$	107.9 *1*	9.6 *12*	466.54	2^+		
		145.3 *1*	21 *4*	429.17	2^-		
		164.6 *1*	35 *5*	409.89	(3)		
		247.8 *3*	60 *5*	326.70	(3)		
		279.5[c] *1*	27[c] *4*	294.93	(2)		
		377.5 *1*	100 *5*	197.08	(1^-)		
		433.6 *4*	16 *8*	140.84	(2^-)		
		574.5 *1*	59 *5*	0.0	(2^-)		
577.42+x		287.96 *26*		289.75+x			
		364.00 *15*		213.31+x			
619.8+x		(42.3 *3*)		577.42+x			
		340.8 *3*		279.0+x			
647.09	1	146.9 *1*	21 *4*	500.09	$(1^-,2^-)$		
		158.9 *1*	37 *3*	488.12	$(1^-,2^-)$		
		180.3	17 *3*	466.54	2^+		
		208.5 *2*	16 *4*	438.98	1^-		
		218.0 *2*	30 *3*	429.17	2^-		
		254.4	21 *4*	392.55	(2^+)		
		274.3 *1*	91 *11*	372.51	1^+		
		352.0 *1*	39 *4*	294.93	(2)		
		450.0 *1*	100 *6*	197.08	(1^-)		
		506.2	17 *3*	140.84	(2^-)		
675.13	$(1^-,2^-)$	478.8[‡] *2*	72 *12*	197.08	(1^-)		E_γ: poor fit: the energy level difference equals 478.07 *8*.
		530.6 *1*	100 *8*	144.60	(3^-)		
		534.1 *1*	96 *16*	140.84	(2^-)		
686.81	$(1,2^-)$	198.4	26 *3*	488.12	$(1^-,2^-)$		
		247.5	39 *6*	438.98	1^-		
		314.0 *1*	100 *10*	372.51	1^+		
		360.2 *3*	45 *16*	326.70	(3)		
708.79	1^+	209.1	3.6 *7*	500.09	$(1^-,2^-)$		
		270.9[‡] *3*	33.9 *18*	438.98	1^-		E_γ: poor fit: the energy level difference equals 269.80 *7*.
		279.5[c] *1*	100[c] *4*	429.17	2^-	D	
		291.5 *3*	25 *4*	417.56	(2)		
		316.3 *1*	68 *4*	392.55	(2^+)	D	

$^{146}_{57}La_{89}$-5

Adopted Levels, Gammas (continued)

γ(^{146}La) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[#]	E_f	J_f^π	Mult.[@]	δ[b]	α[a]	Comments
708.79	1$^+$	335.8 *2*	6.5 *14*	372.51	1$^+$				
		511.9	11.6 *11*	197.08	(1$^-$)				
		568.2 *2*	7.2 *18*	140.84	(2$^-$)				
722.38	(1$^-$,2$^-$)	283.2 *3*	21 *6*	438.98	1$^-$				
		349.5 *3*	96 *2*	372.51	1$^+$				
		525.7 *2*	19 *8*	197.08	(1$^-$)				
		722.5 *1*	100 *10*	0.0	(2$^-$)				
757.78	(1,2$^-$)	347.6 *4*	100 *19*	409.89	(3)				
		385.4 *1*	100 *15*	372.51	1$^+$				
		617.0	38 *8*	140.84	(2$^-$)				
758.1+x		138.3 *3*	100	619.8+x					
880.22	1$^+$	380.1 *3*	15 *3*	500.09	(1$^-$,2$^-$)				
		413.6 *1*	100 *4*	466.54	2$^+$	M1+E2	−0.33 +*8*−*9*	0.0225 *5*	
		436.4 *2*	14 *4*	443.58	(1$^-$)				
		441.2 *1*	86 *4*	438.98	1$^-$				
		462.6 *2*	10.0 *19*	417.56	(2)				
		487.7	36 *4*	392.55	(2$^+$)	D			
		507.8 *3*	46 *8*	372.51	1$^+$	M1+E2	+0.37 +*18*−*13*	0.0133 *5*	
		585.6 *2*	13.8 *19*	294.93	(2)				
		683.4 *2*	11.3 *25*	197.08	(1$^-$)				
		759.1 *1*	39 *4*	121.16	1$^-$,2$^-$				
		880.2 *1*	41.9 *25*	0.0	(2$^-$)				
1005.4	(1)	296.5	62 *40*	708.79	1$^+$				
		612.9 *3*	100 *30*	392.55	(2$^+$)				
1028.2+x		270.1 *2*	100	758.1+x					
1041.37	(1)	466.8[c] *1*	100[c] *16*	574.52	(1$^-$,2)				
		669.1 *2*	61 *30*	372.51	1$^+$				
1064.50	1$^+$	342.3 *1*	57.6 *4*	722.38	(1$^-$,2$^-$)				
		355.6[c] *3*	14.1[c] *2*	708.79	1$^+$				
		389.7 *2*	27.3 *6*	675.13	(1$^-$,2$^-$)				
		489.8 *1*	58 *4*	574.52	(1$^-$,2)				
		564.4 *1*	39 *5*	500.09	(1$^-$,2$^-$)				
		576.3 *2*	14 *4*	488.12	(1$^-$,2$^-$)				
		598.4 *2*	19 *5*	466.54	2$^+$				
		635.2 *1*	40 *4*	429.17	2$^-$				
		672.0	11 *3*	392.55	(2$^+$)				
		692.0 *1*	100 *4*	372.51	1$^+$				
		768.9[‡] *2*	15.2	294.93	(2)				E_γ: poor fit: the energy level difference equals 769.57 *7*.
		1064.7[‡] *1*	58 *12*	0.0	(2$^-$)				E_γ: poor fit: the energy level difference equals 1064.47 *5*.
1181.76	1$^+$	301.4 *3*	24 *5*	880.22	1$^+$				
		607.8[‡] *1*	44 *8*	574.52	(1$^-$,2)				E_γ: poor fit: the energy level difference equals 607.23 *8*.
		681.8 *4*	21 *6*	500.09	(1$^-$,2$^-$)				

$^{146}_{57}La_{89}$-6

Adopted Levels, Gammas (continued)

γ(^{146}La) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[#]	E_f	J_f^π	Comments
1181.76	1+	715.3 *2*	29 *6*	466.54	2+	
		742.8 *2*	34 *5*	438.98	1−	
		752.6 *1*	100 *10*	429.17	2−	
		764.3	16 *3*	417.56	(2)	
		788.8 *2*	16 *3*	392.55	(2+)	
		809.0 *2*	47 *10*	372.51	1+	
		1061.4 *3*	17.7 *16*	121.16	1−,2−	
		1182.3 *4*	9.7 *30*	0.0	(2−)	
1190.38	1+	431.4[‡] *3*	26.5 *24*	757.78	(1,2−)	E_γ: poor fit: the energy level difference equals 432.60 *12*.
		502.8	21 *7*	686.81	(1,2−)	E_γ: poor fit: the energy level difference equals 503.57 *11*.
		702.0	34 *4*	488.12	(1−,2−)	
		724.0 *1*	100 *6*	466.54	2+	
		750.8 *3*	25 *7*	438.98	1−	
		760.8 *3*	7.2 *12*	429.17	2−	
		818.0 *2*	21.7 *24*	372.51	1+	
		993.2 *2*	30.1 *24*	197.08	(1−)	
		1049.2 *4*	7 *4*	140.84	(2−)	
1224.06	1+	735.8 *2*	55 *5*	488.12	(1−,2−)	
		785.2	100 *30*	438.98	1−	
		795.2 *2*	73 *14*	429.17	2−	
		851.5[c] *1*	45[c] *5*	372.51	1+	
1268.94	1+	388.5 *2*	56.8 *14*	880.22	1+	
		546.4 *3*	18 *7*	722.38	(1−,2−)	
		621.6 *2*	48 *7*	647.09	1	
		802.5 *2*	100 *10*	466.54	2+	
		829.9	9.1 *23*	438.98	1−	
		851.5[c] *1*	11.4[c] *23*	417.56	(2)	
		876.5 *1*	36.4 *23*	392.55	(2+)	
		896.7 *2*	50 *5*	372.51	1+	
		973.8 *1*	22.7 *23*	294.93	(2)	
		1128.1	30 *5*	140.84	(2−)	
1308.43	(1)	550.9	27 *4*	757.78	(1,2−)	
		733.9 *3*	42 *15*	574.52	(1−,2)	
		842.0 *2*	100 *12*	466.54	2+	
		869.1 *3*	65 *30*	438.98	1−	
1415.73	(1)	841.0 *2*	100 *16*	574.52	(1−,2)	
		1023.0 *2*	47 *11*	392.55	(2+)	
		1043.3 *1*	90 *5*	372.51	1+	
1425.3+x		397.1 *3*	100	1028.2+x		
1443.44	1+	868.8 *2*	49 *9*	574.52	(1−,2)	
		943.4 *1*	24.7 *12*	500.09	(1−,2−)	
		955.3 *3*	11.8 *24*	488.12	(1−,2−)	
		976.8 *1*	25.9 *24*	466.54	2+	

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Adopted Levels, Gammas (continued)

γ(^{146}La) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[#]	E_f	J_f^π	Comments
1443.44	1+	1003.8[‡] *2*	11.8 *12*	438.98	1−	E_γ: poor fit: the energy level difference equals 1004.50 *7*.
		1050.9 *4*	27 *3*	392.55	(2+)	
		1070.8 *1*	100 *5*	372.51	1+	
		1148.7 *1*	11.8 *12*	294.93	(2)	
		1247.0[‡] *2*	11.8 *12*	197.08	(1−)	E_γ: poor fit: the energy level difference equals 1246.42 *6*.
1469.12	1+	821.8 *1*	50.0 *22*	647.09	1	
		894.6 *1*	100 *17*	574.52	(1−,2)	
		981.2	3.3 *11*	488.12	(1−,2−)	
		1002.0 *3*	6.6 *22*	466.54	2+	
		1040.1 *1*	26.7 *11*	429.17	2−	
		1076.5 *1*	35.6 *22*	392.55	(2+)	
		1097.1 *2*	23 *10*	372.51	1+	
		1174.5 *3*	20 *3*	294.93	(2)	
		1328.5	5.6 *11*	140.84	(2−)	
1481.45	1+	773.0 *4*	34 *14*	708.79	1+	
		834.2 *2*	66 *14*	647.09	1	
		1052.4 *2*	97 *3*	429.17	2−	
		1088.9 *1*	76 *3*	392.55	(2+)	
		1108.9 *1*	100 *3*	372.51	1+	
		1341.2	72 *10*	140.84	(2−)	
1507.68		1068.9	32 *5*	438.98	1−	
		1078.5 *1*	100 *11*	429.17	2−	
1534.39	1+	847.3 *1*	42.2 *11*	686.81	(1,2−)	
		887.1 *1*	38.9 *22*	647.09	1	
		1068.0 *1*	62.2 *22*	466.54	2+	
		1095.5 *1*	100 *3*	438.98	1−	
		1105.3 *1*	56.7 *11*	429.17	2−	
		1142.2 *5*	5.6 *22*	392.55	(2+)	
		1162.0 *1*	24.4 *11*	372.51	1+	
		1337.1 *6*	6.7 *22*	197.08	(1−)	
1606.43		565.4 *5*	55 *18*	1041.37	(1)	
		1213.8	100 *18*	392.55	(2+)	
		1311.4 *3*	73 *18*	294.93	(2)	
1624.35	1+	745.2[‡] *2*	44 *11*	880.22	1+	E_γ: poor fit: the energy level difference equals 744.13 *8*.
		867.0 *2*	63 *19*	757.78	(1,2−)	
		915.5 *2*	59 *7*	708.79	1+	
		949.0 *1*	19 *4*	675.13	(1−,2−)	
		1186.7[‡] *1*	100 *4*	438.98	1−	E_γ: poor fit: the energy level difference equals 1185.36 *8*.
		1195.4	74 *7*	429.17	2−	
		1207.2	41 *7*	417.56	(2)	
		1231.6 *2*	26 *4*	392.55	(2+)	
		1484.0	81 *11*	140.84	(2−)	

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Adopted Levels, Gammas (continued)

γ(^{146}La) (continued)

E_i(level)	J_i^π	E_γ †	I_γ #	E_f	J_f^π	Comments
1624.35	1+	1503.3 *1*	100 *7*	121.16	1−,2−	
1650.77		1184.2 *1*	89 *6*	466.54	2+	
		1211.8 *1*	100 *30*	438.98	1−	
		1258.2	33 *6*	392.55	(2+)	
		1453.7	39 *6*	197.08	(1−)	
1693.31		814.2 *4*	67 *30*	880.22	1+	
		1226.8 *2*	33 *7*	466.54	2+	
		1253.7 *2*	93 *7*	438.98	1−	
		1321.1 *2*	100 *7*	372.51	1+	
		1495.0‡ *2*	80 *13*	197.08	(1−)	E_γ: poor fit: the energy level difference equals 1496.24 *12*.
1722.30		1013.4 *2*	65 *25*	708.79	1+	
		1283.4 *3*	45 *5*	438.98	1−	
		1350.1 *3*	100 *15*	372.51	1+	
		1427.2 *3*	45 *5*	294.93	(2)	
		1525.2	25 *5*	197.08	(1−)	
1777.68	1+	1203.4 *2*	80 *14*	574.52	(1−,2)	
		1339.0 *3*	100 *14*	438.98	1−	
		1384.9	100 *14*	392.55	(2+)	
		1405.0 *3*	50 *14*	372.51	1+	
		1481.8 *4*	71 *14*	294.93	(2)	
		1656.2	43 *7*	121.16	1−,2−	
1882.08		1443.1 *2*	100 *30*	438.98	1−	
		1489.5	32 *5*	392.55	(2+)	
1935.1+x		509.8 *3*	100	1425.3+x		
2060.51		1642.9 *3*	100 *19*	417.56	(2)	
		1919.8	15 *4*	140.84	(2−)	
		1939.3	23 *4*	121.16	1−,2−	
2165.88	1+	1102.0 *3*	89 *11*	1064.50	1+	
		1456.8	100 *22*	708.79	1+	
		1773.2	44 *11*	392.55	(2+)	
		1870.5 *3*	89 *22*	294.93	(2)	
		2044.6 *4*	89 *22*	121.16	1−,2−	
2541.2+x		606.1 *3*	100	1935.1+x		

† From ^{146}Ba β^- decay and ^{252,254}Cf SF decay. $\Delta E\gamma$=0.5 keV assumed by the evaluators, unless indicated otherwise.
‡ Energy of γ ray is not used in a least-squares fitting.
# Relative Iγ branching from each level.
@ From γγ(θ) and α(exp), except as noted.
& From RUL.
a Additional information 2.

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Adopted Levels, Gammas (continued)

$\gamma(^{146}La)$ (continued)

[b] From $\gamma\gamma(\theta)$ (1985Ch16). If no value given it was assumed δ=1.00 for E2/M1.
[c] Multiply placed with undivided intensity.

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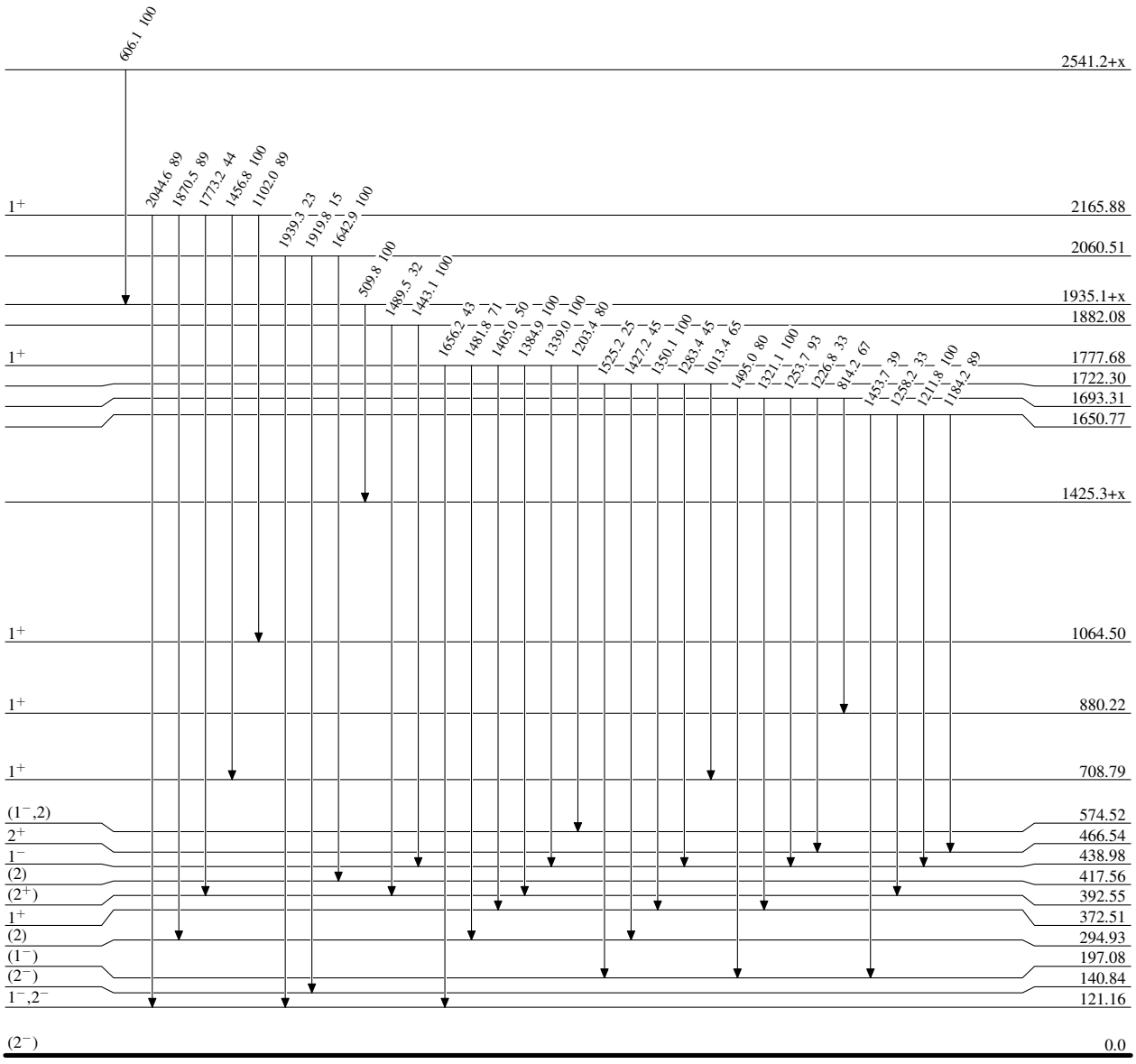
Adopted Levels, Gammas

Level Scheme

Intensities: Relative photon branching from each level



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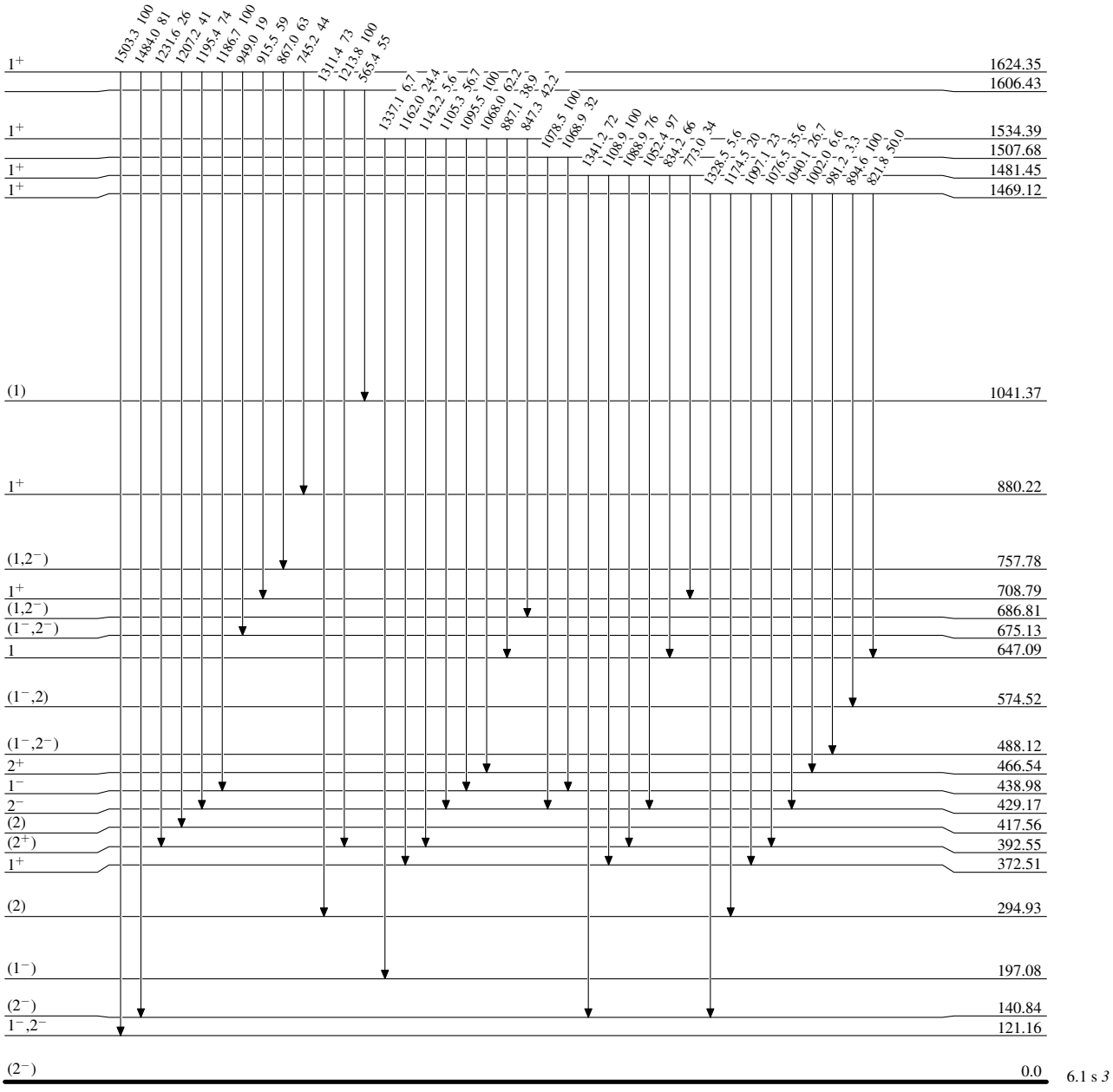
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



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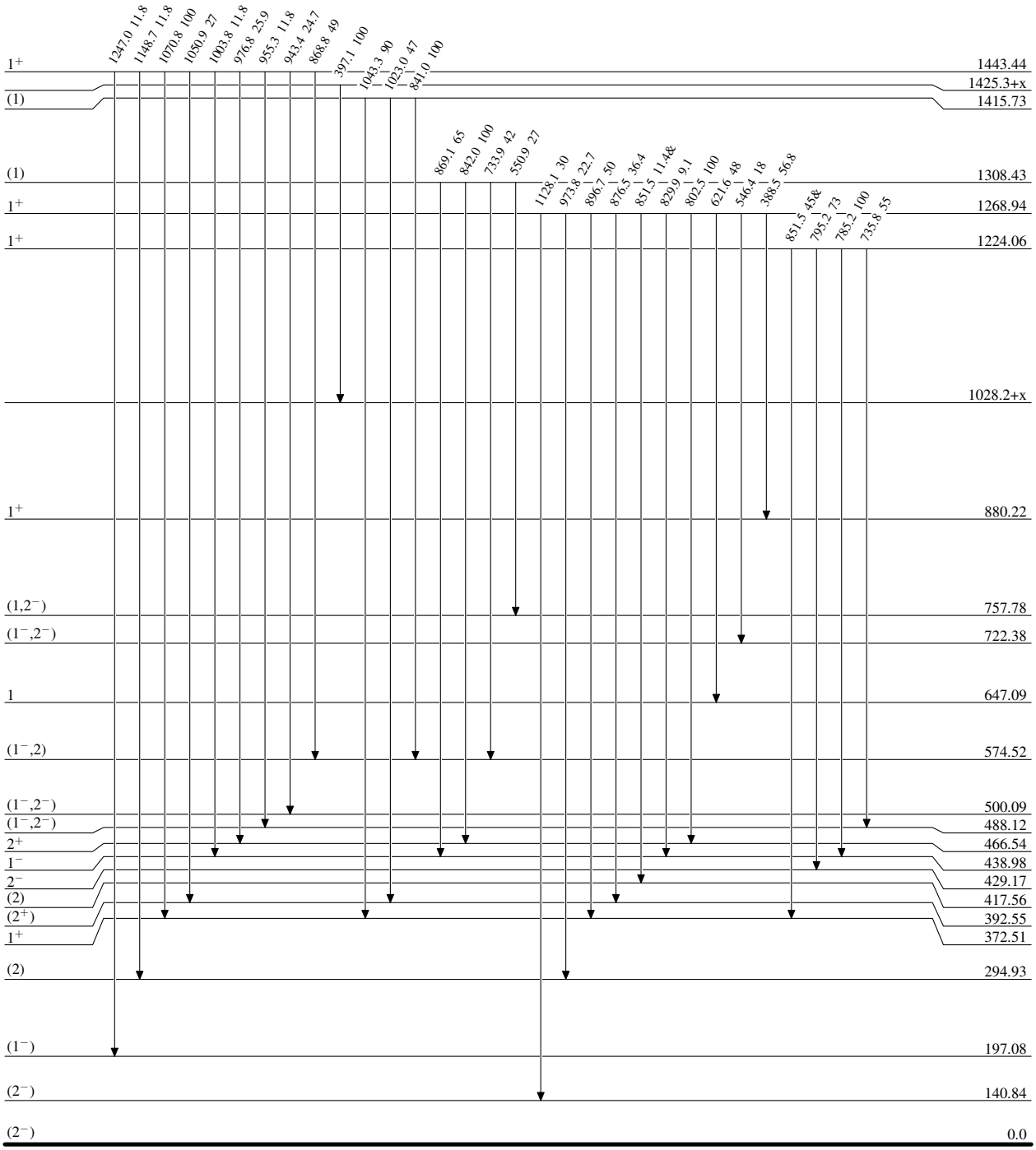
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given



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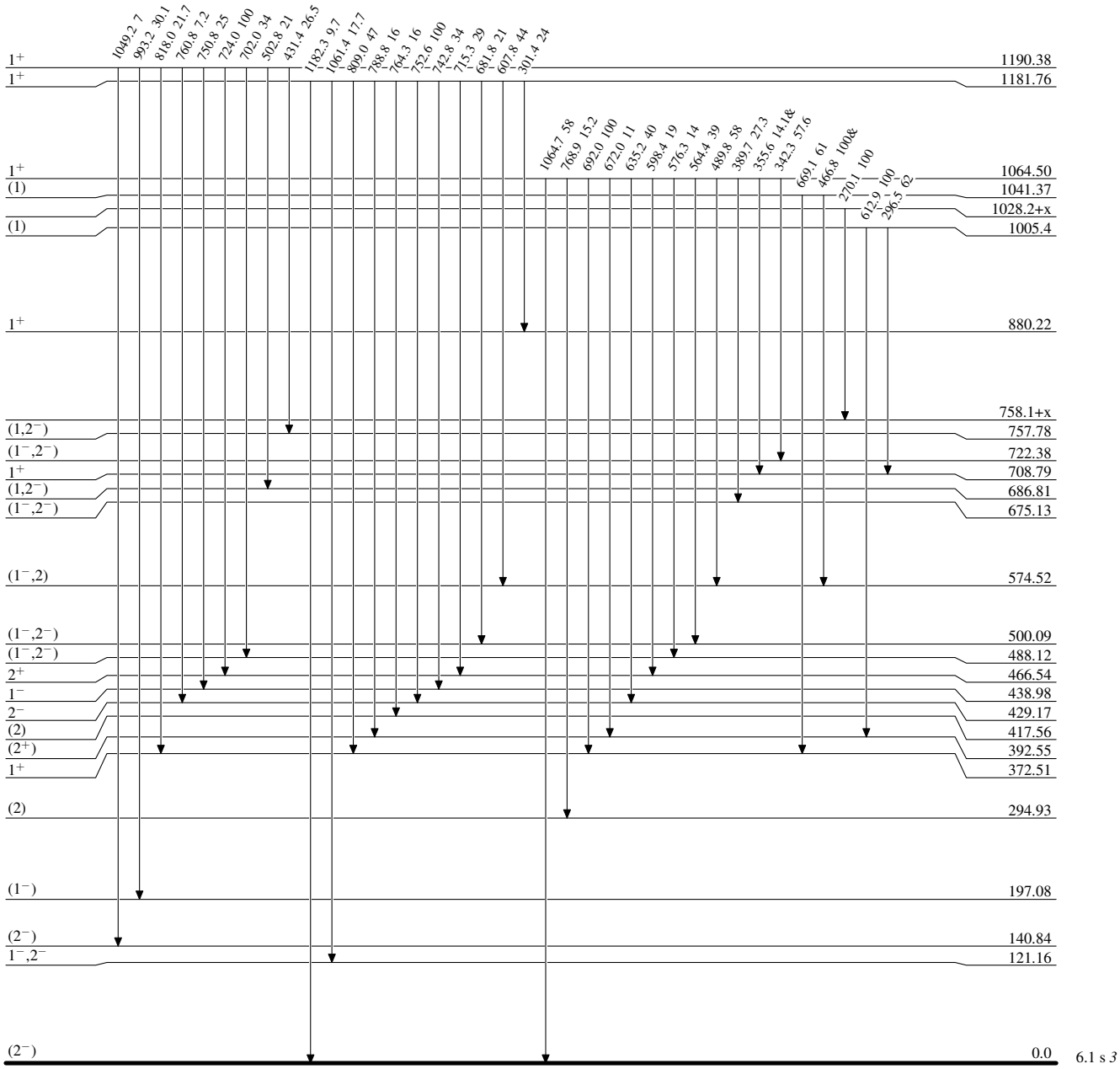
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given



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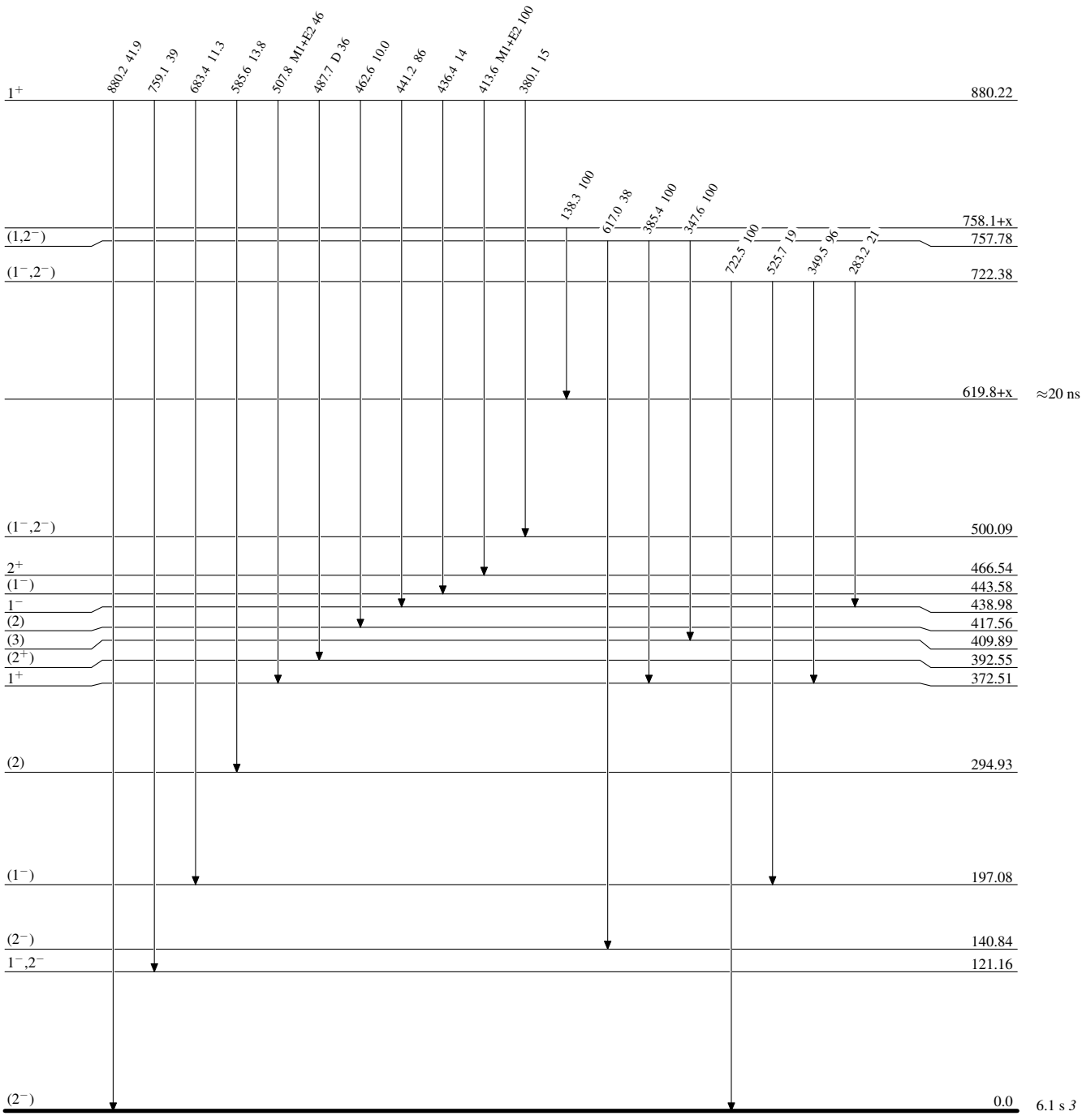
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given



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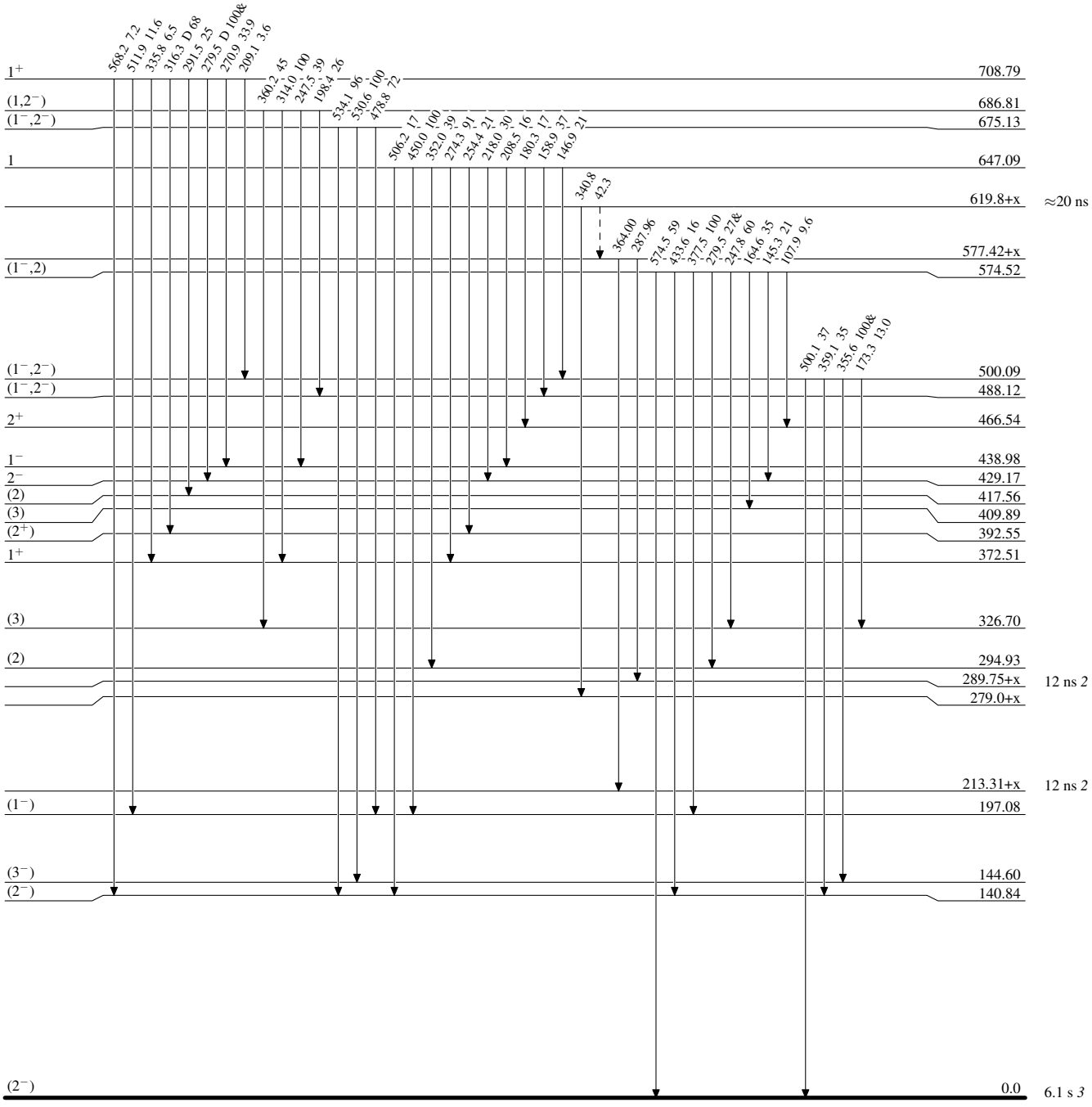
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given

γ Decay (Uncertain)



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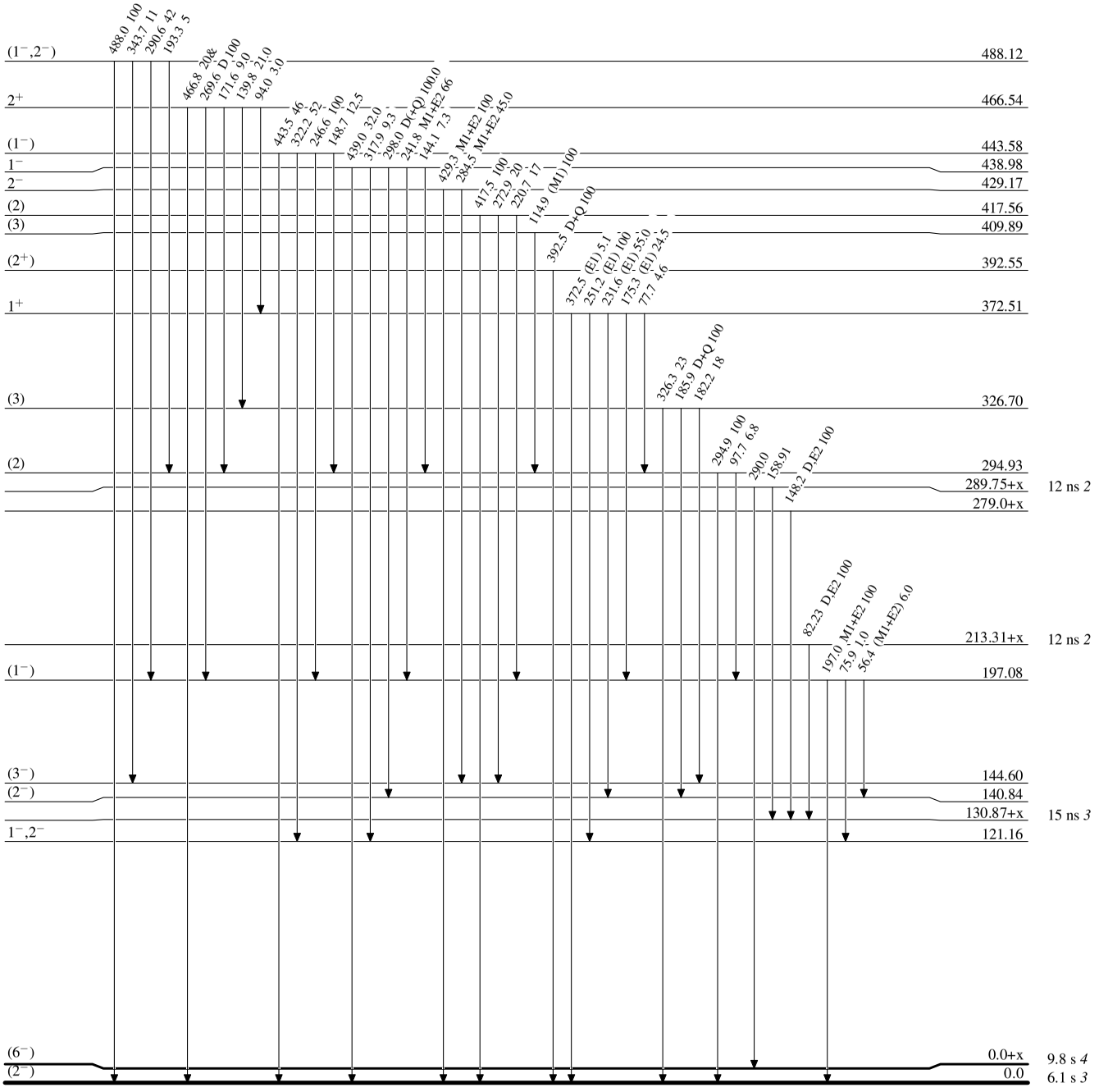
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given



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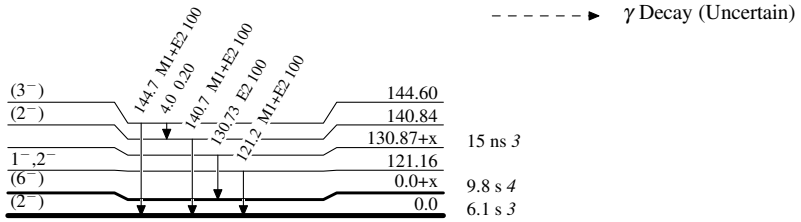
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given



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