

Adopted Levels, Gammas

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	Zoltan Elekes and Janos Timar		NDS 129, 191 (2015)	28-Feb-2015

Q(β^-)=-3090 60; S(n)=8800 60; S(p)=3100 60; Q(α)=680 60 2012Wa38
 S(2n)=19790 110, S(2p)=8850 60 (2012Wa38).
 Assignment: ¹³⁰Ba(p,3n) E=35 MeV, chemical separation (1966Pa06); Sn(¹²C,xn) chemical separation (1963Ya05); In(¹⁶O,xn) E=66.4 MeV, chemical separation (1963Pr02).

¹²⁸La Levels

Cross Reference (XREF) Flags

- A ¹²⁸Ce ϵ decay
- B (HL,xny)

E(level) [†]	J ^{π} [‡]	T _{1/2} [#]	XREF	Comments
0.0	(5 ⁺)	5.18 min 14	B	$\% \epsilon + \% \beta^+ = 100$. J ^{π} : first-forbidden (non-unique or unique) transitions to 4 ⁺ and 7 ⁻ suggest 5 ⁺ or 6 ⁻ . From band systematics 5 ⁺ is favored. It is not established whether this state is the g.s. or the (1 ⁺ ,2 ⁻) isomer with half-life of <1.4 min.
0.0+x	(1 ⁺ ,2 ⁻)	<1.4 min	A	$\% \epsilon + \% \beta^+ = 100$. J ^{π} : β^- feeding to 0 ⁺ , no β^- feeding to 3 ⁺ . Additional information 1.
6.1 ^c 5	(6 ⁻)		B	
37.01 [@] 24	(6 ⁺)			
84.99 ^{&} 24	(7 ⁺)		B	
88.0 ^d 4	(7 ⁻)		B	
104.05+x 11			A	
146.79+x 10			A	
151.0 [@] 3	(8 ⁺)		B	
203.5 ^e 5	(7 ⁻)		B	
207.8 ^c 4	(8 ⁻)		B	
219.21+x 13			A	
221.82+x 13			A	
255.2 ^{&} 3	(9 ⁺)		B	
256.17+x 25			A	
267.45+x 15			A	
270.81+x 16			A	
282.17+x 16			A	
305.99+x 17			A	
323.60+x 16			A	
338.19+x 15			A	
340.46+x 20			A	
347.49+x 17			A	
381.2 ^d 4	(9 ⁻)		B	
393.6 [@] 4	(10 ⁺)		B	
401.84+x 20			A	
409.95+x 17			A	
439.87+x 17			A	
502.96+x 23			A	
514.25+x 20			A	
520.16+x 19			A	

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{128}La Levels (continued)

E(level) [†]	J ^{π‡}	XREF	E(level) [†]	J ^{π‡}	XREF	E(level) [†]	J ^{π‡}	XREF
523.8+x 4		A	1479.5 ^d 4	(13 ⁻)	B	3702.6 ^a 6	(18 ⁺)	B
532.3 ^e 4	(9 ⁻)	B	1485.1 [@] 4	(14 ⁺)	B	3744.2 ^{&} 5	(19 ⁺)	B
545.28+x 14		A	1617.1 ^b 4	(13 ⁺)	B	3756.6 ^f 5	(18 ⁺)	B
590.3 ^c 4	(10 ⁻)	B	1623.6 5	(14 ⁺)	B	4037.2 ^d 5	(19 ⁻)	B
595.58+x 19		A	1717.4 ^e 4	(13 ⁻)	B	4150.7 ^g 5	(19 ⁺)	B
620.07+x 23		A	1842.1 ^c 4	(14 ⁻)	B	4241.4 [@] 6	(20 ⁺)	B
628.7 ^{&} 4	(11 ⁺)	B	1903.8 ^{&} 4	(15 ⁺)	B	4286.3 ^e 6	(19 ⁻)	B
681.12+x 23		A	1929.4 ^a 4	(14 ⁺)	B	4295.7 ^b 6	(19 ⁺)	B
760.60+x 24		A	1946.2 4	(13 ⁺)	B	4457.7 ^c 5	(20 ⁻)	B
762.9+x 4		A	1999.6 5	(14 ⁺)	B	4583.3 ^f 6	(20 ⁺)	B
790.45+x 24		A	2249.5 ^d 4	(15 ⁻)	B	4744.6 ^a 6	(20 ⁺)	B
850.6 ^d 4	(11 ⁻)	B	2272.2 [@] 4	(16 ⁺)	B	4831.2 ^{&} 6	(21 ⁺)	B
851.1 [@] 4	(12 ⁺)	B	2361.2 ^b 4	(15 ⁺)	B	4912.3 ^d 5	(21 ⁻)	B
852.0+x 4		A	2527.7 ^e 5	(15 ⁻)	B	5050.9 ^g 6	(21 ⁺)	B
916.50+x 15		A	2651.2 ^f 5	(14 ⁺)	B	5377.5 ^c 5	(22 ⁻)	B
926.42+x 14		A	2674.7 ^c 4	(16 ⁻)	B	5394.7 [@] 6	(22 ⁺)	B
959.4 ^b 4	(11 ⁺)	B	2703.5 5	(15 ⁺)	B	5549.0 ^f 6	(22 ⁺)	B
1044.4 ^e 4	(11 ⁻)	B	2731.6 ^a 5	(16 ⁺)	B	5878.5 ^d 9	(23 ⁻)	B
1056.70+x 14		A	2762.6 ^{&} 5	(17 ⁺)	B	6006.6 ^{&} 7	(23 ⁺)	B
1105.75+x 15		A	2857.7 ^g 5	(15 ⁺)	B	6071.0 ^g 6	(23 ⁺)	B
1138.94+x 24		A	2908.1 5	(15 ⁺)	B	6402.7 ^c 9	(24 ⁻)	B
1140.9 ^c 4	(12 ⁻)	B	3101.5 ^f 5	(16 ⁺)	B	6637.7 [@] 7	(24 ⁺)	B
1153.6 4	(12 ⁺)	B	3135.6 ^d 4	(17 ⁻)	B	6940.9 ^d 10	(25 ⁻)	B
1163.71+x 17		A	3195.5 [@] 5	(18 ⁺)	B	7537.6 ^c 14	(26 ⁻)	B
1186.1 ^{&} 4	(13 ⁺)	B	3280.7 ^b 5	(17 ⁺)	B	7923.5 [@] 23	(26 ⁺)	B
1230.0 ^a 4	(12 ⁺)	B	3406.1 ^g 5	(17 ⁺)	B	8093.1 ^d 14	(27 ⁻)	B
1336.46+x 17		A	3465.2 ^e 6	(17 ⁻)	B	8774.6 ^c 18	(28 ⁻)	B
1371.97+x 23		A	3589.1 ^c 5	(18 ⁻)	B	9255 [@] 3	(28 ⁺)	B

[†] From a least-squares fit to the adopted E γ 's.

[‡] From assignment to a band linked with $\Delta J=1$ and $\Delta J=2$ transitions in addition to the arguments given. Each bandhead is assigned in comparison with neighboring nuclides and theoretical consideration.

From 2012Au07.

@ Band(A): $\pi h_{11/2} \otimes \nu h_{11/2}, \alpha=0$.

& Band(a): $\pi h_{11/2} \otimes \nu h_{11/2}, \alpha=1$.

^a Band(B): chiral partner of $\pi h_{11/2} \otimes \nu h_{11/2}, \alpha=0$.

^b Band(b): chiral partner of $\pi h_{11/2} \otimes \nu h_{11/2}, \alpha=1$.

^c Band(C): $\pi h_{11/2} \otimes \nu d_{5/2}, \alpha=0$.

^d Band(c): $\pi h_{11/2} \otimes \nu d_{5/2}, \alpha=1$.

^e Band(D): $\pi h_{11/2} \otimes \nu d_{3/2}, \alpha=0$.

^f Band(E): $\pi h_{11/2} \otimes \nu h_{11/2}^3, \alpha=0$.

^g Band(e): $\pi h_{11/2} \otimes \nu h_{11/2}^3, \alpha=1$.

Adopted Levels, Gammas (continued)

E _i (level)	J ^π _i	γ(¹²⁸ La)							Comments
		E _γ [†]	I _γ	E _f	J ^π _f	Mult. [‡]	δ ^{#d}	α ^c	
37.01	(6 ⁺)	37@	100	0.0	(5 ⁺)				
84.99	(7 ⁺)	48@		37.01	(6 ⁺)				
		85@		0.0	(5 ⁺)				
88.0	(7 ⁻)	81.8	100	6.1	(6 ⁻)				
104.05+x		104.0 ^a 3	100	0.0+x	(1 ⁺ ,2 ⁻)				
146.79+x		42.8 3	1.80 20	104.05+x					
		146.7 ^a 3	100	0.0+x	(1 ⁺ ,2 ⁻)				
151.0	(8 ⁺)	66.1		84.99	(7 ⁺)				
		114.0		37.01	(6 ⁺)				
203.5	(7 ⁻)	197.5	100	6.1	(6 ⁻)				
207.8	(8 ⁻)	119.7	100.0& 17	88.0	(7 ⁻)	(M1+E2)	0.03 7	0.649 10	A ₂ =-0.17 2, A ₄ =0.02 3 (1989Go04).
		201.7	9.7& 24	6.1	(6 ⁻)				
219.21+x		72.5 3	16.25 25	146.79+x					
		115.3 ^a 3	18.5 5	104.05+x					
		219.3 ^{ba} 3	100.0 15	0.0+x	(1 ⁺ ,2 ⁻)				
221.82+x		75.2 3	74.2 8	146.79+x					
		118.1 ^a 3	75.0 8	104.05+x					
		221.8 ^a 3	100.0 17	0.0+x	(1 ⁺ ,2 ⁻)				
255.2	(9 ⁺)	104.0	100& 3	151.0	(8 ⁺)	(M1+E2)	0.08 10	0.972 24	DCO=0.87 17 A ₂ =-0.14 8, A ₄ =0.02 8 (1987No07).
		170.2	2.2& 6	84.99	(7 ⁺)				
256.17+x		109.4 3	100	146.79+x					
267.45+x		121.1 3	16.6 20	146.79+x					
		163.4 3	7.5 4	104.05+x					
		267.3 3	100.0 8	0.0+x	(1 ⁺ ,2 ⁻)				
270.81+x		166.7 ^a 3	100 9	104.05+x					
		270.9 ^a 3	69.0 23	0.0+x	(1 ⁺ ,2 ⁻)				
282.17+x		63.0 3	11.9 11	219.21+x					
		178.0 ^a 3	100.0 11	104.05+x					
305.99+x		86.9 3	12.5 17	219.21+x					
		158.8 ^a 3	13 3	146.79+x					
		201.9 ^a 3	100.0 17	104.05+x					
323.60+x		101.9 ^a 3	18.0 15	221.82+x					
		176.5 ^a 3	100.0 15	146.79+x					
		219.8 ^{ba} 3	26 5	104.05+x					
		323.7 ^b 3	75 3	0.0+x	(1 ⁺ ,2 ⁻)				
338.19+x		191.5 ^a 3	38.9 7	146.79+x					
		234.2 ^a 3	59.6 7	104.05+x					
		338.2 ^a 3	100.0 11	0.0+x	(1 ⁺ ,2 ⁻)				

Adopted Levels, Gammas (continued)

$\gamma(^{128}\text{La})$ (continued)									
$E_i(\text{level})$	J_i^π	E_γ †	I_γ	E_f	J_f^π	Mult. ‡	$\delta^{\#d}$	α^c	Comments
340.46+x		84.3 3	4.2 17	256.17+x					
		340.6 3	100 3	0.0+x	(1 ⁺ ,2 ⁻)				
347.49+x		243.3 3	100	104.05+x					
381.2	(9 ⁻)	173.3	100.0 & 11	207.8	(8 ⁻)	M1+E2	-0.05 4	0.231	$\alpha(\text{K})\text{exp}=0.22$ 7 (1992Co15) A ₂ =-0.28 2, A ₄ =0.02 2 (1989Go04).
		230.3		151.0	(8 ⁺)				
		293.1	17 & 3	88.0	(7 ⁻)				
393.6	(10 ⁺)	138.5	100 10	255.2	(9 ⁺)	(M1+E2)	0.00 5	0.431	DCO=0.92 18 A ₂ =-0.26 2, A ₄ =-0.01 2 (1987No07).
		242.5	11.7 23	151.0	(8 ⁺)				
401.84+x		95.8 3	22 3	305.99+x					
		180.0 3	38 19	221.82+x					
		182.7 3	100 6	219.21+x					
409.95+x		142.8 3	100 3	267.45+x					
		263.4 ^b 3	23 6	146.79+x					
		409.7 ^a 3	84 5	0.0+x	(1 ⁺ ,2 ⁻)				
439.87+x		293.0 ^a 3	96 4	146.79+x					
		335.7 ^a 3	100 5	104.05+x					
		440.1 3	84 12	0.0+x	(1 ⁺ ,2 ⁻)				
502.96+x		281.3 3	48 3	221.82+x					
		502.8 3	100 4	0.0+x	(1 ⁺ ,2 ⁻)				
514.25+x		208.0 3	100 4	305.99+x					
		514.2 3	52 17	0.0+x	(1 ⁺ ,2 ⁻)				
520.16+x		373.4 3	54 7	146.79+x					
		520.3 3	100 7	0.0+x	(1 ⁺ ,2 ⁻)				
523.8+x		217.8 3	100	305.99+x					
532.3	(9 ⁻)	324.5	60 12	207.8	(8 ⁻)	(M1+E2)		0.0430	DCO=1.07 16
		328.9	100 10	203.5	(7 ⁻)	(E2)		0.0352	DCO=1.59 21
545.28+x		197.7 3	4.4 10	347.49+x					
		263.2 ^b 3	3.9 10	282.17+x					
		274.5 ^a 3	4.4 5	270.81+x					
		323.8 ^b 3	2.6 10	221.82+x					
		398.2 3	9.6 18	146.79+x					
		544.9 3	100.0 10	0.0+x	(1 ⁺ ,2 ⁻)				
590.3	(10 ⁻)	209.2	100 & 3	381.2	(9 ⁻)	M1+E2	-0.12 5	0.1385	$\alpha(\text{K})\text{exp}=0.13$ 5 (1992Co15) A ₂ =-0.35 2, A ₄ =-0.01 2 (1989Go04).
		335.0		255.2	(9 ⁺)				
		382.5	39.0 & 13	207.8	(8 ⁻)	(E2)		0.0222	A ₂ =0.48 7, A ₄ =0.10 11 (1987No07).
595.58+x		449.5 3	46 4	146.79+x					
		595.5 3	100 6	0.0+x	(1 ⁺ ,2 ⁻)				
620.07+x		473.0 3	19 8	146.79+x					
		516.3 3	100 5	104.05+x					

Adopted Levels, Gammas (continued)

 $\gamma(^{128}\text{La})$ (continued)

$E_i(\text{level})$	J_i^π	E_γ^\dagger	I_γ	E_f	J_f^π	Mult. [‡]	$\delta^{\#d}$	α^c	Comments
628.7	(11 ⁺)	235.2	100 10	393.6	(10 ⁺)	M1+E2	-0.11 5	0.1008	DCO=1.03 21 A ₂ =-0.37 2, A ₄ =-0.03 2 (1987No07). $\alpha(\text{K})_{\text{exp}}=0.12(1992\text{Co15})$.
		373.5	17 3	255.2	(9 ⁺)	(E2)		0.0239	
681.12+x		534.1 3	100 7	146.79+x					
		577.3 3	68 16	104.05+x					
760.60+x		541.6 3	100	219.21+x					
762.9+x		616.1 3	100	146.79+x					
790.45+x		467.0 3	71 23	323.60+x					
		643.5 3	100 19	146.79+x					
850.6	(11 ⁻)	260.2	100 & 3	590.3	(10 ⁻)	(M1+E2)	-0.16 5	0.0769	A ₂ =-0.42 3, A ₄ =0.01 3 (1989Go04).
		457.2		393.6	(10 ⁺)				
		469.5	91 & 6	381.2	(9 ⁻)				
851.1	(12 ⁺)	222.3	100 10	628.7	(11 ⁺)	M1+E2	-0.10 5	0.1174	DCO=1.07 21 A ₂ =-0.36 2, A ₄ =-0.02 2 (1987No07). $\alpha(\text{K})_{\text{exp}}=0.12(1992\text{Co15})$.
		457.5	63 6	393.6	(10 ⁺)	(E2)		0.01320	DCO=1.7 3
852.0+x		569.8 3	100	282.17+x					
916.50+x		396.5 3	77 18	520.16+x					
		578.4 ^a 3	95 10	338.19+x					
		634.5 3	26 15	282.17+x					
		648.9 3	100 10	267.45+x					
		769.8 3	41 10	146.79+x					
		812.1 ^a 3	33 10	104.05+x					
926.42+x		655.4 ^a 3	23 4	270.81+x					
		659.1 3	17 5	267.45+x					
		707.2 ^a 3	50 4	219.21+x					
		780.0 3	11 4	146.79+x					
		822.2 ^b 3	22 4	104.05+x					
		926.3 3	100 4	0.0+x	(1 ⁺ , 2 ⁻)				
959.4	(11 ⁺)	565.7	1.0×10 ² 3	393.6	(10 ⁺)	(M1+E2)		0.01050	DCO=1.1 5
		704.1	9.×10 ¹ 3	255.2	(9 ⁺)	(E2)		0.00426	DCO=1.8 7
1044.4	(11 ⁻)	454.0	33 7	590.3	(10 ⁻)	(M1+E2)		0.0182	DCO=1.13 17
		512.1	100 10	532.3	(9 ⁻)	(E2)		0.00966	DCO=1.65 23
1056.70+x		296.3 3	13 4	760.60+x					
		709.5 ^a 3	13 7	347.49+x					
		716.4 3	44 9	340.46+x					
		718.5 ^a 3	28 9	338.19+x					
		774.2 ^a 3	63 5	282.17+x					
		786.1 3	13 8	270.81+x					
		909.6 ^a 3	24 5	146.79+x					
		952.4 3	100 5	104.05+x					

Adopted Levels, Gammas (continued)

E _i (level)	J _i ^π	γ(¹²⁸ La) (continued)							Comments
		E _γ [†]	I _γ	E _f	J _f ^π	Mult. [‡]	δ ^{#d}	α ^c	
1105.75+x		560.2 3	94 3	545.28+x					
		665.9 ^a 3	19 3	439.87+x					
		696.1 3	20 3	409.95+x					
		886.4 ^a 3	100 3	219.21+x					
		958.8 ^a 3	78 3	146.79+x					
		1106.0 3	49 4	0.0+x	(1 ⁺ ,2 ⁻)				
1138.94+x		791.3 3	100 14	347.49+x					
		992.3 3	28 14	146.79+x					
1140.9	(12 ⁻)	290.4	100 & 3	850.6	(11 ⁻)	(M1+E2)	-0.13 6	0.0575 9	A ₂ =-0.38 4, A ₄ =0.03 4 (1989Go04).
		512.2		628.7	(11 ⁺)				
1153.6	(12 ⁺)	550.7	91 & 7	590.3	(10 ⁻)				
		760.0	100	393.6	(10 ⁺)	(E2)		0.00355	DCO=1.59 48
1163.71+x		816.0 ^a 3	21 3	347.49+x					
		825.6 ^a 3	86 3	338.19+x					
		1059.5 ^a 3	14 3	104.05+x					
		1164.0 3	100	0.0+x	(1 ⁺ ,2 ⁻)				
1186.1	(13 ⁺)	335.0	100 11	851.1	(12 ⁺)	(M1+E2)	-0.16 6	0.0395	DCO=0.92 18 A ₂ =-0.42 2, A ₄ =-0.02 3 (1987No07).
1230.0	(12 ⁺)	557.5	42 8	628.7	(11 ⁺)	(E2)		0.00769	DCO=1.7 3
		270.5	44 13	959.4	(11 ⁺)	(M1+E2)		0.0694	DCO=1.0 4
		601.2	1.0×10 ² 3	628.7	(11 ⁺)	(M1+E2)		0.00904	
		836.3	62 18	393.6	(10 ⁺)	(E2)		0.00284	DCO=1.8 7
1336.46+x		741.5 3	20 7	595.58+x					
		821.9 ^b 3	30 5	514.25+x					
		1189.5 3	33 6	146.79+x					
		1336.3 3	100 7	0.0+x	(1 ⁺ ,2 ⁻)				
1371.97+x		1150.0 ^a 3	100 10	221.82+x					
		1372.1 3	37 12	0.0+x	(1 ⁺ ,2 ⁻)				
1479.5	(13 ⁻)	338.5	54.2 & 22	1140.9	(12 ⁻)	(M1+E2)	-0.22 8	0.0383	A ₂ =-0.47 4, A ₄ =0.00 4 (1989Go04).
		628.4	6.9 22	851.1	(12 ⁺)	(E1)		0.00205	DCO=1.12 34
1485.1	(14 ⁺)	629.0	100 & 3	850.6	(11 ⁻)				
		299.0	67 7	1186.1	(13 ⁺)	(M1+E2)	-0.16 6	0.0532	DCO=1.01 20 A ₂ =-0.45 2, A ₄ =0.05 3 (1987No07).
1617.1	(13 ⁺)	634.0	100 9	851.1	(12 ⁺)	(E2)		0.00552	DCO=1.7 4
		387.1	83 25	1230.0	(12 ⁺)	(M1+E2)		0.0272	DCO=1.1 4
		657.5	9.×10 ¹ 3	959.4	(11 ⁺)	(E2)		0.00504	DCO=1.8 6
1623.6	(14 ⁺)	766.1	100 19	851.1	(12 ⁺)	(M1+E2)		0.00503 8	DCO=0.9 4
1717.4	(13 ⁻)	437.5	100	1186.1	(13 ⁺)				
		576.5	13 4	1140.9	(12 ⁻)	(M1+E2)		0.01002 15	DCO=0.98 29
1842.1	(14 ⁻)	673.0	100 10	1044.4	(11 ⁻)	(E2)		0.00476	DCO=1.68 25
		362.7	38.3 & 16	1479.5	(13 ⁻)	(M1+E2)	-0.19 11	0.0321 6	A ₂ =-0.48 7, A ₄ =0.10 8 (1989Go04).

Adopted Levels, Gammas (continued)

$\gamma(^{128}\text{La})$ (continued)

$E_i(\text{level})$	J_i^π	E_γ^\dagger	I_γ	E_f	J_f^π	Mult. [‡]	$\delta^{\#d}$	α^c	Comments
1842.1	(14 ⁻)	655.8	6.5 19	1186.1	(13 ⁺)	(E1)		0.00187	DCO=1.09 29
		701.2	100 & 4	1140.9	(12 ⁻)				
1903.8	(15 ⁺)	418.6	100 10	1485.1	(14 ⁺)	(M1+E2)	-0.21 7	0.0221 4	DCO=0.96 19 A ₂ =-0.51 3, A ₄ =0.05 3 (1987No07).
		717.7	91 20	1186.1	(13 ⁺)	(E2)		0.00407	DCO=1.7 3
1929.4	(14 ⁺)	312.3	43 12	1617.1	(13 ⁺)	(M1+E2)		0.0475	DCO=1.1 5
		699.3	1.0×10 ² 3	1230.0	(12 ⁺)	(E2)		0.00433	DCO=1.8 7
		743.6	1.0×10 ² 3	1186.1	(13 ⁺)				
1946.2	(13 ⁺)	792.5	1.0×10 ² 3	1153.6	(12 ⁺)	(M1+E2)		0.00464	DCO=1.05 32
		1317.5	<71	628.7	(11 ⁺)				
1999.6	(14 ⁺)	1148.5	100	851.1	(12 ⁺)	(E2)		1.43×10 ⁻³	DCO=1.87 37
2249.5	(15 ⁻)	407.4	29.3 & 16	1842.1	(14 ⁻)				
		764.2	5.5 16	1485.1	(14 ⁺)	(E1)		1.36×10 ⁻³	DCO=1.04 31
		770.1	100 & 4	1479.5	(13 ⁻)	(E2)		0.00344	A ₂ =0.48 6, A ₄ =-0.25 7 (1987No07).
2272.2	(16 ⁺)	368.4	38 8	1903.8	(15 ⁺)	(M1+E2)		0.0309	DCO=1.05 21
		787.2	100 9	1485.1	(14 ⁺)	(E2)		0.00327	DCO=1.8 4
2361.2	(15 ⁺)	431.8	76 24	1929.4	(14 ⁺)				
		744.1	1.0×10 ² 3	1617.1	(13 ⁺)	(E2)		0.00373	DCO=1.8 5
2527.7	(15 ⁻)	685.5	13 4	1842.1	(14 ⁻)	(M1+E2)		0.00657	DCO=1.03 31
		810.4	100 10	1717.4	(13 ⁻)	(E2)		0.00305	DCO=1.74 26
2651.2	(14 ⁺)	705.0	1.0×10 ² 3	1946.2	(13 ⁺)				I _γ : for a doublet.
		1497.5 ^e	<43	1153.6	(12 ⁺)				
2674.7	(16 ⁻)	425.0	23.4 & 13	2249.5	(15 ⁻)				
		771.0 ^e		1903.8	(15 ⁺)				
		832.6	100 & 4	1842.1	(14 ⁻)				
2703.5	(15 ⁺)	704.0	100	1999.6	(14 ⁺)				
2731.6	(16 ⁺)	370.4	48 14	2361.2	(15 ⁺)				
		802.1	1.0×10 ² 3	1929.4	(14 ⁺)				
2762.6	(17 ⁺)	490.4	45 9	2272.2	(16 ⁺)	(M1+E2)		0.01497 22	DCO=0.95 19
		858.9	100 19	1903.8	(15 ⁺)	(E2)		0.00267	DCO=1.8 4
2857.7	(15 ⁺)	206.5	1.0×10 ² 3	2651.2	(14 ⁺)	(M1+E2)		0.1434 21	DCO=1.07 32
		858.1	73 23	1999.6	(14 ⁺)	(M1+E2)		0.00384	DCO=1.02 31
2908.1	(15 ⁺)	908.5	100	1999.6	(14 ⁺)				
3101.5	(16 ⁺)	193.4	42 13	2908.1	(15 ⁺)	(M1+E2)		0.1714 25	DCO=1.12 34
		243.8		2857.7	(15 ⁺)				
		398.0	100 19	2703.5	(15 ⁺)	(M1+E2)		0.0254	DCO=0.97 29
		450.3	17 6	2651.2	(14 ⁺)	(E2)		0.01381	DCO=1.71 48
		1478.0 ^e	<19.2	1623.6	(14 ⁺)				
3135.6	(17 ⁻)	460.7	33 & 4	2674.7	(16 ⁻)				
		863.5	6.1 17	2272.2	(16 ⁺)	(E1)		1.06×10 ⁻³	DCO=0.98 29
		886.1	100 & 5	2249.5	(15 ⁻)				

Adopted Levels, Gammas (continued) $\gamma(^{128}\text{La})$ (continued)

$E_i(\text{level})$	J_i^π	E_γ^\dagger	I_γ	E_f	J_f^π	Mult. [‡]	α^c	Comments
3195.5	(18 ⁺)	432.8	21 4	2762.6	(17 ⁺)			
		923.3	100 10	2272.2	(16 ⁺)	(E2)	0.00228	DCO=1.7 5
3280.7	(17 ⁺)	919.5	100	2361.2	(15 ⁺)			
3406.1	(17 ⁺)	304.6		3101.5	(16 ⁺)			
		548.4	1.0×10 ² 3	2857.7	(15 ⁺)	(E2)	0.00804	DCO=1.65 42
3465.2	(17 ⁻)	937.5	100	2527.7	(15 ⁻)	(E2)	0.00220	DCO=1.59 24
3589.1	(18 ⁻)	453.5	42 & 5	3135.6	(17 ⁻)			
		826.6 ^e		2762.6	(17 ⁺)			
		914.4	100 & 5	2674.7	(16 ⁻)			
3702.6	(18 ⁺)	971.0	100	2731.6	(16 ⁺)			
3744.2	(19 ⁺)	548.7	35 11	3195.5	(18 ⁺)			
		981.6	100 20	2762.6	(17 ⁺)	(E2)	0.00199	DCO=1.8 5
3756.6	(18 ⁺)	350.5		3406.1	(17 ⁺)			
		655.1	1.0×10 ² 3	3101.5	(16 ⁺)	(E2)	0.00509	DCO=1.87 56
4037.2	(19 ⁻)	448.1	34 & 3	3589.1	(18 ⁻)			
		841.7		3195.5	(18 ⁺)			
		901.6	100 & 6	3135.6	(17 ⁻)			
4150.7	(19 ⁺)	394.1		3756.6	(18 ⁺)			
		744.6		3406.1	(17 ⁺)			
4241.4	(20 ⁺)	1045.9	100	3195.5	(18 ⁺)			
4286.3	(19 ⁻)	821.1	100	3465.2	(17 ⁻)	(E2)	0.00296	DCO=1.61 29
4295.7	(19 ⁺)	1015.0	100	3280.7	(17 ⁺)			
4457.7	(20 ⁻)	420.4	42 & 3	4037.2	(19 ⁻)			
		868.6	100 & 7	3589.1	(18 ⁻)			
4583.3	(20 ⁺)	432.6		4150.7	(19 ⁺)			
		826.7		3756.6	(18 ⁺)			
4744.6	(20 ⁺)	1042.0	100	3702.6	(18 ⁺)			
4831.2	(21 ⁺)	1087.0	100	3744.2	(19 ⁺)			
4912.3	(21 ⁻)	454.6	26 & 6	4457.7	(20 ⁻)			
		875.2	100 & 8	4037.2	(19 ⁻)			
5050.9	(21 ⁺)	467.6		4583.3	(20 ⁺)			
		900.2		4150.7	(19 ⁺)			
5377.5	(22 ⁻)	465.1	36 & 6	4912.3	(21 ⁻)			
		919.8	100 & 6	4457.7	(20 ⁻)			
5394.7	(22 ⁺)	1153.3	100	4241.4	(20 ⁺)			
5549.0	(22 ⁺)	498.1		5050.9	(21 ⁺)			
		965.7		4583.3	(20 ⁺)			
5878.5	(23 ⁻)	501.1 5	46 6	5377.5	(22 ⁻)			
		966.1 5	100 12	4912.3	(21 ⁻)			
6006.6	(23 ⁺)	1175.4	100	4831.2	(21 ⁺)			
6071.0	(23 ⁺)	522.0		5549.0	(22 ⁺)			

Adopted Levels, Gammas (continued)

$\gamma(^{128}\text{La})$ (continued)

$E_i(\text{level})$	J_i^π	E_γ^\dagger	I_γ	E_f	J_f^π	$E_i(\text{level})$	J_i^π	E_γ^\dagger	I_γ	E_f	J_f^π
6071.0	(23 ⁺)	1020.1		5050.9	(21 ⁺)	7537.6	(26 ⁻)	1134.9 10	100	6402.7	(24 ⁻)
6402.7	(24 ⁻)	524.2 5	12 6	5878.5	(23 ⁻)	7923.5	(26 ⁺)	1286.0 12	100	6637.7	(24 ⁺)
		1025.3 5	100 7	5377.5	(22 ⁻)	8093.1	(27 ⁻)	1152.2 10	100	6940.9	(25 ⁻)
6637.7	(24 ⁺)	1243.0	100	5394.7	(22 ⁺)	8774.6	(28 ⁻)	1237.0 12	100	7537.6	(26 ⁻)
6940.9	(25 ⁻)	538.2 5	35 6	6402.7	(24 ⁻)	9255	(28 ⁺)	1332.0 12	100	7923.5	(26 ⁺)
		1062.4 5	100 8	5878.5	(23 ⁻)						

† Either from (HI,xn γ) or from ^{128}Ce ϵ decay. Non of the levels were seen in both reactions.

‡ From (HI,xn γ).

From (HI,xn γ).

@ From [1995Ha16](#).

& From [1989Go04](#).

^a Reported in [1997Ha30](#).

^b Doublet.

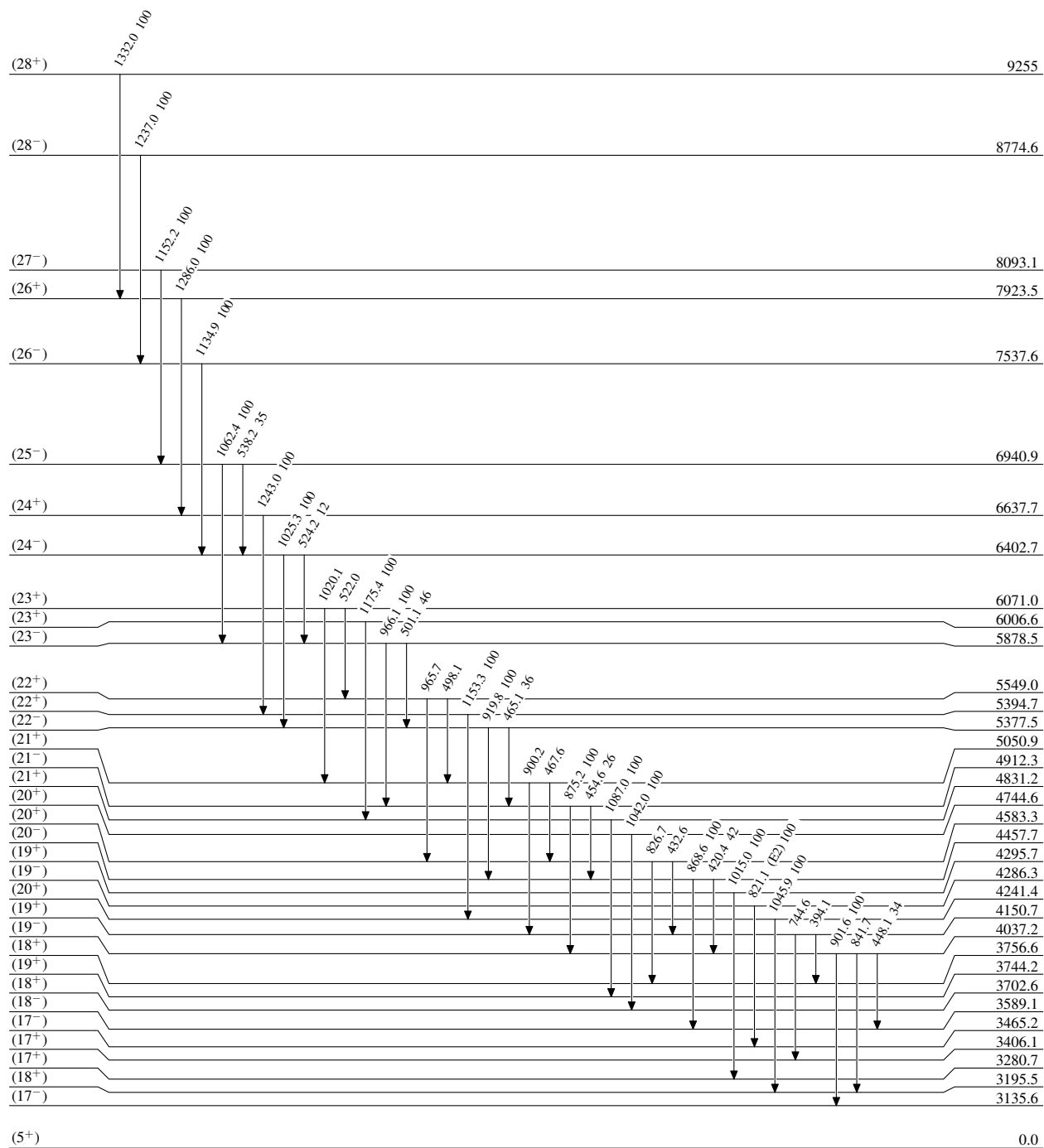
^c [Additional information 2](#).

^d If No value given it was assumed $\delta=0.10$ for E2/M1, $\delta=1.00$ for E3/M2 and $\delta=0.10$ for the other multiplicities.

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

Adopted Levels, Gammas**Level Scheme**

Intensities: Relative photon branching from each level



5.18 min 14

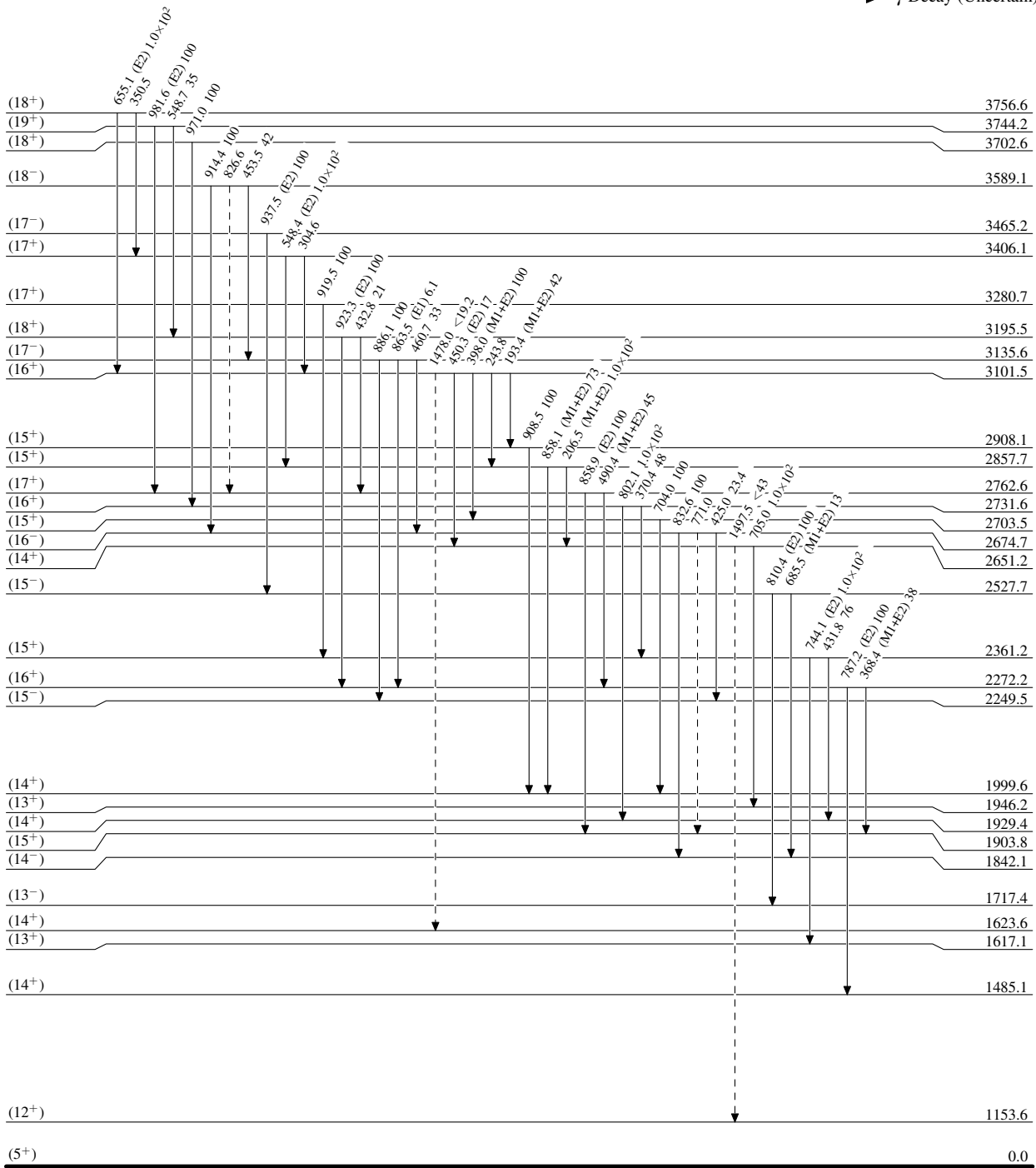
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

-----> γ Decay (Uncertain)



5.18 min /4

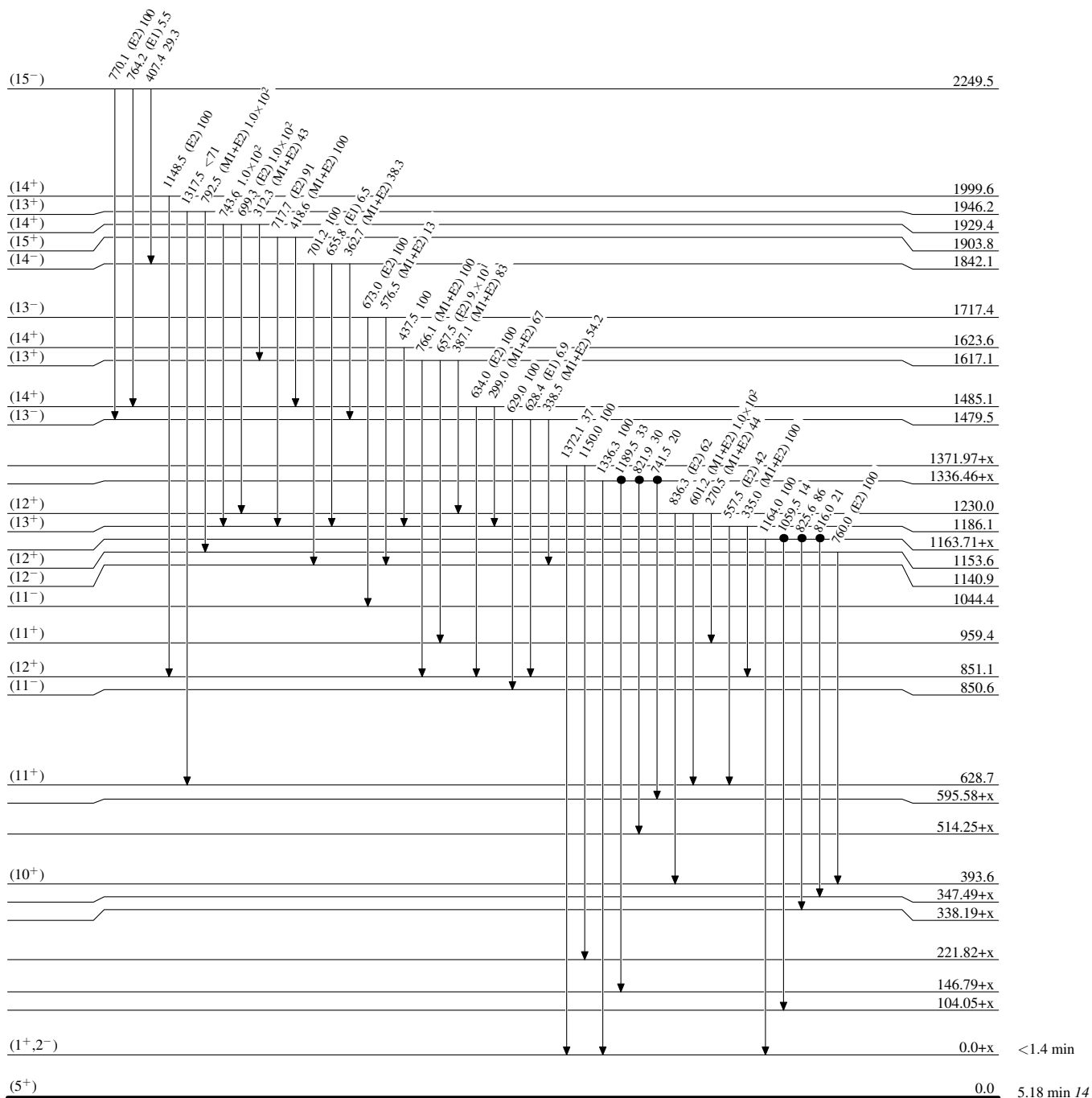
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

● Coincidence



$^{128}_{57}\text{La}_{71}$

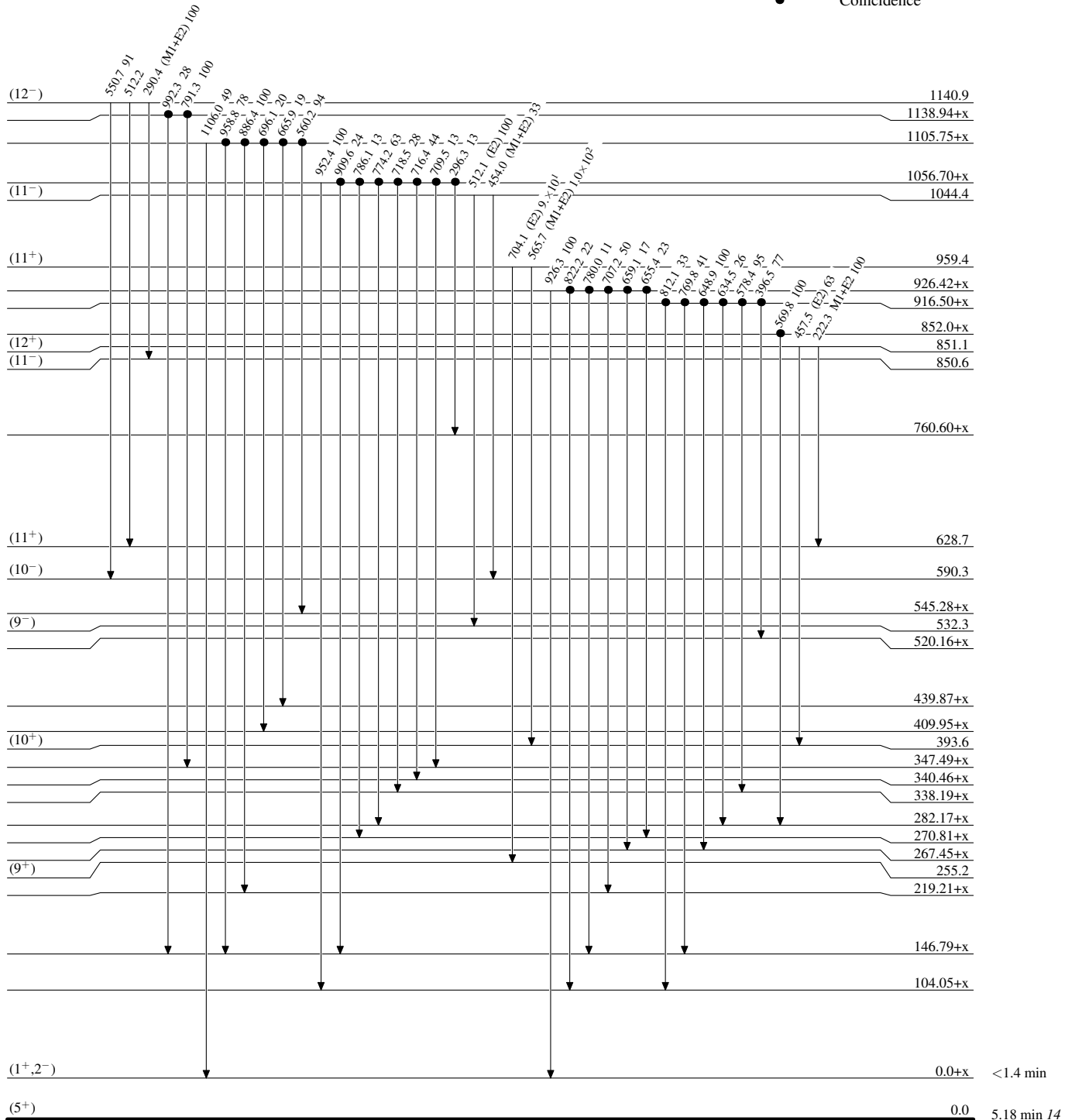
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

● Coincidence



$^{128}_{57}\text{La}_{71}$

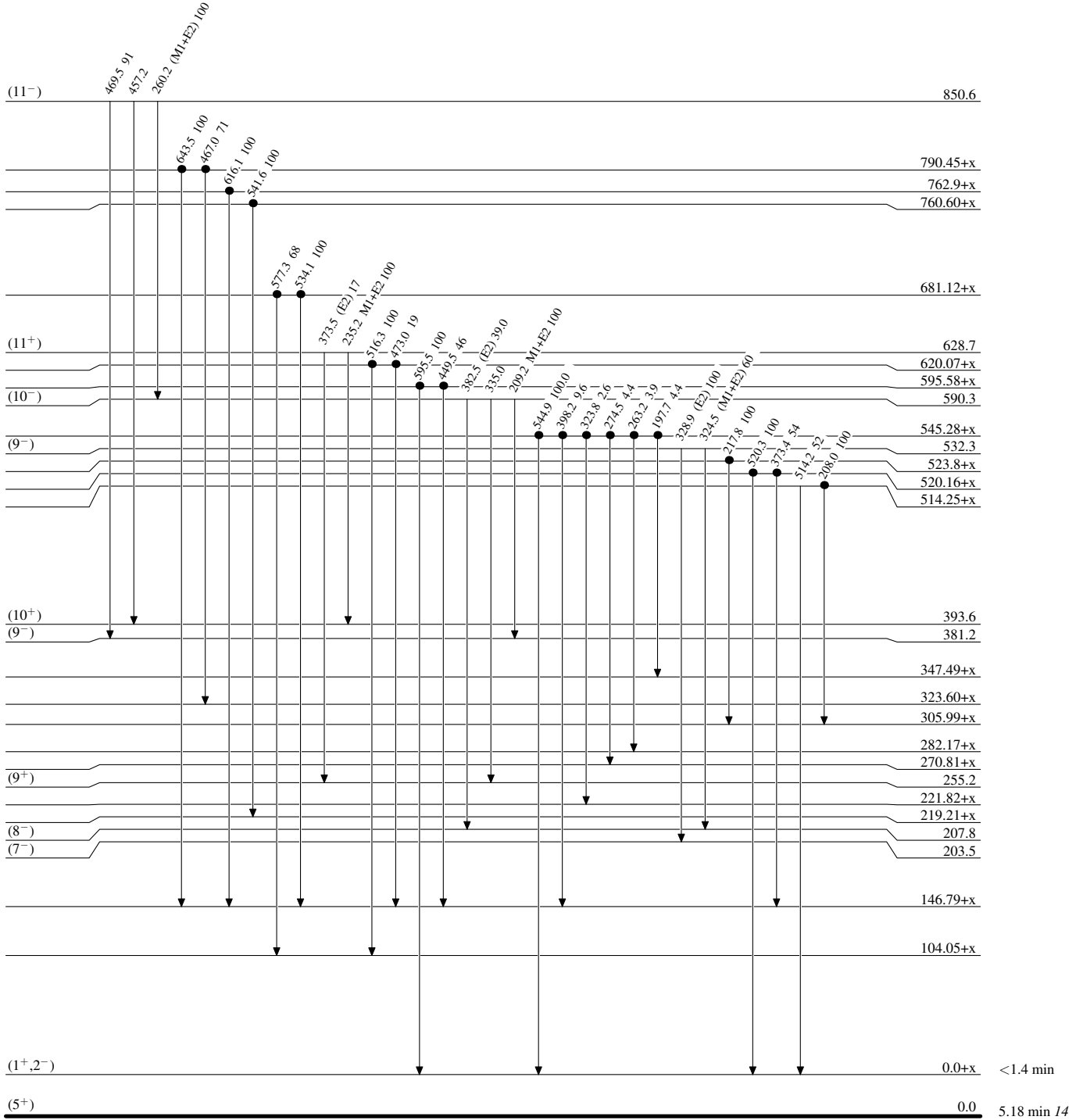
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

● Coincidence



$^{128}_{57}\text{La}_{71}$

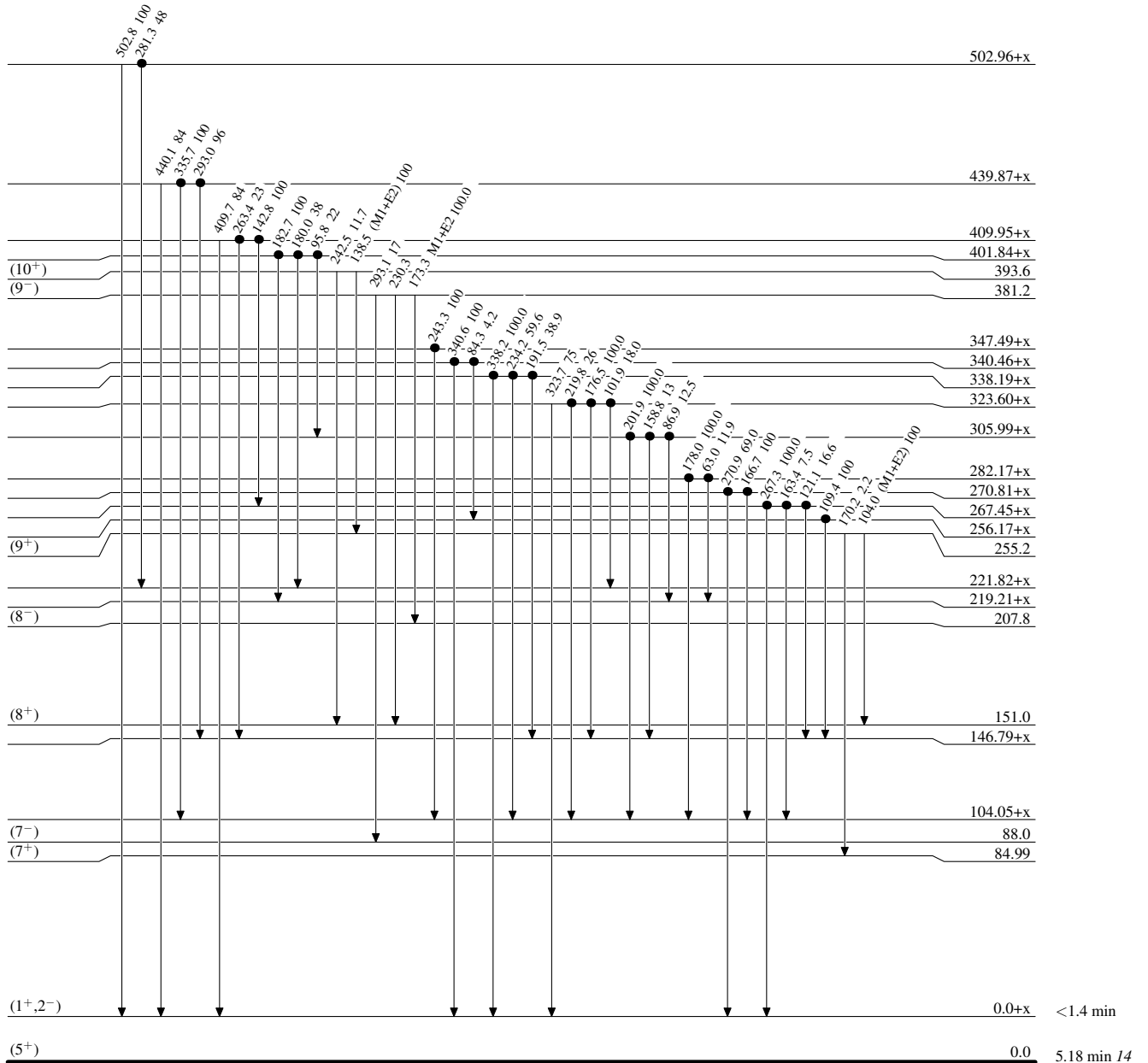
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

● Coincidence



$^{128}_{57}\text{La}_{71}$

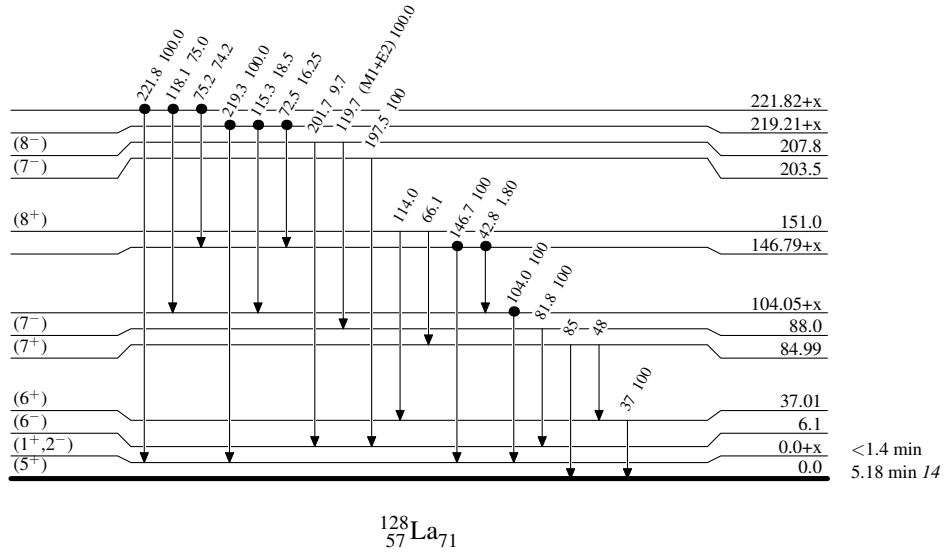
Adopted Levels, Gammas

Legend

Level Scheme (continued)

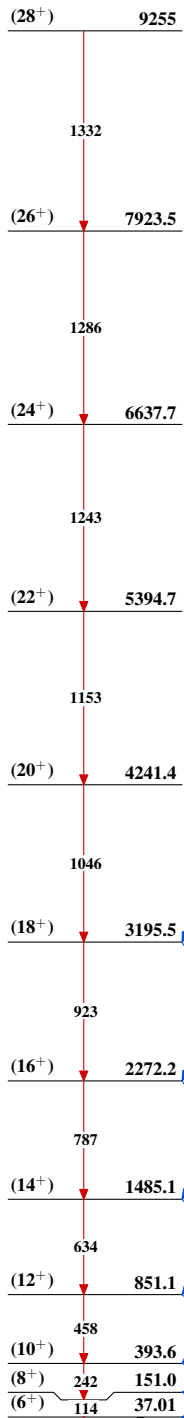
Intensities: Relative photon branching from each level

● Coincidence

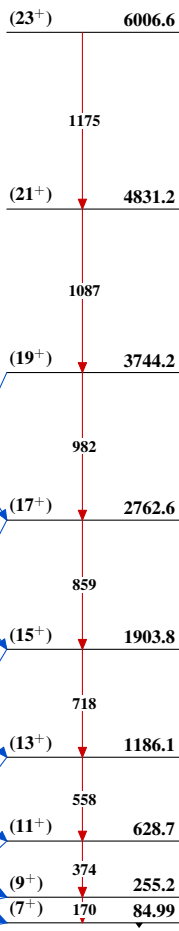


Adopted Levels, Gammas

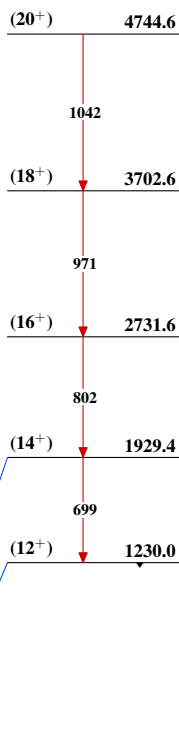
Band(A): $\pi h_{11/2} \otimes \nu h_{11/2}$, $\alpha=0$



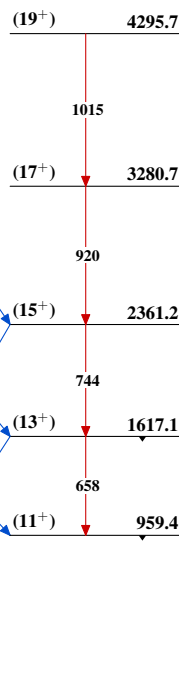
Band(a): $\pi h_{11/2} \otimes \nu h_{11/2}$, $\alpha=1$



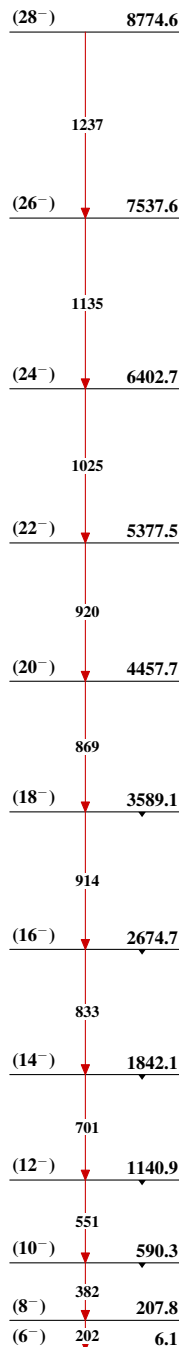
Band(B): Chiral partner of $\pi h_{11/2} \otimes \nu h_{11/2}$, $\alpha=0$



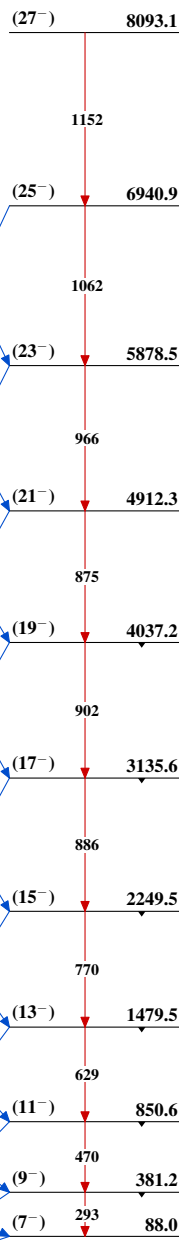
Band(b): Chiral partner of $\pi h_{11/2} \otimes \nu h_{11/2}$, $\alpha=1$

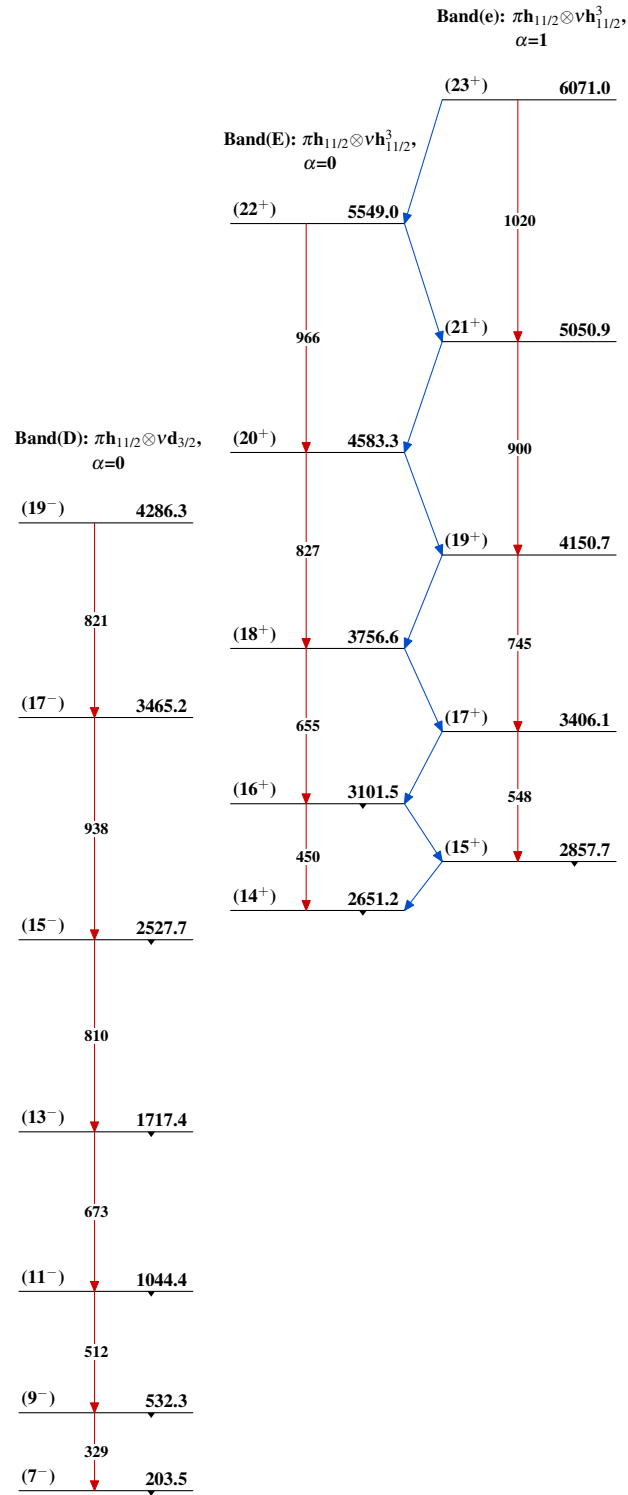


Band(C): $\pi h_{11/2} \otimes \nu d_{5/2}$, $\alpha=0$



Band(c): $\pi h_{11/2} \otimes \nu d_{5/2}$, $\alpha=1$



Adopted Levels, Gammas (continued) $^{128}_{57}\text{La}_{71}$