Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Yu. Khazov, I. Mitropolsky, A. Rodionov	NDS 107,2715 (2006)	17-Jul-2006

Q(β^-)=−4.06×10^3 *5*; S(n)=1.021×10^4 *4*; S(p)=3.80×10^3 *3*; Q(α)=5.×10^1 *3* 2012Wa38
Note: Current evaluation has used the following Q record −4.05E3 4 *10210* 40 *3797* 28 *46* 28 2003Au03.
In the comments for each rotational band the mean-squared deviation Δ of the energy values calculated with use of Variable Moment of Inertia model from the experimental ones is resulted.

^{131}La Levels

Bands: as given by 1989Hi02 and 2000Wa28.

Cross Reference (XREF) Flags

A	^{131}La IT decay (170 μs)	E	^{130}Ba(p,p) IAR
B	^{131}Ce ε decay (10.3 min)	F	^{130}Ba(α,t),(^{3}He,d)
C	^{131}Ce ε decay (5.4 min)	G	^{100}Mo(^{36}S,p4nγ)
D	^{116}Cd(^{19}F,4nγ)		

E(level)[†]	J$^\pi$	T$_{1/2}$[‡]	XREF	Comments
0.0[o]	3/2$^+$	59 min *2*	ABCD F	%ε+%β^+=100 J$^\pi$: from atomic beam (1976Fu06). T$_{1/2}$: weighted average of 61 min *2* (1960Cr01) and 56 min *3* (1963Ya05).
26.22[g] *4*	5/2$^+$	0.85 ns *10*	ABCD F	J$^\pi$: from M1 γ to 3/2$^+$ g.s., M2-M1-M1 γ cascade from 11/2-state to 3/2$^+$ g.s., bandhead of conf.=πg$_{7/2}$. T$_{1/2}$: from ceγ(t) in 10.3-min ε decay.
145.39[n] *5*	(5/2$^+$)	≤0.3 ns	B D	J$^\pi$: from M1 γ to 5/2$^+$ state, (M1,E2) γ to 3/2$^+$ g.s., bandhead of conf.=πd$_{5/2}$. T$_{1/2}$: from ceγ(t) in 10.3-min ε decay.
195.68[f] *5*	7/2$^+$	0.20 ns *8*	AB D F	J$^\pi$: from E2 γ to 3/2$^+$ g.s., M2-M1-M1 γ cascade from 11/2$^-$ state to 3/2$^+$ g.s.
230.44 *5*	(1/2$^+$)	≤30[#] ns	C	J$^\pi$: from decay pattern; systematics.
231.27 *15*	(7/2$^+$)		B	J$^\pi$: from γ's to 5/2$^+$ and 3/2$^+$; γ's from (9/2$^+$) and (11/2$^+$) state.
304.60[d] *24*	11/2$^-$	170 μs *7*	A D FG	%IT=100 J$^\pi$: from L=5 in (α,t); M2-M1-M1 cascade to 3/2 g.s., bandhead of conf.=πh$_{11/2}$. T$_{1/2}$: from ^{131}La IT decay.
416.83 *13*	(7/2$^+$,9/2$^+$)	≤30[#] ns	B	J$^\pi$: from D,E2 (comparison to RUL) γ's to (5/2$^+$), (7/2$^+$) and from (11/2$^+$) states.
421.56[o] *7*	(7/2$^+$)	≤30[#] ns	B D	J$^\pi$: β decay from 7/2$^+$ parent; γ to 3/2$^+$ g.s.; band assignment and expected configuration.
440.48[g] *6*	(9/2$^+$)	≤30[#] ns	B D	J$^\pi$: M1 γ from (11/2$^+$) state; D,E2 (comparison to RUL) γ's to 5/2$^+$ and 7/2$^+$ states; band structure.
459.90 *11*	(5/2,7/2$^+$)	≤30[#] ns	B	J$^\pi$: D,E2 (comparison to RUL) γ's to 3/2$^+$,5/2$^+$,7/2$^+$ states.
463.03 *11*	(3/2,1/2)	≤30[#] ns	C	J$^\pi$: β decay from (1/2$^+$) parent.
588.11[n] *6*	(9/2$^+$)	≤30[#] ns	B D	J$^\pi$: from (M1,E2) to 7/2$^+$ and D,E2 to 9/2$^+$ γ's; systematics.
595.14 *10*	(3/2,1/2)	≤30[#] ns	C	J$^\pi$: β decay from (1/2$^+$) parent, D,Q (comparison to RUL) γ's to 1/2$^+$, 3/2$^+$ states.
640.74[d] *25*	15/2$^-$[&]	38.3 ps *12*	D G	
671.66[f] *10*	(11/2$^+$)[a]	≤30[#] ns	B D	

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Adopted Levels, Gammas (continued)

^{131}La Levels (continued)

E(level)[†]	Jπ	$T_{1/2}$[‡]	XREF	Comments
743.31 *6*	$(5/2^+,7/2^+)$	≤30[#] ns	B	Jπ: from D,E2 (comparison to RUL) γ's to $(9/2^+)$ and $(5/2^+,7/2^+)$, D,Q γ's to $(7/2^+)$ and $3/2^+$ states.
906.7[e] *3*	$(13/2^-)$		D	Jπ: from stretched dipole γ's to $11/2^-$ and $15/2^-$ states; band assignment.
911.17 *16*	$(5/2^+,7/2^+)$	≤30[#] ns	B	Jπ: from D,Q (comparison to RUL) γ's to $(9/2^+)$, $(5/2^+,7/2^+)$, $(7/2^+)$ and $3/2^+$ states; Δπ=no from decay pattern.
946.13 *17*		≤30[#] ns	B	
1024.44[o] *10*	$(11/2^+)$		B D	Jπ: from band assignment, expected configurations and D,Q (comparison to RUL) γ's to $(7/2^+)$, $(9/2^+)$ and $(11/2^+)$ states.
1055.28[g] *10*	$(13/2^+)$[a]		D	
1174.2[d] *3*	$19/2^-$&	3.8 ps *4*	D G	
1224.3 *4*			D	
1225.81[n] *21*	$(13/2^+)$[b]		D	
1329.04[f] *12*	$(15/2^+)$[a]		D	
1357.0[m] *3*	$(15/2^-)$		D	Jπ: from stretched E2, ΔJ=0 dipole and stretched dipole γ's to $11/2^-$, $15/2^-$ and $(13/2^-)$ states, band assignment.
1410.7[e] *3*	$(17/2^-)$		D	Jπ: from stretched dipole γ to $15/2^-$ state, band assignment.
1444.9 *3*			D	
1704.9 *4*			D	
1752.3?[m] *8*	$(17/2^-)$[b]		D	
1752.4[o] *10*	$(15/2^+)$[b]		D	
1774.55 *19*	$(3/2^+,5/2^+,7/2^+)$	≤30[#] ns	B	Jπ: from four γ's to $3/2^+$, $5/2^+$, $(5/2^+,7/2^+)$ states.
1781.93 *20*			B	
1809.13[g] *13*	$(17/2^+)$[a]		D	
1846.2[d] *3*	$23/2^-$&	1.02[#] ps *24*	D G	$T_{1/2}$: from 2006Gr10; 0.83 ps *35* (2004Li27).
1889.97 *14*		≤30[#] ns	B	
1910.08 *13*	$(7/2^+)$	≤30[#] ns	B	Jπ: β decay from $7/2^+$ parent; from decay pattern.
1917.6 *3*			D	
1933.3[m] *4*	$(19/2^-)$		D	Jπ: from stretched E2 and stretched dipole γ's to $15/2^-$ and $(17/2^-)$ states, band assignment.
1951.2 *4*			D	
1997.1[n] *3*	$(17/2^+)$[b]		D	
2090.9[e] *3*	$(21/2^-)$		D	Jπ: from stretched dipole γ to $19/2^-$ state, band assignment.
2116.31[f] *21*	$(19/2^+)$[a]		D	
2121.8[k] *3*	$(21/2)^-$	38 ns *2*	D	Jπ: M1,E2 (ΔJ=1) γ to $19/2^-$ state; from band assignment.
2160.0 *3*			D	
2235.4[h] *3*	$(19/2^+)$[b]		D G	
2267.9[l] *5*	$(15/2^+)$[b]		D	
2345.7[l] *3*	$(17/2^+)$[b]		D	
2355.2[m] *4*	$(21/2^-)$[b]		D	
2477.3[j] *3*	$(19/2^-)$		D	Jπ: from band assignment, (E1) γ to $(17/2^+)$ state.
2497.9[l] *3*	$(19/2^+)$[b]		D	
2545.3[j] *3*	$(21/2^-)$		D	Jπ: from (M1) γ (nonstretched ΔJ=0) to $(21/2^-)$ state; from decay pattern and band assignment.
2549.3[k] *4*	$(23/2^-)$[b]		D	
2620.9[m] *4*	$(23/2^-)$		D	Jπ: from stretched E2, ΔJ=0 dipole and stretched dipole γ's to $19/2^-$, $23/2^-$ and $(21/2^-)$ states; band assignment.
2639.5[d] *4*	$27/2^-$&	0.35 ps *28*	D G	

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Adopted Levels, Gammas (continued)

^{131}La Levels (continued)

E(level)[†]	Jπ	$T_{1/2}$[‡]	XREF	Comments
2641.16[g] 22	(21/2+)[b]		D	
2679.7[h] 4	(23/2+)[&]		D G	
2680.75[l] 23	(21/2+)[b]		D	
2699.6[j] 3	(23/2−)[a]		D	
2845.1[n] 11	(21/2+)[b]		D	
2848.4[e] 4	(25/2−)		D	Jπ: from stretched dipole γ to 21/2− state, band assignment.
2915.5 4			D	
2935.6[j] 4	(25/2−)[a]		D	
2942.1[l] 3	(23/2+)[b]		D	
2975.3[f] 3	(23/2+)[a]		D	
3018.6[k] 4	(25/2−)[b]		D	
3118.8[m] 5	(25/2−)[b]		D	
3145.8[i] 4	(25/2+)		D G	Jπ: from band assignment; stretched (M1,E2) γ to (23/2+) and (E1) γ to (23/2−) states.
3243.8[j] 4	(27/2−)[a]		D	
3267.8[h] 4	(27/2+)		D G	Jπ: from band assignment; ΔJ=0, (E1) γ to (27/2−) and stretched (E2) γ to (23/2+) states.
3287.2 4			D	
3369.1[l] 3	(25/2+)[b]		D	
3399.5[m] 4	(27/2−)		D	Jπ: from stretched E2, ΔJ=0 dipole and stretched dipole γ′s to 23/2−, 27/2− and (25/2−) states; band assignment.
3483.4? 10			D	
3527.4[k] 8	(27/2−)[b]		D	
3541.0[d] 4	31/2−[&]	0.31 ps 9	D G	$T_{1/2}$: from 2006Gr10; 0.35 ps 28 (2004Li27).
3544.4? 10			D	
3580.7 4			D	
3610.5[j] 4	(29/2−)[a]		D	
3619.0 4			D	
3654.8 4			D	
3682.5[e] 4	(29/2−)		D	Jπ: from stretched dipole γ to 27/2− state, band assignment.
3689.1[i] 4	(29/2+)[a]		D G	
3809.3[f] 4	(27/2+)[b]		D	
3922.5 4			D	
3973.6[h] 4	(31/2+)[&]		D G	
3988.7?[m] 10	(29/2−)[b]		D	
4024.4[j] 5	(31/2−)[a]		D	
4043.2? 10			D	
4230.9[m] 4	(31/2−)		D	Jπ: from ΔJ=0 dipole and stretched dipole γ′s to 31/2− and (29/2−) states; band assignment.
4332.1 5			D	
4376.9[i] 4	(33/2+)[a]		D G	
4381.4 5			D	
4479.9[j] 5	(33/2−)[a]		D	
4526.8[d] 5	35/2−[&]	0.47 ps 9	D G	$T_{1/2}$: from 2006Gr10.
4531.4[f] 4	(31/2+)[b]		D	
4580.2?[e] 7	(33/2−)[b]		D	
4703.6 5			D	
4775.4[h] 4	(35/2+)[&]		D G	

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Adopted Levels, Gammas (continued)

^{131}La Levels (continued)

E(level)[†]	Jπ	$T_{1/2}$[‡]	XREF	Comments
4839.1 *11*			D	
4968.4[j] *6*	(35/2⁻)[b]		D	
5103.9[m] *5*	(35/2⁻)		D	Jπ: from ΔJ=0 dipole γ to 35/2⁻ state; band assignment.
5184.3 *6*			D	
5210.6[i] *5*	(37/2⁺)[&]		D G	
5490.5[j] *6*	(37/2⁻)[b]		D	
5580.6[d] *10*	39/2⁻[&]	0.48 ps *11*	D G	$T_{1/2}$: from 2006Gr10.
5654.2[h] *4*	(39/2⁺)[b]		D G	
6038.2[j] *8*	(39/2⁻)[b]		D	
6139.2[i] *6*	(41/2⁺)[&]		D	
6602.0[h] *9*	(43/2⁺)[b]		D	
6606.1?[j] *6*	(41/2⁻)[b]		D	
6671.8[d] *16*	43/2⁻[&]	0.33 ps *9*	D G	$T_{1/2}$: from 2006Gr10.
7148.4[i] *7*	(45/2⁺)[b]		D G	
7185.1?[j] *12*	(43/2⁻)[b]		D	
7618.0[h] *11*	(47/2⁺)[b]		D G	
7733.4[d] *16*	(47/2⁻)[&]		D G	
8250.4[i] *9*	(49/2⁺)[b]		G	
8706.0[h] *12*	(51/2⁺)[b]		G	
8832.4?[d] *6*	(51/2⁻)[&]		D G	
9436.4[i] *10*	(53/2⁺)[b]		G	
9877.0[h] *13*	(55/2⁺)[b]		G	
9974.4?[d] *12*	(55/2⁻)[&]		D	
10696.4[i] *11*	(57/2⁺)[b]		G	
11143.0[h] *14*	(59/2⁺)[b]		G	
11200[@] *34*	1/2⁺[c]		E	Γ=45 keV IAS of ^{131}Ba g.s., 1/2⁺.
11323[@] *34*	(3/2)⁺[c]		E	Γ=59 keV IAS of ^{131}Ba 108, 3/2⁺.
12030.5[i] *12*	(61/2⁺)[b]		G	
12264[@] *34*	1/2⁻,3/2⁻[c]		E	Γ=61 keV IAS of ^{131}Ba 1100, 1/2⁻,3/2⁻.
12333[@] *34*	5/2⁻,7/2⁻[c]		E	Γ=67 keV IAS of ^{131}Ba 1162, 5/2⁻,7/2⁻.
12472[@] *34*	3/2⁻,1/2⁻[c]		E	Γ=62 keV IAS of ^{131}Ba 1317, 1/2⁻,3/2⁻.
12512.0[h] *15*	(63/2⁺)[b]		G	
13459.5[i] *13*	(65/2⁺)[b]		G	
13984.0[h] *16*	(67/2⁺)[b]		G	
15001.5[i] *14*	(69/2⁺)[b]		G	
15563.0[h] *16*	(71/2⁺)[b]		G	
17252.1[h] *17*	(75/2⁺)[b]		G	

[†] From least-squares fits to Eγ's assuming ΔEγ=0.5 if it not given, the normalized χ^2=0.72.

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Adopted Levels, Gammas (continued)

^{131}La Levels (continued)

‡ From recoil distance measurements in ^{116}Cd(^{19}F,4nγ), except as noted.
# From ^{131}Ce ε decay (γ(t) 1983ViZU).
@ IAR from ^{130}Ba(p,p). ΔE(level) is quadratic mean of ΔS(p)=28 and ΔE(p)=20.
& Stretched E2 γ cascade to bandhead; regular sequence of transitions in a cascade.
[a] From M1,E2 or (M1,E2) and/or stretched E2 or (E2) cascade-crossover relations.
[b] Based on band assignments and expected configurations.
[c] From angular momentum transfer in (p,p) and parent level spin and parity in ^{131}Ba.
[d] Band(A): Yrast band based on Configuration=(π $h_{11/2}$), (α=−1/2; signature) partner of band B; (Δ=178 keV).
[e] Band(B): Based on Configuration=(π $h_{11/2}$), (α=+1/2); signature partner of band A; (Δ=19 keV). Unified band A+B (K=11/2, Δ=255 keV).
[f] Band(C): Based on Configuration=(π $g_{7/2}$), (α=−1/2); signature partner of band D; (Δ=94 keV).
[g] Band(D): Based on Configuration=(π $g_{7/2}$), (α=+1/2); signature partner of band C; (Δ=18 keV). Unified band C+D (K=5/2, Δ=124 keV).
[h] Band(E): Based on Configuration=(π $g_{7/2}$)(π $H_{11/2}$)^2, (α=−1/2); signature partner of band F; (Δ=40 keV).
[i] Band(F): Based on Configuration=(π $g_{7/2}$)(π $H_{11/2}$)^2, (α=+1/2); signature partner of band E; (Δ=34 keV). Unified band e^+F (K=19/2, Δ=73 keV).
[j] Band(G): based on Configuration=(π $h_{11/2}$)(ν $H_{11/2}$)^2; (Δ=152 keV).
[k] Band(H): Based on configuration=(π,$g_{7/2}$)(ν $h_{11/2}$)(ν $g_{7/2}$); (δ=2 kev).
[l] Band(I): Possible band based on Configuration=(π $g_{7/2}$)(ν $H_{11/2}$)^2; (Δ=77eV).
[m] Band(J): negative-parity rotational level sequence; (Δ=65 keV).
[n] Band(K): Based on configuration=$\pi d_{5/2}$, α=+1/2; signature partner of band L; (Δ=15 keV).
[o] Band(L): Based on configuration=$\pi d_{5/2}$, α=−1/2; signature partner of band K; (Δ=2 keV). Unified band K+L (K=3/2, Δ=65 keV).

Adopted Levels, Gammas (continued)

$\gamma(^{131}La)$

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[#]	δ	α[d]	Comments
26.22	$5/2^+$	26.20[@] *5*	100	0.0	$3/2^+$	M1(+E2)	<0.05	8.31 *47*	B(M1)(W.u.)>0.13; B(E2)(W.u.)<4.1×10^2 δ: from 10.3-min ε decay. Mult.: M1 from comparison to RUL.
145.39	$(5/2^+)$	119.16[‡] *9*	100[@] *4*	26.22	$5/2^+$	M1			B(M1)(W.u.)>0.036
		145.41[‡] *5*	20.4[@] *20*	0.0	$3/2^+$	(M1,E2)			
195.68	$7/2^+$	169.38[‡] *6*	100[@]	26.22	$5/2^+$	M1,E2			
		195.71[‡] *12*	4.7[@] *9*	0.0	$3/2^+$	E2			B(E2)(W.u.)=11 *5*
230.44	$(1/2^+)$	204.3[&] *2*	1.2[&] *6*	26.22	$5/2^+$	(E2)			B(E2)(W.u.)>0.016
		230.43[&] *5*	100[&] *5*	0.0	$3/2^+$	(M1,E2)			
231.27	$(7/2^+)$	205.0[@] *2*	100[@] *10*	26.22	$5/2^+$				
		231.2[@] *3*	25[@] *6*	0.0	$3/2^+$				
304.60	$11/2^-$	108.9[a] *3*	100	195.68	$7/2^+$	M2		8.01	B(M2)(W.u.)=0.0513 *24*
416.83	$(7/2^+,9/2^+)$	186.74[@e] *17*	15[@] *5*	231.27	$(7/2^+)$				
		271.46[@] *19*	100[@] *6*	145.39	$(5/2^+)$				
		390.3[@] *3*	54[@] *27*	26.22	$5/2^+$				
421.56	$(7/2^+)$	226.1[@] *3*	5.9[@] *12*	195.68	$7/2^+$				
		276.1[@] *2*	6.7[@] *19*	145.39	$(5/2^+)$				
		395.31[‡] *8*	100[@] *7*	26.22	$5/2^+$				
		421.59[‡] *24*	31.2[@] *21*	0.0	$3/2^+$				
440.48	$(9/2^+)$	244.82[‡] *7*	40[@] *11*	195.68	$7/2^+$				
		414.26[‡] *6*	100[@] *9*	26.22	$5/2^+$				
459.90	$(5/2,7/2^+)$	264.2[@] *2*	69[@] *17*	195.68	$7/2^+$				
		433.70[@] *12*	100[@] *10*	26.22	$5/2^+$				
		459.8[@] *3*	26[@] *10*	0.0	$3/2^+$				
463.03	$(3/2,1/2)$	436.85[&] *12*	100[&] *8*	26.22	$5/2^+$				
		462.9[&] *2*	96[&] *13*	0.0	$3/2^+$				
588.11	$(9/2^+)$	147.67[@] *21*	16[@] *5*	440.48	$(9/2^+)$	D,E2			Mult.: from comparison to RUL.
		392.36[‡] *5*	94[@] *13*	195.68	$7/2^+$	(M1,E2)			
		442.78[‡] *9*	100[@] *13*	145.39	$(5/2^+)$				
		562.2[@] *2*	18.1[@] *25*	26.22	$5/2^+$				
		588.4[@e] *2*	18[@] *4*	0.0	$3/2^+$				
595.14	$(3/2,1/2)$	568.95[&] *10*	100[&] *10*	26.22	$5/2^+$				
		595.0[&] *2*	35[&] *6*	0.0	$3/2^+$				

$^{131}_{57}La_{74}$-6

Adopted Levels, Gammas (continued)

γ(^{131}La) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[#]	Comments
640.74	15/2$^-$	336.1[‡] *1*	100	304.60	11/2$^-$	E2	B(E2)↓=0.33 *2* (1992Za11) B(E2)(W.u.)=87 *3*
671.66	(11/2$^+$)	231.00[‡] *17*	8.3[@] *3*	440.48	(9/2$^+$)	M1	B(M1)(W.u.)>3.9×10^{-6}
		257.0[@e] *2*	4.8[@] *6*				
		440.4[@] *4*	14[@] *3*	231.27	(7/2$^+$)		
		476.01[‡] *13*	100 *11*	195.68	7/2$^+$	(E2)	B(E2)(W.u.)>0.015
743.31	(5/2$^+$,7/2$^+$)	155.20[@] *2*	15[@] *6*	588.11	(9/2$^+$)		
		302.90[@] *21*	32[@] *6*	440.48	(9/2$^+$)		
		547.7[@] *4*	100[@] *10*	195.68	7/2$^+$		
		598.44[@e] *18*	100[@] *10*	145.39	(5/2$^+$)		
		742.20[@e] *24*	24[@] *7*	0.0	3/2$^+$		
906.7	(13/2$^-$)	265.8 *3*		640.74	15/2$^-$		Mult.: stretched dipole.
		602.0 *3*		304.60	11/2$^-$		Mult.: stretched dipole.
911.17	(5/2$^+$,7/2$^+$)	470.6[@] *2*	84[@] *30*	440.48	(9/2$^+$)		
		489.7[@] *3*	≈41[@]	421.56	(7/2$^+$)		
		715.7[@c]	84[@] *24*	195.68	7/2$^+$		
		911.3[@] *5*	100[@] *24*	0.0	3/2$^+$		
946.13		202.0[@]		743.31	(5/2$^+$,7/2$^+$)		
		750.6[@] *2*	100[@] *20*	195.68	7/2$^+$		
		800.7[@] *3*	39[@] *10*	145.39	(5/2$^+$)		
1024.44	(11/2$^+$)	353.2[@] *3*	20[@] *7*	671.66	(11/2$^+$)		
		564.4[@e]	≈13[@]	459.90	(5/2,7/2$^+$)		
		584.02[‡] *23*	53[@] *7*	440.48	(9/2$^+$)		
		602.85[‡] *10*	100[@] *10*	421.56	(7/2$^+$)		
		607.60[@] *19*	51[@] *6*	416.83	(7/2$^+$,9/2$^+$)		
		792.7[@] *5*	7[@] *3*	231.27	(7/2$^+$)		
1055.28	(13/2$^+$)	383.5 *2*	11.8 *14*	671.66	(11/2$^+$)		
		614.9 *1*	100 *3*	440.48	(9/2$^+$)	(E2)	
		751 *1*		304.60	11/2$^-$		
1174.2	19/2$^-$	533.5[‡] *1*	100	640.74	15/2$^-$	E2	B(E2)↓=0.42 *12* (1992Za11) B(E2)(W.u.)=87 *10*
1224.3		583.6 *3*	100	640.74	15/2$^-$		
1225.81	(13/2$^+$)	637.7 *2*	100	588.11	(9/2$^+$)		
1329.04	(15/2$^+$)	273.9 *2*	15 *3*	1055.28	(13/2$^+$)		
		657.3 *1*	100 *3*	671.66	(11/2$^+$)	(E2)	

$^{131}_{57}La_{74}$-7

Adopted Levels, Gammas (continued)

γ(^{131}La) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[#]	Comments
1357.0	(15/2$^-$)	449.9 *3*		906.7	(13/2$^-$)		Mult.: stretched dipole.
		715.8 *3*		640.74	15/2$^-$		Mult.: ΔJ=0 dipole.
		1053 *1*		304.60	11/2$^-$		Mult.: stretched E2.
1410.7	(17/2$^-$)	770.0 *3*	100	640.74	15/2$^-$		Mult.: stretched dipole.
1444.9		537.8 *3*		906.7	(13/2$^-$)		
		1140.7 *3*		304.60	11/2$^-$		
1704.9		480.7 *3*		1224.3			
		530.5 *3*		1174.2	19/2$^-$		
1752.3?	(17/2$^-$)	396[e] *1*		1357.0	(15/2$^-$)		
		845[e] *1*		906.7	(13/2$^-$)		
1752.4	(15/2$^+$)	728 *1*	100	1024.44	(11/2$^+$)		
1774.55	(3/2$^+$,5/2$^+$,7/2$^+$)	1186.7[@] *5*	26[@] *10*	588.11	(9/2$^+$)		
		1357.6[@] *2*	62[@] *9*	416.83	(7/2$^+$,9/2$^+$)		
		1748.8[@] *5*	17[@] *5*	26.22	5/2$^+$		
		1774.5[c@]	100[@] *13*	0.0	3/2$^+$		
1781.93		835.8[@] *1*	100[@]	946.13			
1809.13	(17/2$^+$)	479.9 *3*	13 *4*	1329.04	(15/2$^+$)		
		753.9 *1*	100 *4*	1055.28	(13/2$^+$)	(E2)	
		1169 *1*	<6.5	640.74	15/2$^-$		
1846.2	23/2$^-$	672.0[‡] *2*	100	1174.2	19/2$^-$	E2	B(E2)↓=0.47 *20* (1992Za11); B(E2)↓=0.41 *+13−8* (2006Gr10) B(E2)(W.u.)=97 *22*
1889.97		1449.4[@] *2*	58[@] *9*	440.48	(9/2$^+$)		
		1694.2[@] *2*	100[@] *15*	195.68	7/2$^+$		
		1864.1[@] *3*	20[@] *5*	26.22	5/2$^+$		
1910.08	(7/2$^+$)	885.7 *7*	34[@] *5*	1024.44	(11/2$^+$)		
		1166.5[@] *6*	31.8[@] *17*	743.31	(5/2$^+$,7/2$^+$)		
		1238.5[@] *5*	22.9[@] *23*	671.66	(11/2$^+$)		
		1469.66[@] *16*	100[@] *6*	440.48	(9/2$^+$)		
		1488.4[@] *4*	35[@] *4*	421.56	(7/2$^+$)		
		1714.2[@] *4*	9.5[@] *20*	195.68	7/2$^+$		
		1883.8[@] *4*	8.6[@] *20*	26.22	5/2$^+$		
1917.6		472.7 *3*		1444.9			
		559.8 *3*		1357.0	(15/2$^-$)		
		1011.1 *3*		906.7	(13/2$^-$)		
1933.3	(19/2$^-$)	522.6 *3*	100 *50*	1410.7	(17/2$^-$)		Mult.: stretched dipole.
		1293.2 *5*	79 *43*	640.74	15/2$^-$		Mult.: stretched E2.
1951.2		1310.2 *4*	100	640.74	15/2$^-$		

$^{131}_{57}La_{74}$-8

Adopted Levels, Gammas (continued)

γ(^{131}La) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[#]	Comments
1997.1	(17/2$^+$)	771.3 *2*	100	1225.81	(13/2$^+$)		
2090.9	(21/2$^-$)	680.3 *3*		1410.7	(17/2$^-$)		
		916.6 *3*	100	1174.2	19/2$^-$		Mult.: stretched dipole.
2116.31	(19/2$^+$)	307.4 *4*	15 *4*	1809.13	(17/2$^+$)		
		787.2 *2*	100 *4*	1329.04	(15/2$^+$)	(E2)	
2121.8	(21/2)$^-$	711.3 *8*	29 *15*	1410.7	(17/2$^-$)		
		947.6 *1*	100 *15*	1174.2	19/2$^-$	M1,E2	
2160.0		242.0 *3*		1917.6			
		749.4 *2*	100	1410.7	(17/2$^-$)		
2235.4	(19/2$^+$)	1061.17[‡] *19*	100	1174.2	19/2$^-$		
2267.9	(15/2$^+$)	315 *1*		1951.2			
		1361.6 *5*		906.7	(13/2$^-$)		
2345.7	(17/2$^+$)	78 *1*		2267.9	(15/2$^+$)		
		394.6 *3*	100 *50*	1951.2			
		900.9 *3*		1444.9			
		988.8 *3*		1357.0	(15/2$^-$)		
		1171.4 *4*	33 *17*	1174.2	19/2$^-$		
2355.2	(21/2$^-$)	422.1 *3*		1933.3	(19/2$^-$)		
		650.1 *3*	100	1704.9			
		944.5 *3*		1410.7	(17/2$^-$)		
2477.3	(19/2$^-$)	131.6 *1*	100.0 *23*	2345.7	(17/2$^+$)	(E1)	
		317.3 *1*	12 *6*	2160.0			
		559.5 *5*		1917.6			
2497.9	(19/2$^+$)	152.1 *3*		2345.7	(17/2$^+$)		
		580.2 *3*		1917.6			
2545.3	(21/2$^-$)	67.3 *6*		2477.3	(19/2$^-$)		
		423.5 *1*	100	2121.8	(21/2)$^-$	(M1)	
2549.3	(23/2$^-$)	427.5 *2*	100	2121.8	(21/2)$^-$		
2620.9	(23/2$^-$)	529.9 *3*		2090.9	(21/2$^-$)		Mult.: stretched dipole.
		687.6 *3*		1933.3	(19/2$^-$)		
		774 *1*	60 *30*	1846.2	23/2$^-$		Mult.: ΔJ=0 dipole.
		1446.8 *5*	100 *50*	1174.2	19/2$^-$		Mult.: stretched E2.
2639.5	27/2$^-$	793.15[‡] *23*	100	1846.2	23/2$^-$	E2	B(E2)↓=0.49 *39* (1992Za11); B(E2)↓=0.35 *+13−7* (2006Gr10) B(E2)(W.u.)=1.3×10^2 *11*
2641.16	(21/2$^+$)	525 *1*		2116.31	(19/2$^+$)		
		832.0 *2*	100	1809.13	(17/2$^+$)		
2679.7	(23/2$^+$)	444.25[‡] *25*	100	2235.4	(19/2$^+$)	(E2)	Mult.: stretched (ΔJ=2) E2.
		833.60[‡] *24*		1846.2	23/2$^-$		
2680.75	(21/2$^+$)	182.6 *3*		2497.9	(19/2$^+$)		
		564 *1*		2116.31	(19/2$^+$)		
		871.8 *3*		1809.13	(17/2$^+$)		

$^{131}_{57}La_{74}$-9

Adopted Levels, Gammas (continued)

γ(^{131}La) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[#]	Comments
2680.75	(21/2$^+$)	1506.8 *5*		1174.2	19/2$^-$		
2699.6	(23/2$^-$)	154.3 *1*	100	2545.3	(21/2$^-$)	(M1,E2)	
2845.1	(21/2$^+$)	848 *1*	100	1997.1	(17/2$^+$)		
2848.4	(25/2$^-$)	757.5 *3*	33 *20*	2090.9	(21/2$^-$)		
		1002.1 *3*	100 *50*	1846.2	23/2$^-$		Mult.: stretched dipole.
2915.5		234.8 *3*	100	2680.75	(21/2$^+$)		
2935.6	(25/2$^-$)	236.1 *3*	100.0 *24*	2699.6	(23/2$^-$)	(M1,E2)	
		389.9 *7*	11.9 *12*	2545.3	(21/2$^-$)		
2942.1	(23/2$^+$)	261.3 *3*		2680.75	(21/2$^+$)		
		301.0 *3*		2641.16	(21/2$^+$)		
2975.3	(23/2$^+$)	859.0 *2*	100	2116.31	(19/2$^+$)	(E2)	
3018.6	(25/2$^-$)	469.3 *2*		2549.3	(23/2$^-$)		
		896 *1*		2121.8	(21/2)$^-$		
3118.8	(25/2$^-$)	763.6 *3*	100 *50*	2355.2	(21/2$^-$)		
		1028 *1*	25 *17*	2090.9	(21/2$^-$)		
3145.8	(25/2$^+$)	466.29[‡] *26*	100 *3*	2679.7	(23/2$^+$)	(M1,E2)	
		1299.4[‡] *4*	31.9 *15*	1846.2	23/2$^-$	(E1)	
3243.8	(27/2$^-$)	308.2 *1*	100 *4*	2935.6	(25/2$^-$)	(M1,E2)	
		544.1 *6*	7.9 *16*	2699.6	(23/2$^-$)		
3267.8	(27/2$^+$)	588.0[‡] *1*	100 *3*	2679.7	(23/2$^+$)	(E2)	Mult.: stretched (ΔJ=2) E2.
		628.48[‡] *21*	47.2 *14*	2639.5	27/2$^-$	(E1)	nonstretched (ΔJ=0).
3287.2		345.0 *3*		2942.1	(23/2$^+$)		
		371.5 *3*		2915.5			
3369.1	(25/2$^+$)	427.1 *3*		2942.1	(23/2$^+$)		
		727.8 *3*		2641.16	(21/2$^+$)		
3399.5	(27/2$^-$)	551.1 *3*	40 *20*	2848.4	(25/2$^-$)		Mult.: stretched dipole.
		760.0 *3*	60 *30*	2639.5	27/2$^-$		Mult.: ΔJ=0 dipole.
		778 *1*	100 *50*	2620.9	(23/2$^-$)		
		1553.8 *5*	60 *30*	1846.2	23/2$^-$		Mult.: stretched E2.
3483.4?		844[e] *1*	100	2641.16	(21/2$^+$)		
3527.4	(27/2$^-$)	509 *1*		3018.6	(25/2$^-$)		
		978 *1*		2549.3	(23/2$^-$)		
3541.0	31/2$^-$	901.4 *3*	100	2639.5	27/2$^-$	E2	B(E2)↓=0.26 *21* (1992Za11); B(E2)↓=0.26 *+9−5* (2006Gr10) B(E2)(W.u.)=78 *23*
3544.4?		902.5[e] *25*	100	2641.16	(21/2$^+$)		E_γ: unweighted average of 905 (^{19}F,4nγ) and 900 (^{36}Mo,p4nγ).
3580.7		941.0 *3*	100 *33*	2639.5	27/2$^-$		
		1734.8 *5*	67 *33*	1846.2	23/2$^-$		
3610.5	(29/2$^-$)	366.6 *1*	100 *3*	3243.8	(27/2$^-$)	(M1,E2)	
		675.6 *4*	14 *3*	2935.6	(25/2$^-$)		
3619.0		331.5 *3*		3287.2			
		703.8 *3*		2915.5			

$^{131}_{57}La_{74}$-10

Adopted Levels, Gammas (continued)

γ(^{131}La) (continued)

E_i(level)	J_i^π	E_γ [†]	I_γ [†]	E_f	J_f^π	Mult.[#]	Comments
3654.8		1015.1 *3*	100	2639.5	27/2$^-$		
3682.5	(29/2$^-$)	834.1 *3*		2848.4	(25/2$^-$)		
		1043.0 *3*	100	2639.5	27/2$^-$		Mult.: stretched dipole.
3689.1	(29/2$^+$)	421.43[‡] *19*	45 *4*	3267.8	(27/2$^+$)	(M1,E2)	
		543.29[‡] *10*	100 *7*	3145.8	(25/2$^+$)		Mult.: stretched (ΔJ=2) E2.
		1049.1 *3*		2639.5	27/2$^-$		
3809.3	(27/2$^+$)	834.0 *2*	100	2975.3	(23/2$^+$)		
3922.5		267.4 *3*	90	3654.8			
		341.7 *3*	100 *50*	3580.7			
3973.6	(31/2$^+$)	284.5[‡] *4*	3.5 *9*	3689.1	(29/2$^+$)		
		705.96[‡] *19*	100 *3*	3267.8	(27/2$^+$)	(E2)	Mult.: stretched (ΔJ=2) E2.
3988.7?	(29/2$^-$)	870[e] *1*		3118.8	(25/2$^-$)		
4024.4	(31/2$^-$)	413.9 *1*	100 *4*	3610.5	(29/2$^-$)	(M1,E2)	
		780.7 *4*	15 *4*	3243.8	(27/2$^-$)		
4043.2?		756[e] *1*		3287.2			
4230.9	(31/2$^-$)	548[e] *1*		3682.5	(29/2$^-$)		Mult.: stretched dipole.
		690.0 *3*		3541.0	31/2$^-$		Mult.: ΔJ=0 dipole.
		831.5 *3*		3399.5	(27/2$^-$)		
4332.1		409.6 *3*	100	3922.5			
4376.9	(33/2$^+$)	403.35[‡] *19*	12.7 *16*	3973.6	(31/2$^+$)	(M1,E2)	
		687.81[‡] *10*	100 *4*	3689.1	(29/2$^+$)	(E2)	Mult.: stretched (ΔJ=2) E2.
		837[e] *1*		3541.0	31/2$^-$		
4381.4		458.7 *3*	70 *40*	3922.5			
		1742.5 *5*	100 *50*	2639.5	27/2$^-$		
4479.9	(33/2$^-$)	455.4 *3*	100 *14*	4024.4	(31/2$^-$)	(M1,E2)	
		869.8 *5*	27 *7*	3610.5	(29/2$^-$)		
4526.8	35/2$^-$	985.6[‡] *3*	100	3541.0	31/2$^-$	E2	B(E2)↓=0.19 *+5−3* (2006Gr10) B(E2)(W.u.)=33 *7*
4531.4	(31/2$^+$)	722.1 *2*	100	3809.3	(27/2$^+$)		
4580.2?	(33/2$^-$)	897[e] *1*		3682.5	(29/2$^-$)		
		1040[e] *1*		3541.0	31/2$^-$		
4703.6		371.4 *3*	35 *18*	4332.1			
		472.8 *3*	100 *50*	4230.9	(31/2$^-$)		
4775.4	(35/2$^+$)	398.4[‡] *5*	8 *3*	4376.9	(33/2$^+$)		
		801.77[‡] *15*	100 *3*	3973.6	(31/2$^+$)	(E2)	Mult.: stretched (ΔJ=2) E2.
4839.1		507 *1*	100	4332.1			
4968.4	(35/2$^-$)	488.6 *3*	100 *10*	4479.9	(33/2$^-$)		
		943.9 *7*	20 *10*	4024.4	(31/2$^-$)		
5103.9	(35/2$^-$)	577.0 *3*	43 *30*	4526.8	35/2$^-$		Mult.: ΔJ=0 dipole.

$^{131}_{57}La_{74}$-11

Adopted Levels, Gammas (continued)

γ(^{131}La) (continued)

E_i(level)	J_i^π	E_γ [†]	I_γ [†]	E_f	J_f^π	Mult.[#]	Comments
5103.9	(35/2$^-$)	873.2 *3*	100 *60*	4230.9	(31/2$^-$)		
5184.3		480.7 *3*	100	4703.6			
5210.6	(37/2$^+$)	435 *1*	1.8 *6*	4775.4	(35/2$^+$)		
		833.7[‡] *3*	100.0 *19*	4376.9	(33/2$^+$)	(E2)	Mult.: stretched (ΔJ=2) E2.
5490.5	(37/2$^-$)	522.2 *3*	100 *17*	4968.4	(35/2$^-$)		
		1010 *1*	<17	4479.9	(33/2$^-$)		
5580.6	39/2$^-$	1053.8[‡] *8*	100	4526.8	35/2$^-$		B(E2)↓=0.13 *+4−2* (2006Gr10) E_γ: unweighted average of 1054.4 (^{19}F,4nγ) and 1053.0 (^{36}Mo,p4nγ).
5654.2	(39/2$^+$)	878.77[‡] *15*	100	4775.4	(35/2$^+$)	(E2)	Mult.: stretched (ΔJ=2) E2.
6038.2	(39/2$^-$)	547.8 *5*	100 *33*	5490.5	(37/2$^-$)		
		1069 *1*	<33	4968.4	(35/2$^-$)		
6139.2	(41/2$^+$)	928.6[‡] *3*	100	5210.6	(37/2$^+$)	(E2)	Mult.: stretched (ΔJ=2) E2.
6602.0	(43/2$^+$)	947.8[‡] *8*	100	5654.2	(39/2$^+$)		E_γ: unweighted average of 948.5 Cd(^{19}F,4nγ) and 947.0 (^{36}Mo,p4nγ). Mult.: stretched (ΔJ=2) E2.
6606.1?	(41/2$^-$)	568.5[e] *6*		6038.2	(39/2$^-$)		
		1115[e] *1*		5490.5	(37/2$^-$)		
6671.8	43/2$^-$	1091.2 *12*	100	5580.6	39/2$^-$	E2	B(E2)↓=0.16 *+6−3* (2006Gr10) B(E2)(W.u.)=28 *8* E_γ: unweighted average of 1092.4 (^{19}F,4nγ) and 1990.0 (^{36}Mo,p4nγ).
7148.4	(45/2$^+$)	1009.2 *4*	100	6139.2	(41/2$^+$)		
7185.1?	(43/2$^-$)	579[e] *1*	100	6606.1?	(41/2$^-$)		
7618.0	(47/2$^+$)	1016.0[‡] *5*	100	6602.0	(43/2$^+$)		
7733.4	(47/2$^-$)	1061.6 *4*	100	6671.8	43/2$^-$	E2	E_γ: 1067.0 in (^{36}Mo,p4nγ).
8250.4	(49/2$^+$)	1102.0[b]		7148.4	(45/2$^+$)		
8706.0	(51/2$^+$)	1088.0[b]		7618.0	(47/2$^+$)		
8832.4?	(51/2$^-$)	1097.1[e] *4*	100	7733.4	(47/2$^-$)		E_γ: 1129.0 in (^{36}Mo,p4nγ).
9436.4	(53/2$^+$)	1186.0[b]		8250.4	(49/2$^+$)		
9877.0	(55/2$^+$)	1171.0[b]		8706.0	(51/2$^+$)		
9974.4?	(55/2$^-$)	1142[e] *1*	100	8832.4?	(51/2$^-$)		
10696.4	(57/2$^+$)	1260.0[b]		9436.4	(53/2$^+$)		
11143.0	(59/2$^+$)	1266.0[b]		9877.0	(55/2$^+$)		
12030.5	(61/2$^+$)	1334.0[b]		10696.4	(57/2$^+$)		
12512.0	(63/2$^+$)	1369.0[b]		11143.0	(59/2$^+$)		
13459.5	(65/2$^+$)	1429.0[b]		12030.5	(61/2$^+$)		
13984.0	(67/2$^+$)	1472.0[b]		12512.0	(63/2$^+$)		
15001.5	(69/2$^+$)	1542.0[b]		13459.5	(65/2$^+$)		

$^{131}_{57}La_{74}$-12

Adopted Levels, Gammas (continued)

$\gamma(^{131}La)$ (continued)

E_i(level)	J_i^π	E_γ †	E_f	J_f^π
15563.0	$(71/2^+)$	1579.0[b]	13984.0	$(67/2^+)$
17252.1	$(75/2^+)$	1689.0[b]	15563.0	$(71/2^+)$

† From $^{116}Cd(^{19}F,4n\gamma)$, except as noted.
‡ Weighted average of all available data, assuming $\Delta E\gamma$=0.5, if not given.
# From α(exp), $\gamma\gamma(\theta)$.
@ From ^{131}Ce ε decay (10.3 min).
& From ^{131}Ce ε decay (5.4 min).
a From ^{131}La IT decay (170 μs).
b From $^{100}Mo(^{36}S,p4n\gamma)$.
c Doublet.
d Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.
e Placement of transition in the level scheme is uncertain.

$^{131}_{57}La_{74}$-13

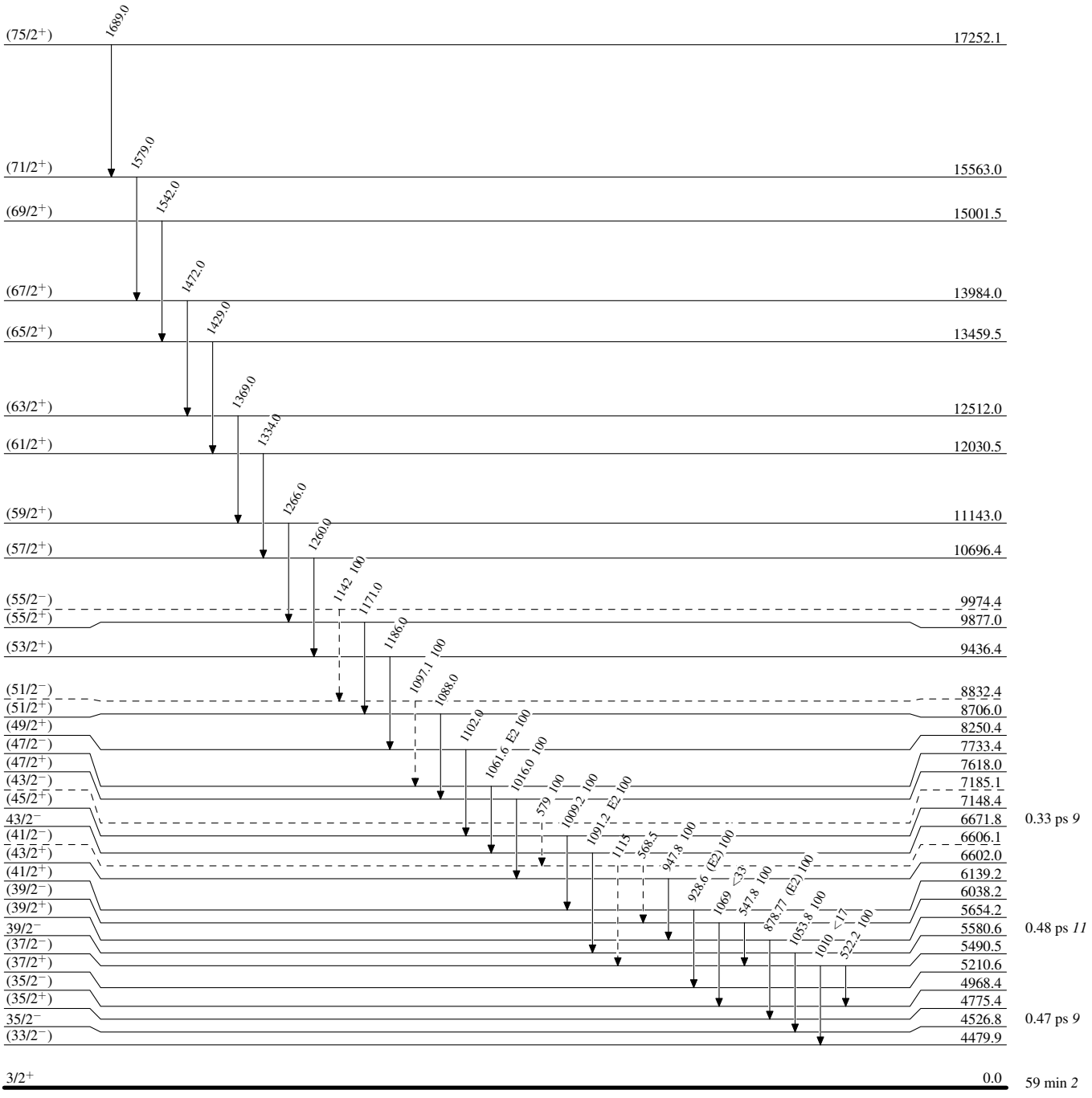
Adopted Levels, Gammas

Legend

Level Scheme

Intensities: Relative photon branching from each level

- - - - - - ► γ Decay (Uncertain)



$^{131}_{57}La_{74}$

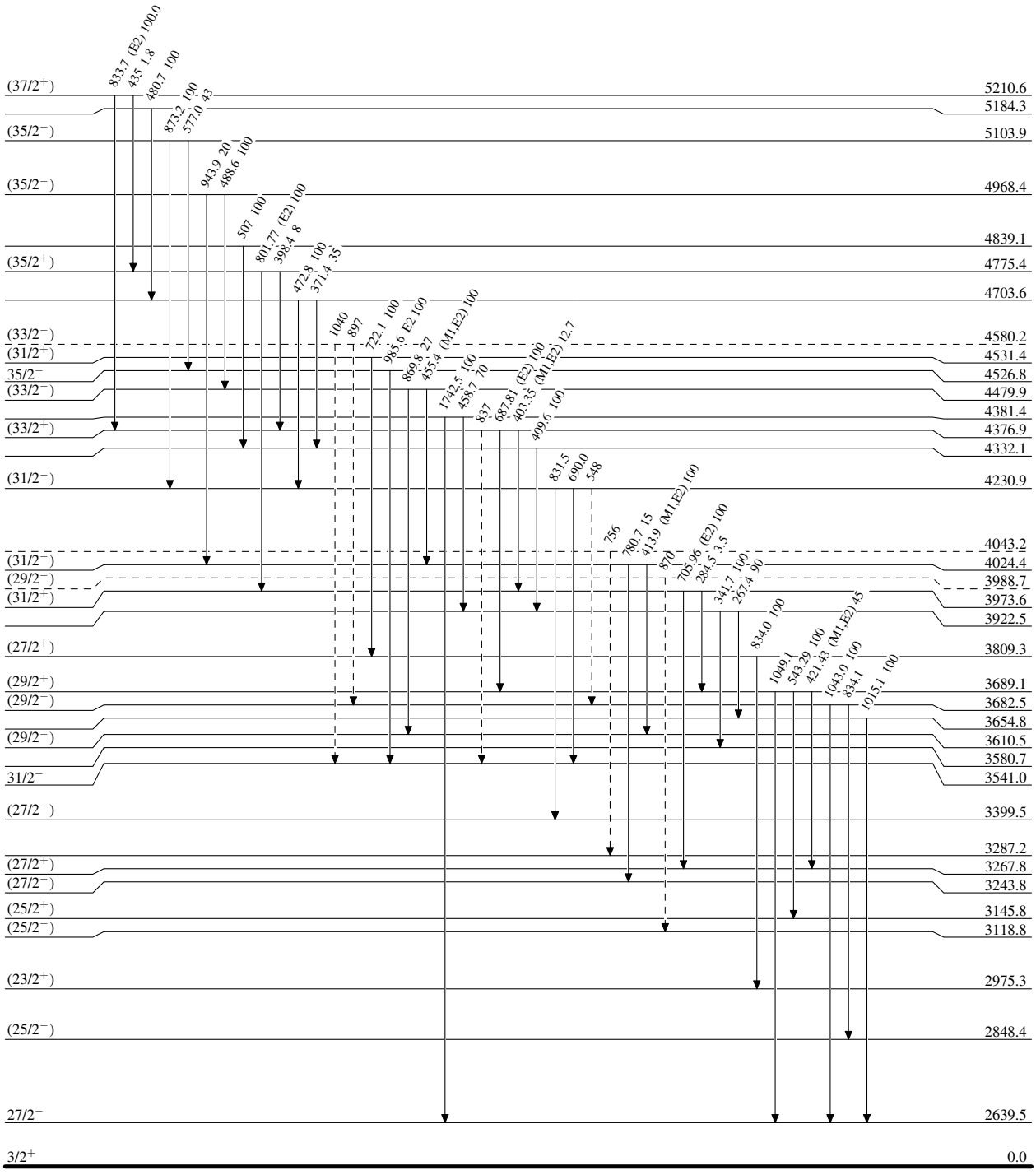
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

γ Decay (Uncertain)



$^{131}_{57}La_{74}$

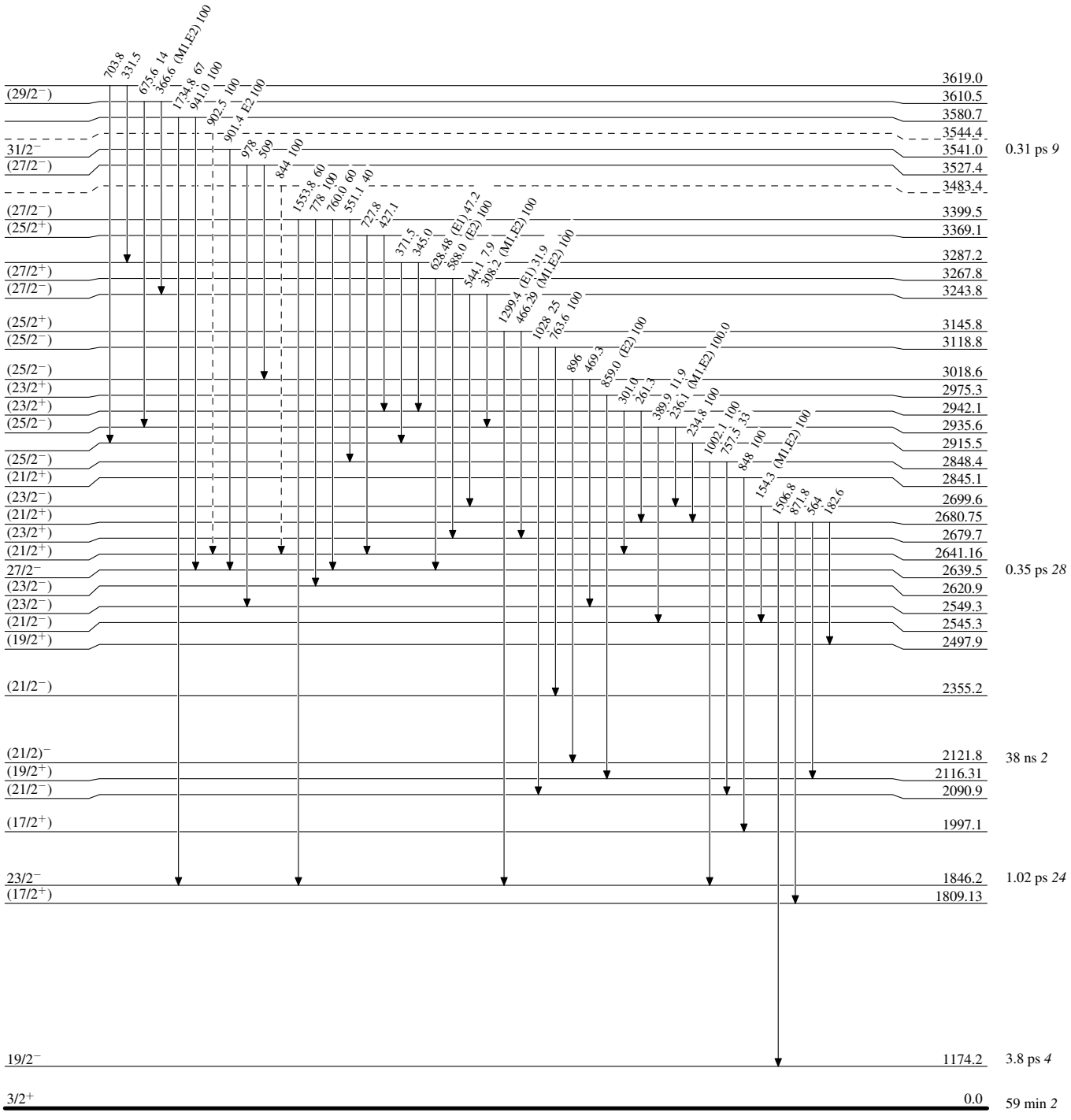
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

γ Decay (Uncertain)

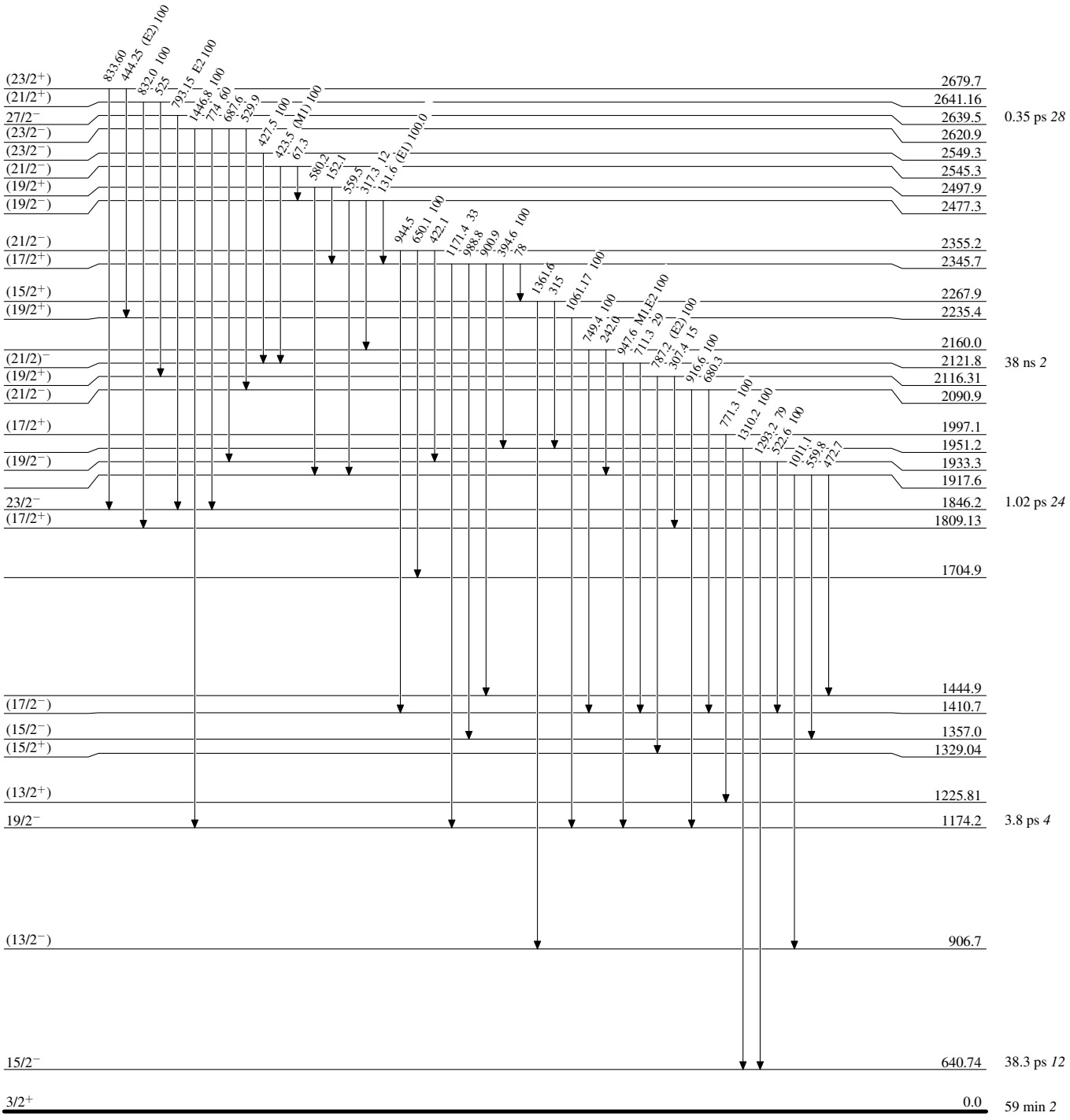


$^{131}_{57}La_{74}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

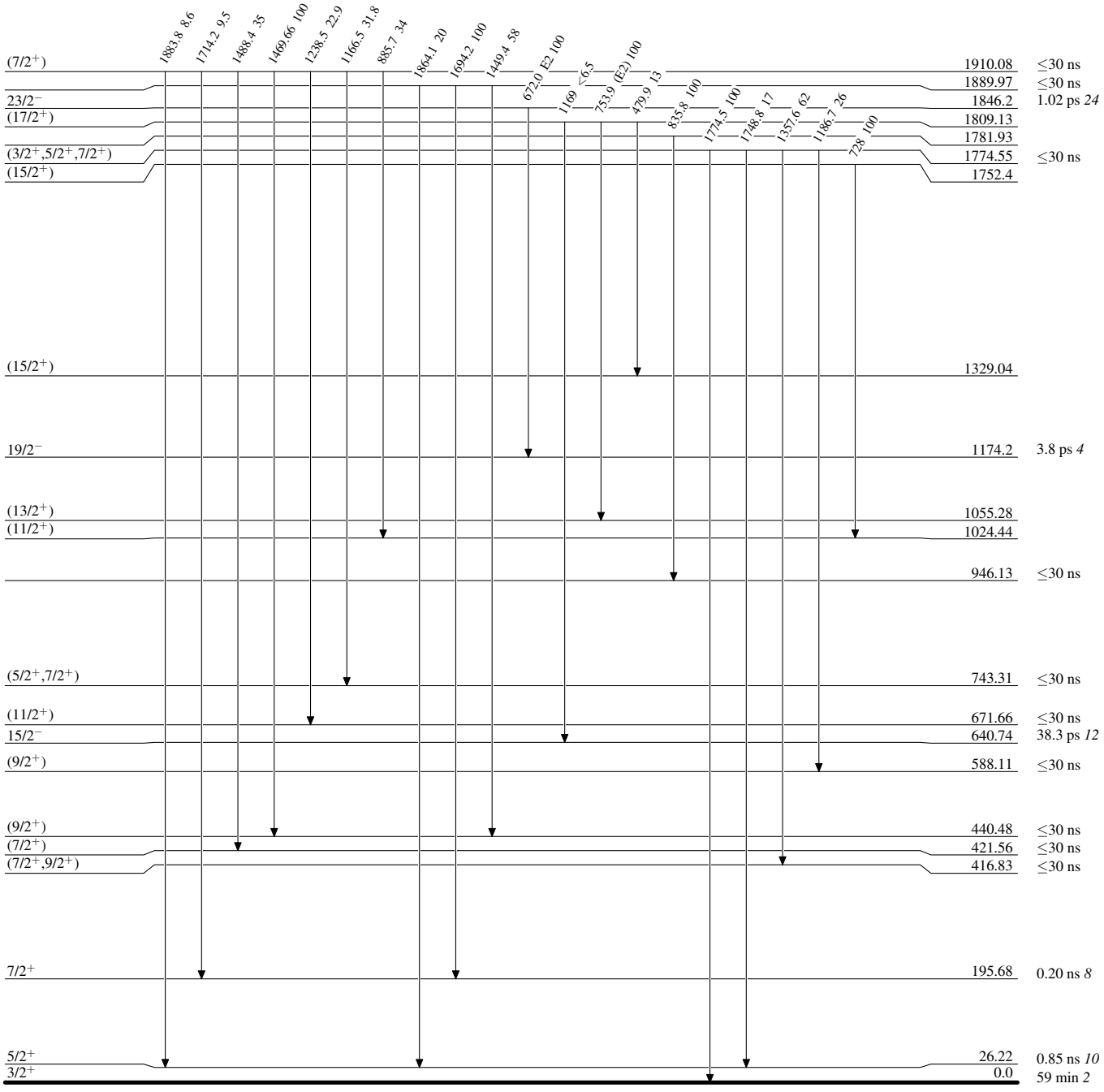


$^{131}_{57}La_{74}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



$^{131}_{57}La_{74}$

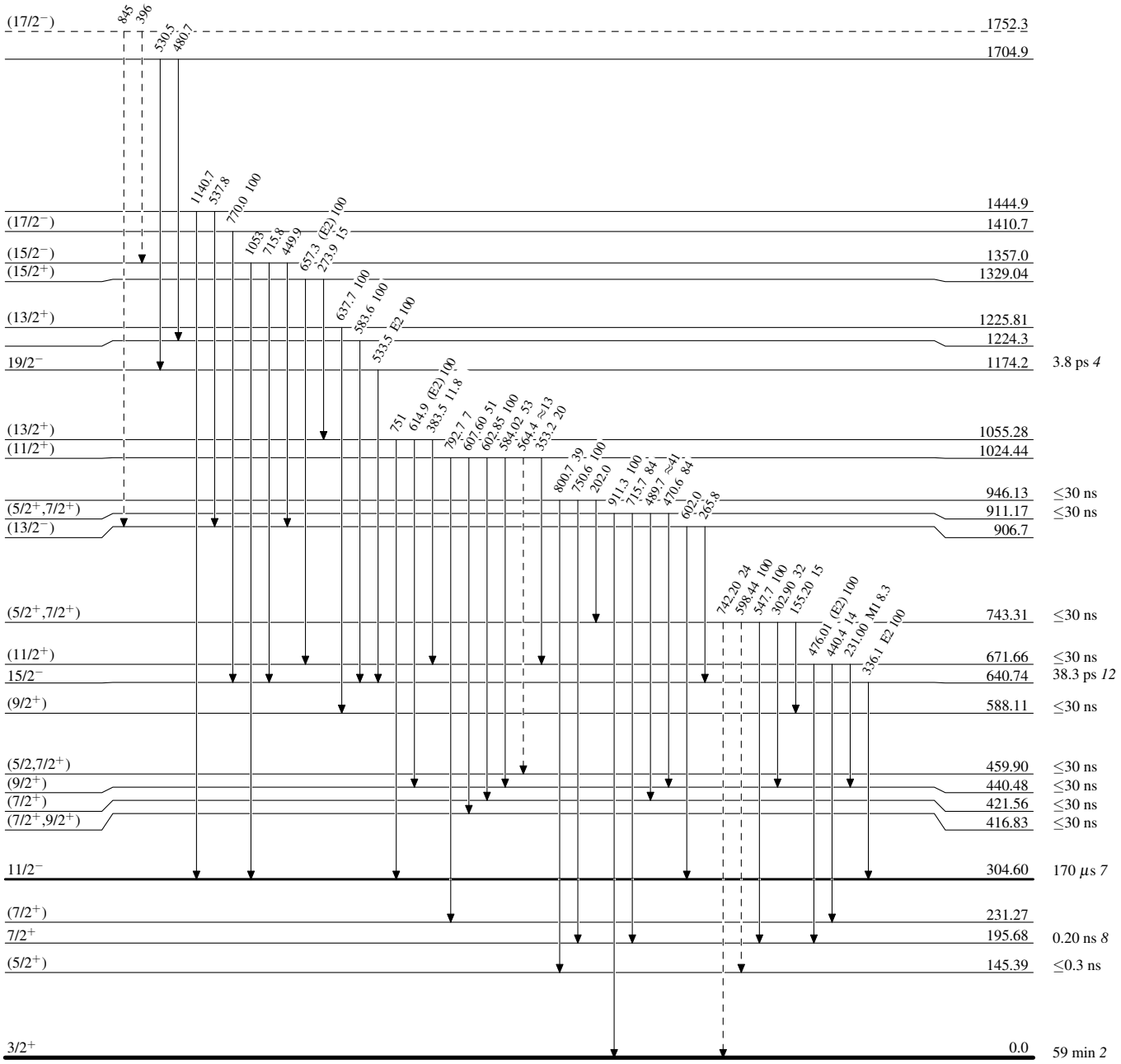
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

γ Decay (Uncertain)



$^{131}_{57}La_{74}$

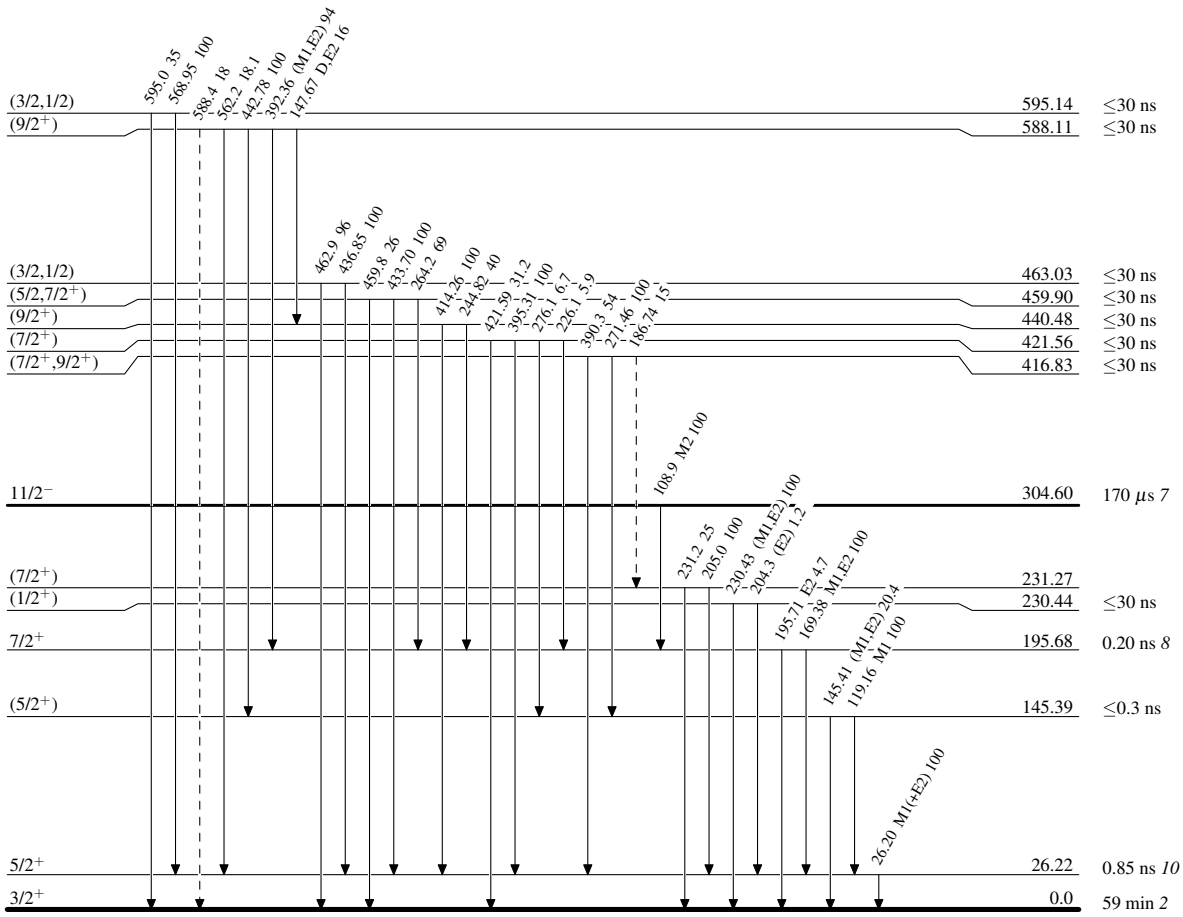
Adopted Levels, Gammas

Legend

Level Scheme (continued)

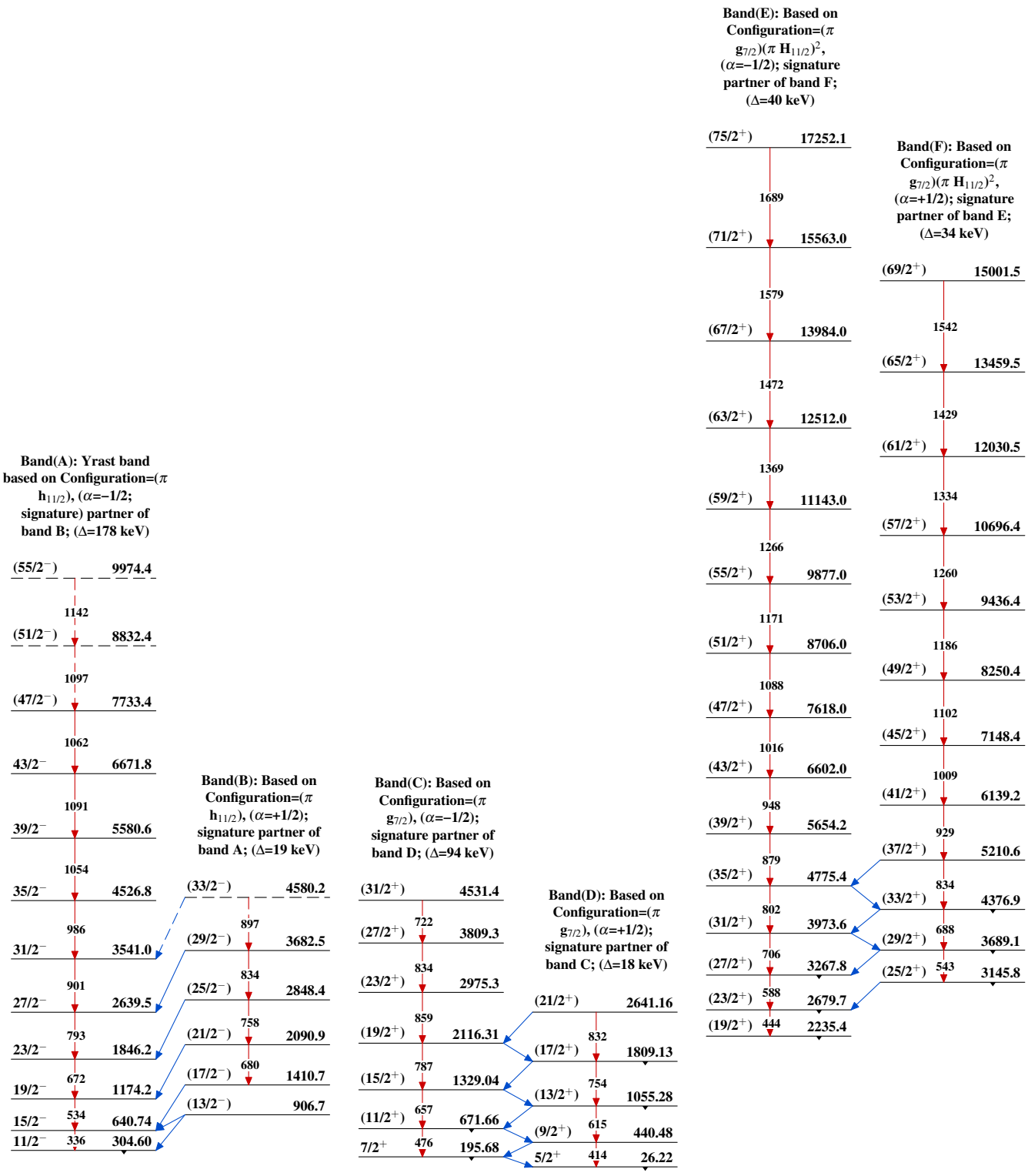
Intensities: Relative photon branching from each level

γ Decay (Uncertain)



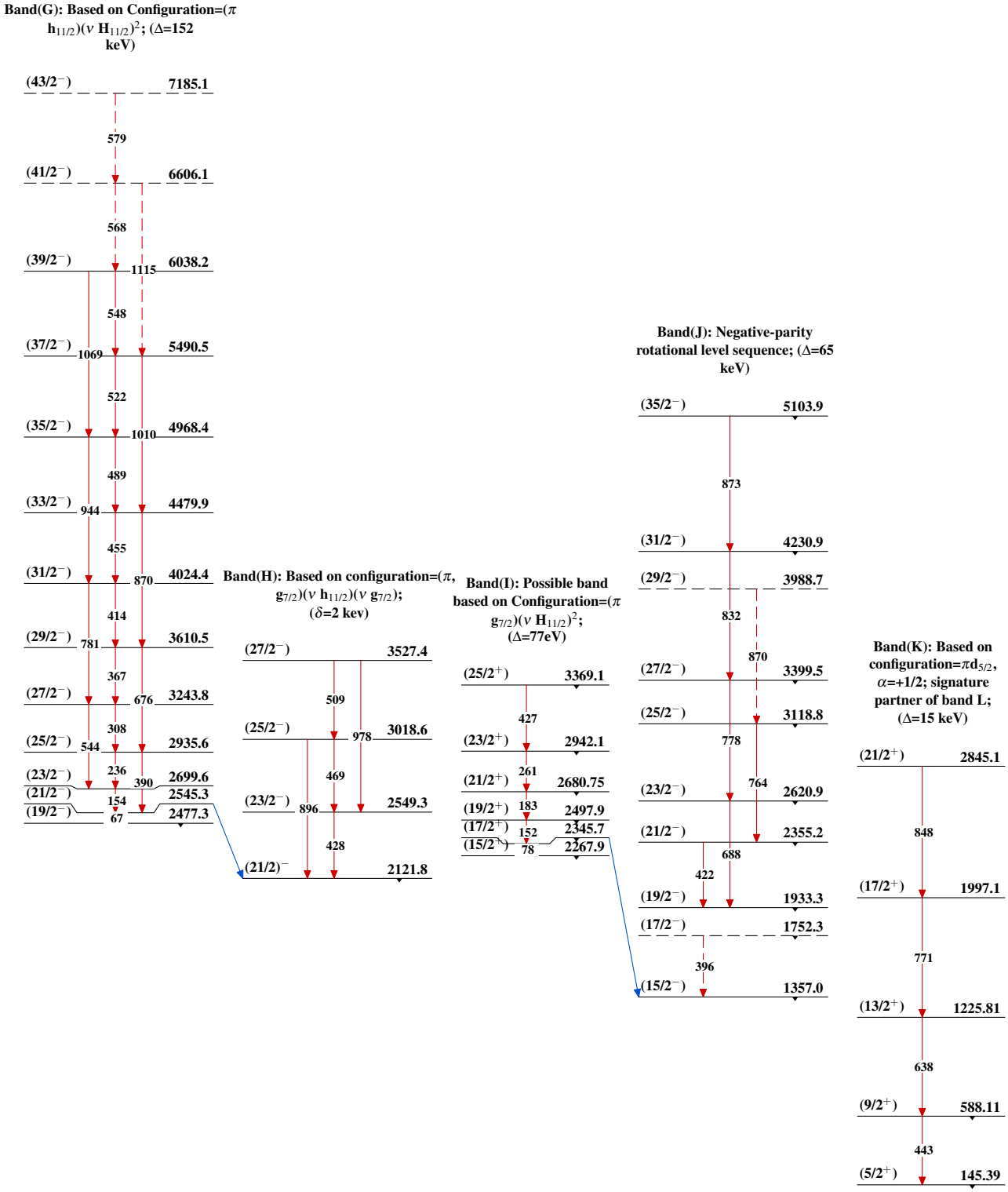
$^{131}_{57}La_{74}$

Adopted Levels, Gammas

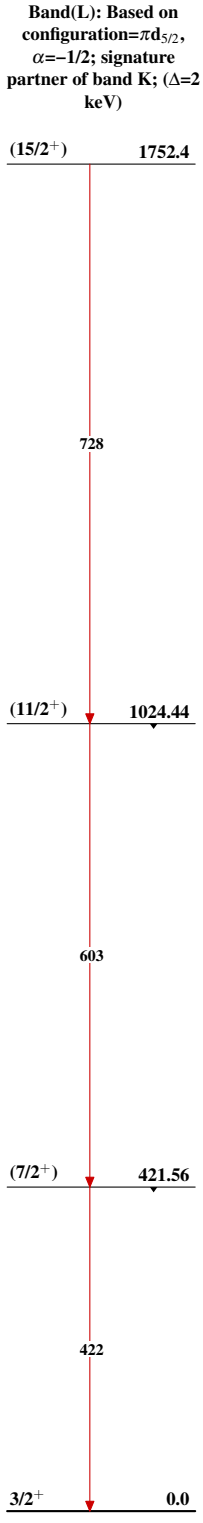


$^{131}_{57}La_{74}$

Adopted Levels, Gammas (continued)



Adopted Levels, Gammas (continued)



$^{131}_{57}La_{74}$