Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	P. K. Joshi, B. Singh, S. Singh, A. K. Jain	NDS 138,1 (2016)	15-Oct-2016

Q(β^-)=−278 *7*; S(n)=8778.0 *26*; S(p)=6255.7 *23*; Q(α)=−2071.7 *25* 2012Wa38
S(2n)=16230.3 *28*, S(2p)=15260.7 *23* (2012Wa38).
Other reactions:
2015Kh02: ^{139}La(^{3}He,X)^{138}La/^{139}La, E=38 MeV; measured Eγ, Iγ; deduced γ-ray strength functions, and nuclear level densities.
1997Sa05: ^{139}La(pol n,n′), E=0.5-1 eV. Measured parity-violating spin rotation angle near p-wave resonance and deduced parity mixing matrix element.
1996Ha05: ^{139}La(π^+,K$^+$)$^{139}_{\Lambda}$La E=1.06 GeV/c. measured hypernuclei mass spectra. Deduced Λ hypernuclei spectroscopic properties.
1996Ha47: ^{139}La(π^+,K$^+$)$^{139}_{\Lambda}$La E=1.06 GeV/c. measured Λ hypernuclei excitation energy spectra. Deduced binding energy mass number dependence.
1995Aj01: ^{139}La(π^+,K$^+$)$^{139}_{\Lambda}$La E=1.06 GeV/c. measured $\sigma(\theta)$; superconducting kaon spectrometer. FWHM=2 MeV. Deduced s_Λ, p_Λ, d_Λ, f_Λ, and g_Λ binding energies.
1994Al35: polarized La(pol n,X), E=0.5-10 eV; measured transmission; deduced J(3 eV res)=11/2 from sign of ε=(N$_+$−N$_-$)/(N$_+$+N$_-$).
2006MuZX: evaluation of neutron resonances.

^{139}La Levels

Cross Reference (XREF) Flags

A	^{139}Ba β^- decay (82.93 min)	G	^{138}La(d,p)	M	Coulomb excitation
B	^{139}Ce ε decay (137.641 d)	H	^{139}La(γ,γ'):E=1.2-4.1 MeV	N	^{140}Ce(μ^-,nγ)
C	^{138}Ba(pol p,p),(pol p,p′):IAR	I	^{139}La(γ,γ'):E=6.0-8.6 MeV	O	^{140}Ce(d,^{3}He)
D	^{138}Ba(^{3}He,d),(α,t)	J	^{139}La(γ,γ'):E=5.4-11.5 MeV	P	^{238}U(^{12}C,Fγ)
E	^{138}Ba(^{7}Li,^{6}He)	K	^{139}La(n,n′γ),(n,n′)		
F	^{138}La(n,γ),(n,n):resonances	L	^{139}La(d,d′),(α,α')		

E(level)†	J$^\pi$‡	T$_{1/2}$	XREF	Comments
0.0[g]	7/2$^+$	stable	AB DE GHIJKLMNOP	μ=+2.7830455 *9* (1977Kr12,2014StZZ) Q=+0.200 *6* (2007Ja16,2016St14) RMS charge radius <r^2>$^{1/2}$=4.8550 fm *49* (2013An02 evaluation). J$^\pi$: spin from ABMR (1971Ch02) and optical spectroscopy (1934An02); π from L(^{3}He,d)=L(d,^{3}He)=4. μ: NMR, optical spectroscopy using ^{2}H standard (1977Kr12). Others: 2.7832 *2* (NMR,1951Sh33), 2.7780 *9* (1949Di13), +2.76 (1940Wi08). Q: 2007Ja16 carried out a theoretical calculation of electric field gradients using relativistic model and measured nuclear quadrupole coupling constants from molecular beam magnetic resonance (D.S. Rudinoff et al., Jour. Mol. Spectr. 218, 169 (2003)). Others: +0.20 *1* (collinear fast beam laser spectroscopy (1982Ho02,1982Ba08); +0.26 or +0.28 (1971Ch02), +0.229 (1962Ko22), +0.21 *1* (1958Mu08), +0.23 *1* (1957Ti30), +0.3 *1* (1955Lu59). Recent hyperfine structure studies: 1994Wa31, 1990Pr03, and 1990Sh13.
165.8577[h] *11*	5/2$^+$	1.50 ns *3*	AB DE HI KLMNOP	J$^\pi$: M1 γ to 7/2$^+$. L=2 in (^{3}He,d) or (d,^{3}He). T$_{1/2}$: weighted av of β^- decay (1.48 ns *3* (1966Be42), 1.50 ns *10* (1956De57), 1.50 ns *10* (1955Ge38)) and ε decay (1.60 ns *4* (1970Ko38), 1.48 ns *3* (1967Ma07), 1.47 ns *6* (1965Ge04), 1.47 ns *5* (1962Be31)). See β^- and ε decay for details.

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Adopted Levels, Gammas (continued)

^{139}La Levels (continued)

E(level)[†]	J$^{\pi}$[‡]	T$_{1/2}$	XREF	Comments
1209.0 *3*	1/2^{+}[#]		DE K o	
1216? *1*			H o	
1219.047 *10*	9/2^{+}[@]	0.58 ps *9*	A HI KLMN	T$_{1/2}$: from B(E2) in Coulomb excitation and adopted J^{π} and γ properties.
1256.797 *10*	(5/2)$^{+}$		A I KLMN	J$^{\pi}$: 5/2^{+},7/2^{+} from $\gamma(\theta)$ and excit in Coul. ex. 5/2^{+} from comparison of compound-nucleus calculation to γ excit in (n,n$'\gamma$).
1381.408[h] *12*	(9/2^{+})		A HI K N P	J$^{\pi}$: γ to 5/2^{+}. 9/2^{+} from comparison of compound-nucleus calculation to γ excit in (n,n$'\gamma$). 1970Mo30 suggest 7/2 based on 5034$\gamma(\theta)$ in (γ,γ'); however, $\gamma(\theta)$ also appears consistent with 9/2.
1420.3 *3*	(11/2)$^{-}$		D I OP	J$^{\pi}$: L=5 in (^{3}He,d) and (d,^{3}He), where 11/2 was assumed for spectroscopic factors with possible involvement of h$_{11/2}$ orbital; 291.3γ from (13/2^{+}) in ^{238}U(^{12}C,Fγ) unlikely to be M2 for 9/2^{-}.
1420.490 *7*	(7/2)$^{+}$		A E HI KLMN	J$^{\pi}$: M1+E2 γ to 7/2^{+}; dipole γ from 9/2^{-}; excit and $\gamma(\theta)$ in Coul. ex. Note that 11/2^{+} proposed in (n,n$'\gamma$) (1987Ab17) from excitation function data is inconsistent.
1476.489 *7*	(9/2^{+})		A I K	J$^{\pi}$: 5/2^{+},7/2,9/2^{+} from γ's from 9/2 resonance and to 5/2^{+}. 9/2^{+} from comparison of compound-nucleus calculation to γ excit in (n,n$'\gamma$).
1536.388 *7*	7/2^{+}[@]	0.044 ps *7*	A GHI K	T$_{1/2}$: from B(E2) in Coulomb excitation and adopted J^{π} and γ properties.
1537.69[g] *10*	(11/2^{+})		KLM P	J$^{\pi}$: from comparison of compound-nucleus calculation to γ excit in (n,n$'\gamma$).
1558.72 *3*	3/2^{+},5/2^{+}[#]		A DE K O	J$^{\pi}$: 3/2^{+} from comparison of compound-nucleus calculation to γ excit in (n,n$'\gamma$). 5/2^{+} from comparison of DWBA to $\sigma(\theta)$ in (^{7}Li,^{6}He).
1578.163 *14*	5/2^{+},7/2^{+}[@]		A HI KLM	J$^{\pi}$: 1987Ab17 suggest (11/2^{+}) based on comparison of compound-nucleus calculation to γ excit in (n,n$'\gamma$); however, this is not consistent with γ excit in Coul. ex.
1683.146 *10*	7/2^{+}		A HI KLM	J$^{\pi}$: 7/2,11/2 from $\gamma(\theta)$ in (γ,γ'). 5/2^{+},7/2^{+} from $\gamma(\theta)$ and excit in Coul. ex. 1987Ab17 suggest 9/2^{+} based on comparison of compound-nucleus calculation to γ excit in (n,n$'\gamma$).
1711.66[h] *20*	(13/2^{+})[f]		P	
1716.12 *10*	5/2^{+}[@]		HI KLM	J$^{\pi}$: 1987Ab17 suggest 9/2^{+} based on comparison of compound-nucleus calculation to γ excit in (n,n$'\gamma$); however, this is not consistent with γ excit in Coul. ex. Also suggested 9/2^{+} in (n,n').
1740 *1*			H	
1761.167 *10*			A I K	J$^{\pi}$: 7/2 from $\gamma(\theta)$ in (γ,γ'). 3/2 from comparison of compound-nucleus calculation to γ excit in (n,n$'\gamma$).
1766.428 *24*	(5/2)$^{+}$		A I KLM	J$^{\pi}$: from L=2 in (^{3}He,d). 3/2 from $\gamma(\theta)$ in Coul. ex. if 1767γ assigned in Coul. ex. Same as 1765.5γ in β^{-} decay. ≠3/2^{+} from γ from 9/2$^{(+)}$ resonance.
1780 *15*	1/2^{+}[#]		DE	
1800.4[h] *4*	(17/2^{+})[f]	315 ns *35*	P	%IT=100 T$_{1/2}$: (fragment)γ(t) (2012As06).
1810			L	
1837 *4*			E HI	
1854 *1*			H	
1856.62 *4*	(3/2^{+},5/2^{+})[#]		A DE I KL	J$^{\pi}$: γ from 9/2$^{(-)}$ resonance. 3/2^{+} from comparison of

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Adopted Levels, Gammas (continued)

^{139}La Levels (continued)

E(level)[†]	Jπ[‡]	XREF	Comments
			DWBA to σ(θ) in (^{7}Li,^{6}He).
1894.0 *5*		I K	
1920.43 *4*	(7/2^{+})	A HI KL	Jπ: 5/2^{-},7/2,9/2^{+} from γ's from 9/2^{-} resonance and to 5/2^{+}. (7/2^{+}) from comparison of compound-nucleus calculations to γ excit in (n,n′γ).
1940.83 *12*	(7/2^{+})	KL	Jπ: comparison of compound-nucleus calculations to γ excit in (n,n′γ).
1950	(3/2^{+})	O	
1954 *4*		I	
1962.8 *3*	(13/2^{+})[f]	P	
1962.84 *11*	(5/2)$^{+}$	A DE KL	Jπ: 3/2^{+},5/2^{+} from L=2 in (^{3}He,d) or (d,^{3}He). ≠3/2^{+} from 7/2^{-} resonance. (3/2^{+}) from comparison of compound-nucleus calculations to γ excit in (n,n′γ).
1980 *1*		H	
2032.75[g] *25*	(15/2^{+})[f]	P	
2035[&]		KL	XREF: K(?).
2059.73 *10*		A HI K	
2123 *3*		I	
2136 *1*		H	
2152 *1*		H L	
2158.1 *11*		I K	XREF: K(?).
2232 *5*	(7/2,11/2)	e I	Jπ: (7/2,11/2) from γ(θ) in (γ,γ′). 3/2^{+} and 7/2^{+} from L=2+4 doublet in (^{7}Li,^{6}He).
2240[&] *12*	3/2^{+},5/2^{+}[#]	De	Jπ: see comment for 2232 level.
2276 *1*		H	
2291 *5*		I	
2310 *19*	1/2^{+}[#]	DE L	E(level): from (^{3}He,d),(α,t).
2313 *1*		H	
2357 *1*		H	
2385[&] *1*		H L	
2390 *5*		I	
2401	(11/2^{-},9/2^{-})	E L	Jπ: L(^{7}Li,^{6}He)=(5).
2440 *1*		H L	
2448 *1*		H	
2466		L	
2573 *1*		H L	
2597		L	
2600 *1*		H	
2685 *1*	$^{-}$	H L	Jπ: L(α,α′)=3.
2705.0 *10*		H	
2712? *1*		H	
2724 *1*		H	
2747 *1*		H	
2774 *1*		H	
2780	($^{-}$)	L	Jπ: L(α,α′)=(3).
2800 *1*		H	
2811 *1*	($^{+}$)	H L	Jπ: L(α,α′)=(2).
2828 *1*		H	
2862 *1*		H	
2868 *1*		H	
2870	$^{+}$	L	Jπ: L(α,α′)=2.
2877? *1*		H	
2885.9[g] *5*	(19/2^{+})[f]	P	
2890	($^{-}$)	L	Jπ: L(α,α′)=(3).
2918.0 *5*	(17/2^{+})[f]	P	
2928? *1*		H	

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Adopted Levels, Gammas (continued)

^{139}La Levels (continued)

E(level)[†]	Jπ[‡]	XREF	Comments
2964 *1*		H	
2972 *1*		H	
2990 *1*		H	
3043 *1*		H	
3053 *1*		H	
3061.2 *5*	(19/2$^-$)[f]	P	
3077 *1*		H	
3095? *1*		H	
3114 *1*		H	
3147 *4*		G	
3150.3 *6*	(19/2$^+$)[f]	P	
3175.3 *5*	(21/2$^+$)[f]	P	
3184.3[g] *5*	(23/2$^+$)[f]	P	
3196? *1*		H	
3221 *1*		H	
3247.9 *6*	(21/2$^-$)[f]	P	
3252 *1*		H	
3262 *1*		H	
3275 *1*		H	
3303 *1*		H	
3305.6 *6*	(23/2$^-$)[f]	P	
3351 *1*		H	
3355 *2*	−[a]	G	
3361? *1*		H	
3364.5 *6*	(21/2$^+$)[f]	P	
3370 *1*		H	
3375 *2*	(15/2)$^-$	G	Jπ: L(d,p)=3 from 5$^+$ target and comparison of experimental σ with theory.
3401 *1*		H	
3433 *2*		G	
3445 *1*		H	
3458 *1*		H	
3475 *1*		H	
3483 *1*		H	
3485 *2*	−[a]	G	
3517 *2*	−[a]	G	
3523 *1*		H	
3527 *1*		H	
3544 *1*		H	
3555 *2*	−[a]	G	
3557 *1*		H	
3561 *1*		H	
3573 *1*		H	
3586 *1*		H	
3611 *2*	−[a]	G	
3631 *1*		H	
3664 *1*		H	
3688 *2*	−[a]	G	
3732 *1*		H	
3748 *2*	−[a]	G	
3785 *2*	−[a]	G	
3790 *1*		H	
3799 *1*		H	
3805 *2*	−[a]	G	
3832 *1*		H	

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Adopted Levels, Gammas (continued)

^{139}La Levels (continued)

E(level)†	Jπ‡	$T_{1/2}$	XREF	Comments
3841 *2*			G	
3854 *1*			H	
3868 *2*			G	
3878 *1*			H	
3886 *1*			H	
3905 *2*	−*a*		G	
3919 *1*			H	
3927 *2*	(17/2)−*a*		G	
3931 *1*			H	
3941 *1*			H	
3952 *2*	−*a*		G	
3963 *1*			H	
3980 *2*	−*a*		G	
4014 *2*	−*a*		G	
4095 *2*	−*a*		G	
4116.2 *6*	(25/2+)*f*		P	
4148 *2*	−*a*		G	
4230 *2*	−*a*		G	
4252.3*i* *6*	(23/2+)*f*		P	
4336 *2*	(−)*a*		G	
4394 *2*	(−)*a*		G	
4628.0 *7*	(27/2−)*f*		P	
4641.2*i* *7*	(25/2+)*f*		P	
4791.2 *8*			P	
5217.6*i* *8*	(27/2+)*f*		P	
5380.6 *6*			J	
5389.8 *12*			J	
5406.8 *13*			J	
5423.1 *7*			J	
5545.4 *7*			J	
5552.7 *9*			J	
5572.0 *11*			J	
5582.1 *10*			J	
5594.8 *7*			J	
5620.4 *8*			J	
5658.8 *7*			J	
5688.1 *5*			J	
5708.6 *7*			J	
5716.5 *6*			J	
5723.0 *3*			J	
5811.3 *8*			J	
5830.9 *9*			J	
5848.9 *6*			J	
5940.2 *8*			J	
5984.1 *20*			J	
6015.9 *8*	7/2−*b*	0.051 eV *+14−8*	IJ	Γ from (γ,γ′):E=6.0-8.6 MeV.
6047.1 *14*			J	
6077.9 *11*			J	
6097.8 *12*			J	
6112.0 *15*			J	
6114.2 *4*	9/2(−)	0.068 eV *34*	I	Jπ: 9/2 from γ(θ) in (γ,γ′). π=(−) since E1 absorption is generally two orders of magnitude larger than M1 for heavier nuclei. Γ from (γ,γ′):E=6.0-8.6 MeV.

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Adopted Levels, Gammas (continued)

^{139}La Levels (continued)

E(level)[†]	J$^{\pi}$[‡]	$T_{1/2}$	XREF	Comments
6131.1 *9*			J	
6150.8 *10*			J	
6178 *3*			J	
6194.1 *9*			J	
6214.2 *5*			J	
6233.3 *8*			J	
6249.2 *20*			J	
6260.2 *20*			J	
6269.5 *12*			J	
6301.1 *6*			J	
6326.1 *6*			J	
6354.8 *5*			J	
6366.5 *10*			J	
6383.5 *5*			J	
6402.6 *9*			J	
6417.4 *23*	9/2^{-}[b]	0.081 eV *+13−7*	I	Γ from (γ,γ'):E=6.0-8.6 MeV.
6435.2 *20*			J	
6441.9 *11*			J	
6450.9 *4*			J	
6465.3 *7*			J	
6483.8 *16*			J	
6491.3 *8*			J	
6501.4 *6*			J	
6526.7 *6*			J	
6539.6 *5*			J	
6549.6 *8*			J	
6619.4 *6*			J	
6651.3 *7*			J	
6674.8 *8*			J	
6713.0 *6*			J	
6723.8 *15*			J	
6755.8 *7*			J	
6758.8 *16*	7/2[d]		I	E(level): this level may be the same as 6755.8 level, although, the decay patterns are different.
6767.6 *18*			J	
6875.4 *8*			J	
6889.9 *8*			J	
6901.1 *10*			J	
6926.3 *8*			J	
6969.0 *6*			J	
6983.4 *7*			J	
7019.7 *10*			J	
7036.1 *9*			J	
7052.4 *7*			J	
7154.0 *11*			J	
7158 *3*			J	
7272.8 *15*			J	
7278.3 *22*			I	E(level): this level may be the same as 7272.8 level, although, the decay patterns are different.
7320.0 *8*			J	
7327.2 *8*			J	
7370.0 *8*			J	
7400.0 *7*			J	
7414.0 *7*			J	
7444.9 *12*			J	
7451.1 *9*			J	

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Adopted Levels, Gammas (continued)

^{139}La Levels (continued)

E(level)[†]	J$^{\pi}$[‡]	$T_{1/2}$	XREF	Comments
7462.8 *7*			J	
7472.0 *9*			J	
7506.7 *7*			J	
7552.7 *8*			J	
7562.1 *4*			J	
7570.2 *11*			J	
7579.8 *6*			J	
7591.6 *11*			J	
7599.1 *7*			J	
7636.2 *5*	7/2^{-}[b]	0.17 eV *4*	IJ	Γ from (γ,γ′):E=6.0-8.6 MeV.
7661.3 *18*			J	
7667 *3*			J	
7678.6 *16*			J	
7684.7 *9*			J	
7692.4 *12*			J	
7699 *3*			J	
7765.1 *13*			J	
7789.4 *13*			J	
7905.2 *6*			J	
7912.5 *7*			J	
7922.2 *9*			J	
7961 *3*			J	
7972.3 *7*			J	
8527.2 *10*			I	
8551.5 *6*			J	
8582.3 *10*	(7/2,9/2)[e]		I	
8595.7 *5*			J	
8781.0 *1*			F	
8798.9 *1*			F	
8844.6 *3*			F	
8867.5 *4*			F	
8908.5 *7*			F	
8996.4 *1*			F	
9016.3 *2*			F	
9037.1 *2*			F	
9082.7 *3*			F	
9131.4 *3*			F	
16177.8	(7/2^{-})	65.2[c] keV *5*	C	
16808.2	(3/2^{-})	98[c] keV *1*	C	
17263.9	(1/2^{-})	89[c] keV *1*	C	
17482.3	(9/2^{-})	48[c] keV *4*	C	
17612.3	(5/2^{-})	73[c] keV *1*	C	
17752.3	(13/2^{+})	34[c] keV *9*	C	
17818.8	(9/2^{-})	66[c] keV *11*	C	
17869.4	(7/2^{-})	76[c] keV *3*	C	
17888.3	(5/2^{-})	66[c] keV *2*	C	
17957.8	(3/2^{-})	57[c] keV *6*	C	
18019.3	(9/2^{-})	118[c] keV	C	
18120.6	(7/2^{-})	95[c] keV *11*	C	
18140.4	(5/2^{-})	57[c] keV *4*	C	
18293.3	(7/2^{-})	64[c] keV *5*	C	
18335.0	(3/2^{-})	94[c] keV *5*	C	
18358.9	(5/2^{-})	68[c] keV *5*	C	
18363.8	(1/2^{-})	84[c] keV *4*	C	

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Adopted Levels, Gammas (continued)

^{139}La Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$	XREF
18512.7?	(5/2⁻)	76[c] keV	C
18624.9?	(3/2⁻)	2[c] keV	C

† From least-squares fit to Eγ data, assuming 1 keV uncertainty when not stated. For levels populated in (γ,γ′):E=1.2-4.1 MeV, 1 keV uncertainty is assumed by the evaluators.
‡ From angular momentum transfer in inelastic scattering for levels between 2.6 and 3.0 MeV; angular momentum transfer in (d,p) for levels between 3.0 and 4.4 MeV, except as noted; and resonance analysis for unbound states above 16 MeV. For levels populated in (γ,γ′), J^π is limited to 5/2,7/2,9/2 from expected dipole excitation from $7/2^+$ g.s. of ^{139}La.
# From angular momentum transfer in (^{3}He,d) or (d,^{3}He).
@ From γ(θ) and comparison of excitation function to theory in Coulomb excitation.
& From inelastic scattering.
a L(d,p) and/or comparison to theoretical calculations.
b From γ(θ) and polarization of elastically scattered γ in (γ,γ′) E=6.0-8.6 MeV.
c Width from (pol p,p′):IAR.
d From γ(θ) in (γ,γ′).
e From γ-deexcitation pattern.
f For high-spin levels from (^{12}C,Fγ), tentative assignments are from yrast type of population, band structures and consistency of intensities of cascading and cross over transitions.
g Band(A): γ cascade based on g.s.
h Band(B): γ cascade based on $5/2^+$.
i Band(C): Band based on $(23/2^+)$.

Adopted Levels, Gammas (continued)

$\gamma(^{139}La)$

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[‡]	δ[‡]	α[#]	Comments
165.8577	$5/2^+$	165.8575 *11*	100	0.0	$7/2^+$	M1		0.2516 *7*	B(M1)(W.u.)=0.00257 *4* α: based on α(K)(exp)=0.2146 *10* (recommended by 1985HaZA from several experimental values, see ^{139}Ce ε decay). α(L)(exp)=0.0289 *12* (1976Ha11). Corresponding value from BrIcc code is 0.261 *4*. δ: +0.034 *34* from ε decay. <0.160 *6* from adopted J^π, $T_{1/2}$, and α and B(E2)↑ in Coul. ex. B(E2)(W.u.)<2 from δ(E2/M1)=0.034 *34*.
1209.0	$1/2^+$	1043.1 *3*	100	165.8577	$5/2^+$				
1216?		1216		0.0	$7/2^+$				
1219.047	$9/2^+$	1053.162 *32*	12.8 *18*	165.8577	$5/2^+$	E2			B(E2)(W.u.)=1.76 *24* E_γ: unweighted av of data from Coul. ex., β^- decay, and (n,n′γ).
		1219.044 *10*	100 *1*	0.0	$7/2^+$	E2+M1	−4.9 *4*		B(E2)(W.u.)=7.4 *11*; B(M1)(W.u.)=0.00076 *17* E_γ: unweighted av of data from Coul. ex., β^- decay, (n,n′γ), (γ,γ'), and (μ^-,nγ).
1256.797	$(5/2)^+$	1090.938 *10*	100.0 *24*	165.8577	$5/2^+$	M1+E2			δ: −0.28 *6* or +3.5 *7*. I_γ: from β^- decay. Others: 72.0 *17* in Coulomb. ex. and 76 *9* in (n,n′γ).
		1256.772 *22*	39.9 *11*	0.0	$7/2^+$	M1+E2			δ: −0.28 *6* or −2.3 *5*. B(E2)(W.u.)($5/2^+$)=3.7 *13* from B(E2)↑ in Coul. ex.
1381.408	$(9/2^+)$	1215.542 *12*	100.0 *8*	165.8577	$5/2^+$				
		1381.560 *93*	5.2 *3*	0.0	$7/2^+$				
1420.3	$(11/2)^-$	1420.0 *5*		0.0	$7/2^+$	[M2]			
1420.490	$(7/2)^+$	1254.631 *10*	11.5 *1*	165.8577	$5/2^+$				
		1420.478 *10*	100	0.0	$7/2^+$	M1+E2			δ: −0.15 *2* or +5.3 *9*. B(E2)(W.u.)=3.5 *4* from B(E2)↑ in Coul. ex.
1476.489	$(9/2^+)$	1310.617 *10*	100 *3*	165.8577	$5/2^+$				
		1476.488 *10*	11.5 *18*	0.0	$7/2^+$				
1536.388	$7/2^+$	1370.509 *10*	100 *4*	165.8577	$5/2^+$	M1+E2	−0.81 *25*		B(E2)(W.u.)=13 *6*; B(M1)(W.u.)=0.06 *3* I_γ: from Coulomb ex. Other: 102 *7* in β^- decay is in agreement but somewhat less precise.
		1536.391 *10*	100.0 *10*	0.0	$7/2^+$	M1+E2	−0.89 *9*		B(E2)(W.u.)=14.0 *14*; B(M1)(W.u.)=0.070 *16*
1537.69	$(11/2^+)$	1537.69 *10*	100	0.0	$7/2^+$				
1558.72	$3/2^+$,$5/2^+$	1392.944 *75*	47 *4*	165.8577	$5/2^+$				I_γ: other: 74 *7* in (n,n′γ).
		1558.697 *31*	100 *5*	0.0	$7/2^+$				
1578.163	$5/2^+$,$7/2^+$	1578.156 *14*	100	0.0	$7/2^+$	M1+E2			δ: −0.29 *3* or −2.2 *2* for J(1578)=5/2, −0.17 *2* or +1.6 *2* for J(1578)=7/2. B(E2)(W.u.)=18.4 *16* for J(1578)=5/2, B(E2)(W.u.)=13.8 *12* for J(1578)=7/2 from B(E2)↑ in Coul. ex.
1683.146	$7/2^+$	1517.73 *18*	1.62 *17*	165.8577	$5/2^+$				

Adopted Levels, Gammas (continued)

γ(^{139}La) (continued)

E_i(level)	J_i^π	E_γ [†]	I_γ [†]	E_f	J_f^π	Mult.[‡]	α[#]	Comments
1683.146	7/2+	1683.133 *10*	100.0 *9*	0.0	7/2+	M1+E2		B(E2)(W.u.)=11.9 *16* δ: −0.34 *7* or −2.0 *4* for J(1683)=7/2. B(E2)(W.u.) from B(E2)↑ in Coul. ex.
1711.66	(13/2+)	174.0 *3*	53 *9*	1537.69	(11/2+)			
		291.3 *3*	19 *6*	1420.3	(11/2)−			
		330.3 *3*	100 *15*	1381.408	(9/2+)			
1716.12	5/2+	1716.11 *10*	100	0.0	7/2+	M1+E2		B(E2)(W.u.)=19.3 *22* δ: +0.42 *7* or +3.8 *6*. B(E2)(W.u.) from B(E2)↑ in Coul. ex.
1740		1740	100	0.0	7/2+			
1761.167		1595.299 *10*	100.0 *10*	165.8577	5/2+			
		1761.18 *13*	2.8 *11*	0.0	7/2+			
1766.428	(5/2)+	1600.577 *26*	100 *4*	165.8577	5/2+			
		1766.346 *59*	73 *3*	0.0	7/2+	[E2]		B(E2)(W.u.)=22 *4*
1800.4	(17/2+)	88.7 *5*	100	1711.66	(13/2+)	[E2]	3.05 *8*	
1854		1854	100	0.0	7/2+			
1856.62	(3/2+,5/2+)	1690.750 *36*	100	165.8577	5/2+			
1894.0		1894.0[&] *5*	100	0.0	7/2+			
1920.43	(7/2+)	1754.604 *82*	68 *6*	165.8577	5/2+			
		1920.407 *42*	100 *5*	0.0	7/2+			
1940.83	(7/2+)	174.6 *2*	100	1766.428	(5/2)+			
		363.1 *2*	69	1578.163	5/2+,7/2+			
		403.8 *2*	87	1536.388	7/2+			E_γ: somewhat poor fit, level-energy difference=404.4.
1962.8	(13/2+)	425.2 *3*	100	1537.69	(11/2+)			
1962.84	(5/2)+	1796.97 *11*	100	165.8577	5/2+			
1980		1980	100	0.0	7/2+			
2032.75	(15/2+)	70.0 *3*	6.3 *26*	1962.8	(13/2+)	[M1+E2]	5.1 *21*	
		232.3 *4*	100 *13*	1800.4	(17/2+)			
		495.0 *3*	37 *7*	1537.69	(11/2+)			
2059.73		1894.28[&] *13*	35 *5*	165.8577	5/2+			
		2059.72 *10*	100 *7*	0.0	7/2+			
2136		2136	100	0.0	7/2+			
2152		2152	100	0.0	7/2+			
2158.1		308.3[&] *3*	100 *14*	1856.62	(3/2+,5/2+)			All three γ rays are from (n,n′γ).
		477.0[&] *9*		1683.146	7/2+			
		581.3[&] *5*	66 *19*	1578.163	5/2+,7/2+			
2276		2276	100	0.0	7/2+			
2313		2313	100	0.0	7/2+			
2357		2357	100	0.0	7/2+			
2385		2385	100	0.0	7/2+			

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Adopted Levels, Gammas (continued)

γ(^{139}La) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[‡]	α[#]
2440		2440	100	0.0	7/2$^+$		
2448		2448	100	0.0	7/2$^+$		
2573		2573	100	0.0	7/2$^+$		
2600		2600	100	0.0	7/2$^+$		
2685	$^-$	2685	100	0.0	7/2$^+$		
2705.0		2705	100	0.0	7/2$^+$		
2712?		2712	100	0.0	7/2$^+$		
2724		2724	100	0.0	7/2$^+$		
2747		2747	100	0.0	7/2$^+$		
2774		2774	100	0.0	7/2$^+$		
2800		2634	100	165.8577	5/2$^+$		
		2800	85 *26*	0.0	7/2$^+$		
2811	(+)	2811	100	0.0	7/2$^+$		
2828		2828	100	0.0	7/2$^+$		
2862		2696	10	165.8577	5/2$^+$		
		2862	100 *19*	0.0	7/2$^+$		
2868		2868	100	0.0	7/2$^+$		
2877?		2712	100	165.8577	5/2$^+$		
		2877	109 *21*	0.0	7/2$^+$		
2885.9	(19/2$^+$)	853.2 *4*	100	2032.75	(15/2$^+$)		
2918.0	(17/2$^+$)	1206.3 *5*	100	1711.66	(13/2$^+$)		
2928?		2928	100	0.0	7/2$^+$		
2964		2964	100	0.0	7/2$^+$		
2972		2972	100	0.0	7/2$^+$		
2990		2990	100	0.0	7/2$^+$		
3043		2877	59	165.8577	5/2$^+$		
		3043	100 *15*	0.0	7/2$^+$		
3053		3053	100	0.0	7/2$^+$		
3061.2	(19/2$^-$)	1260.8 *5*	100	1800.4	(17/2$^+$)		
3077		3077	100	0.0	7/2$^+$		
3095?		2928	100	165.8577	5/2$^+$		
		3095	108 *15*	0.0	7/2$^+$		
3114		2948	25	165.8577	5/2$^+$		
		3114	100 *18*	0.0	7/2$^+$		
3150.3	(19/2$^+$)	232.3 *4*	100	2918.0	(17/2$^+$)		
3175.3	(21/2$^+$)	1374.9 *4*	100	1800.4	(17/2$^+$)		
3184.3	(23/2$^+$)	(9.0 *8*)	0.5 *2*	3175.3	(21/2$^+$)	[M1]	1.9×10^2 *7*
		298.4 *3*	100 *15*	2885.9	(19/2$^+$)		
3196?		3196	100	0.0	7/2$^+$		
3221		3221	100	0.0	7/2$^+$		
3247.9	(21/2$^-$)	97.6 *5*	100 *14*	3150.3	(19/2$^+$)		
		186.7 *4*	84 *13*	3061.2	(19/2$^-$)		

$^{139}_{57}La_{82}$-11

Adopted Levels, Gammas (continued)

γ(^{139}La) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[‡]	α[#]
3252		3252	100	0.0	$7/2^+$		
3262		3095	56	165.8577	$5/2^+$		
		3262	100 *20*	0.0	$7/2^+$		
3275		3275	100	0.0	$7/2^+$		
3303		3303	100	0.0	$7/2^+$		
3305.6	$(23/2^-)$	(57.7 *8*)	41 *6*	3247.9	$(21/2^-)$	[M1]	5.29 *24*
		130.3 *3*	100 *19*	3175.3	$(21/2^+)$		
3351		3351	100	0.0	$7/2^+$		
3361?		3196	100	165.8577	$5/2^+$		
		3361	85 *11*	0.0	$7/2^+$		
3364.5	$(21/2^+)$	478.6 *4*	100	2885.9	$(19/2^+)$		
3370		3370	100	0.0	$7/2^+$		
3401		3235	100	165.8577	$5/2^+$		
		3401	138 *38*	0.0	$7/2^+$		
3445		3445	100	0.0	$7/2^+$		
3458		3292	100	165.8577	$5/2^+$		
		3458	67 *13*	0.0	$7/2^+$		
3475		3475	100	0.0	$7/2^+$		
3483		3317	23	165.8577	$5/2^+$		
		3483	100 *19*	0.0	$7/2^+$		
3523		3523	100	0.0	$7/2^+$		
3527		3361	100	165.8577	$5/2^+$		
		3527	117 *30*	0.0	$7/2^+$		
3544		3378	100	165.8577	$5/2^+$		
		3544	117 *22*	0.0	$7/2^+$		
3557		3391	6	165.8577	$5/2^+$		
		3557	100 *32*	0.0	$7/2^+$		
3561		3395	100	165.8577	$5/2^+$		
		3561	32 *6*	0.0	$7/2^+$		
3573		3407	6	165.8577	$5/2^+$		
		3573	100 *20*	0.0	$7/2^+$		
3586		3586	100	0.0	$7/2^+$		
3631		3631	100	0.0	$7/2^+$		
3664		3664	100	0.0	$7/2^+$		
3732		3732	100	0.0	$7/2^+$		
3790		3790	100	0.0	$7/2^+$		
3799		3799	100	0.0	$7/2^+$		
3832		3832	100	0.0	$7/2^+$		
3854		3854	100	0.0	$7/2^+$		
3878		3878	100	0.0	$7/2^+$		
3886		3886	100	0.0	$7/2^+$		
3919		3919	100	0.0	$7/2^+$		

$^{139}_{57}La_{82}$-12

Adopted Levels, Gammas (continued)

γ(^{139}La) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[‡]	δ[‡]	Comments
3931		3931	100	0.0	7/2$^+$			
3941		3941	100	0.0	7/2$^+$			
3963		3963	100	0.0	7/2$^+$			
4116.2	(25/2$^+$)	940.9 *4*	100	3175.3	(21/2$^+$)			
4252.3	(23/2$^+$)	887.8 *4*	16 *3*	3364.5	(21/2$^+$)			
		1068.0 *4*	100 *10*	3184.3	(23/2$^+$)			
4628.0	(27/2$^-$)	512 *1*	11 *3*	4116.2	(25/2$^+$)			
		1322.3 *5*	100 *10*	3305.6	(23/2$^-$)			
4641.2	(25/2$^+$)	388.9 *3*	100	4252.3	(23/2$^+$)			
4791.2		1485.6 *6*	100	3305.6	(23/2$^-$)			
5217.6	(27/2$^+$)	576.4 *4*	100	4641.2	(25/2$^+$)			
5380.6		5380.5 *6*	100	0.0	7/2$^+$			
5389.8		5389.7 *12*	100	0.0	7/2$^+$			
5406.8		5406.7 *13*	100	0.0	7/2$^+$			
5423.1		5423.0 *7*	100	0.0	7/2$^+$			
5545.4		5545.3 *7*	100	0.0	7/2$^+$			
5552.7		5552.6 *9*	100	0.0	7/2$^+$			
5572.0		5571.9 *11*	100	0.0	7/2$^+$			
5582.1		5582.0 *10*	100	0.0	7/2$^+$			
5594.8		5594.7 *7*	100	0.0	7/2$^+$			
5620.4		5620.3 *8*	100	0.0	7/2$^+$			
5658.8		5658.7 *7*	100	0.0	7/2$^+$			
5688.1		5688.0 *5*	100	0.0	7/2$^+$			
5708.6		5708.5 *7*	100	0.0	7/2$^+$			
5716.5		5716.4 *6*	100	0.0	7/2$^+$			
5723.0		5722.9 *3*	100	0.0	7/2$^+$			
5811.3		5811.2 *8*	100	0.0	7/2$^+$			
5830.9		5830.8 *9*	100	0.0	7/2$^+$			
5848.9		5848.8 *6*	100	0.0	7/2$^+$			
5940.2		5940.1 *8*	100	0.0	7/2$^+$			
5984.1		5984 *2*	100	0.0	7/2$^+$			
6015.9	7/2$^-$	3895 *4*	1.1	2123				
		4062 *4*	1.1	1954				
		4334 *4*	13.6	1683.146	7/2$^+$			
		4438 *4*	27.9	1578.163	5/2$^+$,7/2$^+$	D(+Q)	+0.005 *15*	
		4481 *4*	5.8	1536.388	7/2$^+$			
		4538 *4*	4.8	1476.489	(9/2$^+$)			
		4798 *6*	14.4	1219.047	9/2$^+$	D+Q	+0.15 *10*	
		5852 *4*	21.5	165.8577	5/2$^+$	(E1(+M2))	−0.02 *6*	B(E1)(W.u.)=1.59×10^{-5} *+25−44* Mult.: from γ(θ) and Iγ/Eγ^3 in (γ,γ′).
		6015.4 *8*	100	0.0	7/2$^+$	(E1(+M2))	−0.01 *3*	B(E1)(W.u.)=6.8×10^{-5} *+11−19*

$^{139}_{57}La_{82}$-13

Adopted Levels, Gammas (continued)

γ(^{139}La) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[‡]
6047.1		6047.0 *14*	100	0.0	$7/2^+$	
6077.9		6077.8 *11*	100	0.0	$7/2^+$	
6097.8		6097.7 *12*	100	0.0	$7/2^+$	
6112.0		6111.9 *15*	100	0.0	$7/2^+$	
6114.2	$9/2^{(-)}$	3956	8 *2*	2158.1		
		4055	4 *2*	2059.73		
		4221 *2*	4 *1*	1894.0		
		4259	4 *1*	1856.62	$(3/2^+,5/2^+)$	[M2,E3]
		4345	21 *1*	1766.428	$(5/2)^+$	
		4428	19 *1*	1683.146	$7/2^+$	
		4534	7 *1*	1578.163	$5/2^+,7/2^+$	
		4575	5 *1*	1536.388	$7/2^+$	
		4638	11 *1*	1476.489	$(9/2^+)$	
		4694[@&]	22[@] *1*	1420.490	$(7/2)^+$	
		4734	9 *1*	1381.408	$(9/2^+)$	
		4858[&]	<2	1256.797	$(5/2)^+$	
		4896	19 *1*	1219.047	$9/2^+$	
		5949	≈1	165.8577	$5/2^+$	
		6115 *2*	100 *1*	0.0	$7/2^+$	
6131.1		6131.0 *9*	100	0.0	$7/2^+$	
6150.8		6150.7 *10*	100	0.0	$7/2^+$	
6178		6178 *3*	100	0.0	$7/2^+$	
6194.1		6194.0 *9*	100	0.0	$7/2^+$	
6214.2		6214.1 *5*	100	0.0	$7/2^+$	
6233.3		6233.1 *8*	100	0.0	$7/2^+$	
6249.2		6249 *2*	100	0.0	$7/2^+$	
6260.2		6260 *2*	100	0.0	$7/2^+$	
6269.5		6269.3 *12*	100	0.0	$7/2^+$	
6301.1		6300.9 *6*	100	0.0	$7/2^+$	
6326.1		6325.9 *6*	100	0.0	$7/2^+$	
6354.8		6354.6 *5*	100	0.0	$7/2^+$	
6366.5		6366.3 *10*	100	0.0	$7/2^+$	
6383.5		6383.3 *5*	100	0.0	$7/2^+$	
6402.6		6402.4 *9*	100	0.0	$7/2^+$	
6417.4	$9/2^-$	4186[&] *4*	3.0	2232	(7/2,11/2)	D(+Q)
		4356[&] *4*	1.0	2059.73		
		4459[&] *6*	1.0	1954		
		4498[&] *4*	0.6	1920.43	$(7/2^+)$	
		4580[&] *4*	0.9	1837		

$^{139}_{57}La_{82}$-14

Adopted Levels, Gammas (continued)

γ(^{139}La) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[‡]	δ[‡]	Comments
6417.4	9/2$^-$	4661[&] *4*	<1	1761.167				
		4704[&] *4*	2	1716.12	5/2$^+$			
		4838[&] *4*	4 *1*	1578.163	5/2$^+$,7/2$^+$	D		
		4882 *4*	6 *1*	1536.388	7/2$^+$	(E1)		B(E1)(W.u.)=1.8×10^{-5} *+4−5* Mult.: dipole from γ(θ) in (γ,γ′). E1 from decay scheme.
		4999[@&] *4*	4[@] *1*	1420.490	(7/2)$^+$	D(+Q)	−0.1 *+3−2*	
		4999[@&] *4*	4[@] *1*	1420.3	(11/2)$^-$	D(+Q)	−0.03 *8*	
		5034 *4*	2 *1*	1381.408	(9/2$^+$)	D(+Q)		
		6418 *4*	100 *1*	0.0	7/2$^+$	(E1(+M2))	−0.001 *4*	B(E1)(W.u.)=0.000134 *+13−22*
6435.2		6435 *2*	100	0.0	7/2$^+$			
6441.9		6441.7 *11*	100	0.0	7/2$^+$			
6450.9		6450.7 *4*	100	0.0	7/2$^+$			
6465.3		6465.1 *7*	100	0.0	7/2$^+$			
6483.8		6483.6 *16*	100	0.0	7/2$^+$			
6491.3		6491.1 *8*	100	0.0	7/2$^+$			
6501.4		6501.2 *6*	100	0.0	7/2$^+$			
6526.7		6526.5 *6*	100	0.0	7/2$^+$			
6539.6		6539.4 *5*	100	0.0	7/2$^+$			
6549.6		6549.4 *8*	100	0.0	7/2$^+$			
6619.4		6619.2 *6*	100	0.0	7/2$^+$			
6651.3		6651.1 *7*	100	0.0	7/2$^+$			
6674.8		6674.6 *8*	100	0.0	7/2$^+$			
6713.0		6712.8 *6*	100	0.0	7/2$^+$			
6723.8		6723.6 *15*	100	0.0	7/2$^+$			
6755.8		6755.6 *7*	100	0.0	7/2$^+$			
6758.8	7/2	4704[&]	48 *9*	2059.73				
		5075 *4*	10 *6*	1683.146	7/2$^+$			
		5180 *4*	20 *6*	1578.163	5/2$^+$,7/2$^+$	D		
		5221 *4*	14 *6*	1536.388	7/2$^+$			
		5375 *4*	68 *6*	1381.408	(9/2$^+$)			
		5502[&] *4*	60	1256.797	(5/2)$^+$			
		5540 *6*	13 *6*	1219.047	9/2$^+$			
		6594 *4*	100 *7*	165.8577	5/2$^+$	D		
		6760 *4*	48 *7*	0.0	7/2$^+$			
6767.6		6767.4 *18*	100	0.0	7/2$^+$			
6875.4		6875.2 *8*	100	0.0	7/2$^+$			
6889.9		6889.7 *8*	100	0.0	7/2$^+$			
6901.1		6900.9 *10*	100	0.0	7/2$^+$			
6926.3		6926.1 *8*	100	0.0	7/2$^+$			
6969.0		6968.8 *6*	100	0.0	7/2$^+$			

$^{139}_{57}La_{82}$-15

Adopted Levels, Gammas (continued)

γ(^{139}La) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[‡]	Comments
6983.4		6983.2 *7*	100	0.0	$7/2^+$		
7019.7		7019.5 *10*	100	0.0	$7/2^+$		
7036.1		7035.9 *9*	100	0.0	$7/2^+$		
7052.4		7052.2 *7*	100	0.0	$7/2^+$		
7154.0		7153.8 *11*	100	0.0	$7/2^+$		
7158		7158 *3*	100	0.0	$7/2^+$		
7272.8		7272.6 *15*	100	0.0	$7/2^+$		
7278.3		5150 *4*	100	2123			
		5360 *4*	74	1920.43	$(7/2^+)$		
		5459 *4*	44	1837			
		5699 *4*	48	1578.163	$5/2^+,7/2^+$		
		7279 *4*	70	0.0	$7/2^+$		
7320.0		7319.8 *8*	100	0.0	$7/2^+$		
7327.2		7327.0 *8*	100	0.0	$7/2^+$		
7370.0		7369.8 *8*	100	0.0	$7/2^+$		
7400.0		7399.8 *7*	100	0.0	$7/2^+$		
7414.0		7413.8 *7*	100	0.0	$7/2^+$		
7444.9		7444.7 *12*	100	0.0	$7/2^+$		
7451.1		7450.9 *9*	100	0.0	$7/2^+$		
7462.8		7462.6 *7*	100	0.0	$7/2^+$		
7472.0		7471.8 *9*	100	0.0	$7/2^+$		
7506.7		7506.5 *7*	100	0.0	$7/2^+$		
7552.7		7552.5 *8*	100	0.0	$7/2^+$		
7562.1		7561.9 *4*	100	0.0	$7/2^+$		
7570.2		7570.0 *11*	100	0.0	$7/2^+$		
7579.8		7579.6 *6*	100	0.0	$7/2^+$		
7591.6		7591.4 *11*	100	0.0	$7/2^+$		
7599.1		7598.9 *7*	100	0.0	$7/2^+$		
7636.2	$7/2^-$	5867[&]	16 *2*	1766.428	$(5/2)^+$		
		7636.0 *5*	100 *6*	0.0	$7/2^+$	E1	B(E1)(W.u.)=0.00018 *5*
7661.3		7661.1 *18*	100	0.0	$7/2^+$		
7667		7667 *3*	100	0.0	$7/2^+$		
7678.6		7678.4 *16*	100	0.0	$7/2^+$		
7684.7		7684.5 *9*	100	0.0	$7/2^+$		
7692.4		7692.2 *12*	100	0.0	$7/2^+$		
7699		7699 *3*	100	0.0	$7/2^+$		
7765.1		7764.9 *13*	100	0.0	$7/2^+$		
7789.4		7789.2 *13*	100	0.0	$7/2^+$		
7905.2		7905.0 *6*	100	0.0	$7/2^+$		
7912.5		7912.3 *7*	100	0.0	$7/2^+$		
7922.2		7922.0 *9*	100	0.0	$7/2^+$		

$^{139}_{57}La_{82}$-16

Adopted Levels, Gammas (continued)

γ(^{139}La) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π
7961		7961 *3*	100	0.0	$7/2^+$	8551.5		8551.2 *6*	100	0.0	$7/2^+$
7972.3		7972.1 *7*	100	0.0	$7/2^+$	8582.3	(7/2,9/2)	7002[&]	9 *6*	1578.163	$5/2^+,7/2^+$
8527.2		6985 *5*	27 *2*	1536.388	$7/2^+$			7363	23 *10*	1219.047	$9/2^+$
		7312 *5*	15 *2*	1219.047	$9/2^+$			8582 *3*	100 *2*	0.0	$7/2^+$
		8527	100 *5*	0.0	$7/2^+$	8595.7		8595.4 *5*	100	0.0	$7/2^+$

[†] When available, values are from ^{139}Ba β^- decay. In other values are mostly independently known.

[‡] For low-lying (<2 MeV) levels, values are from $\gamma(\theta)$ data in Coulomb excitation from $7/2^+$ ground state in ^{139}La. Parity is considered as positive in such excitation. For gamma rays from levels above 6 MeV, values are from $\gamma(\theta)$ data in (γ,γ'):E=6.0-8.6 MeV.

[#] 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.

[@] Multiply placed with undivided intensity.

[&] Placement of transition in the level scheme is uncertain.

$^{139}_{57}La_{82}$-17

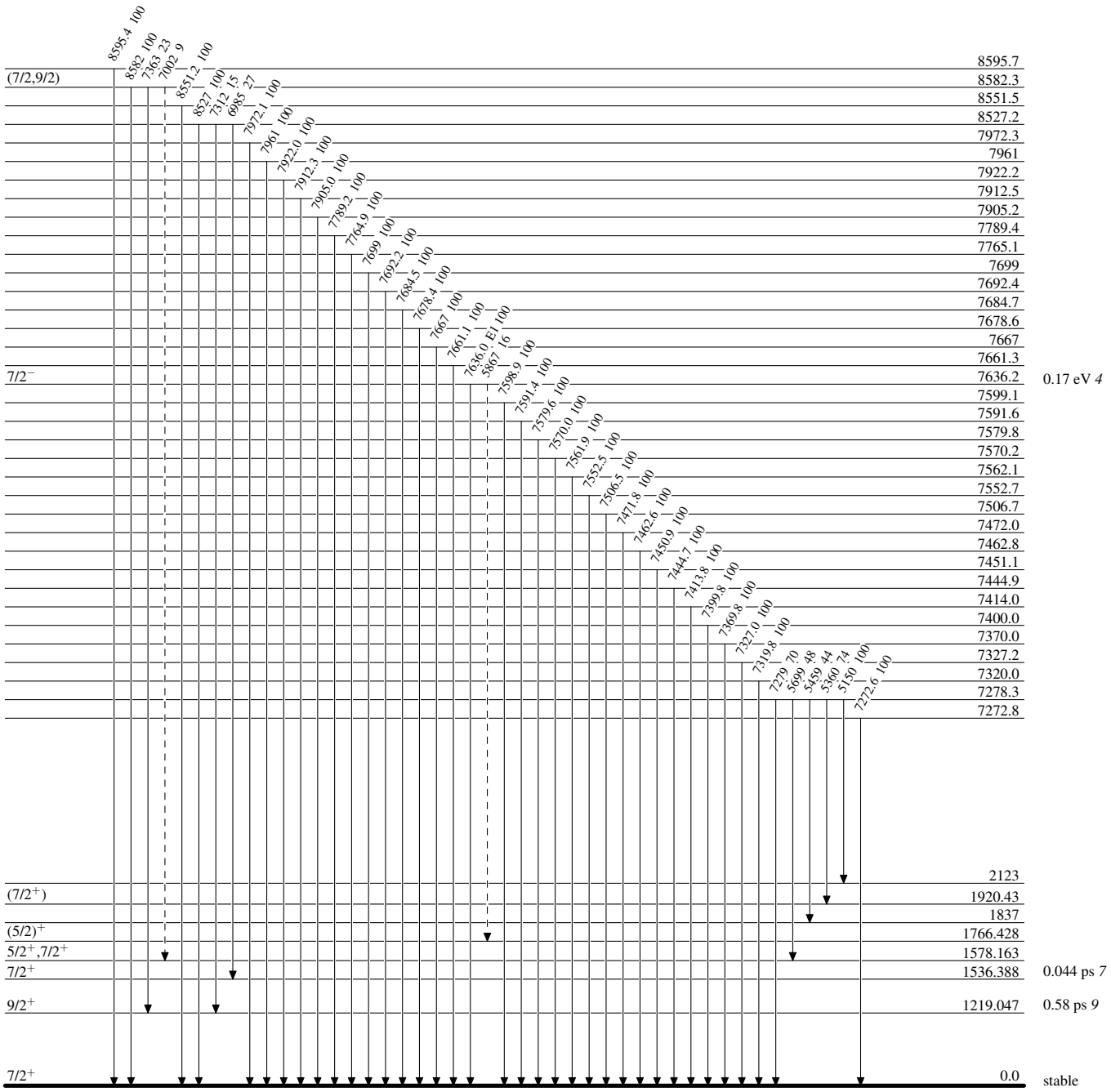
Adopted Levels, Gammas

Legend

Level Scheme

Intensities: Relative photon branching from each level

- - - - - - ► γ Decay (Uncertain)



$^{139}_{57}La_{82}$

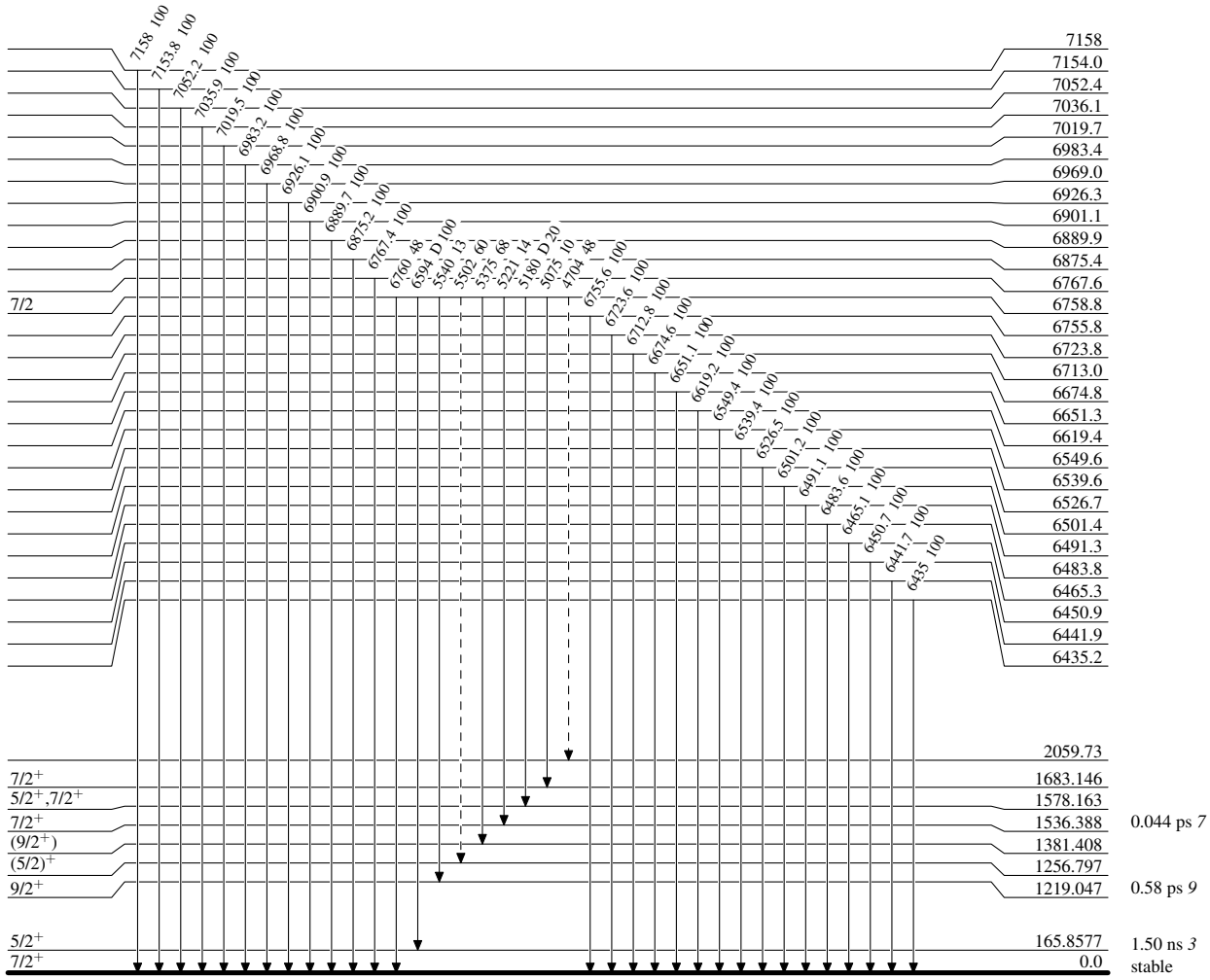
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

γ Decay (Uncertain)



$^{139}_{57}La_{82}$

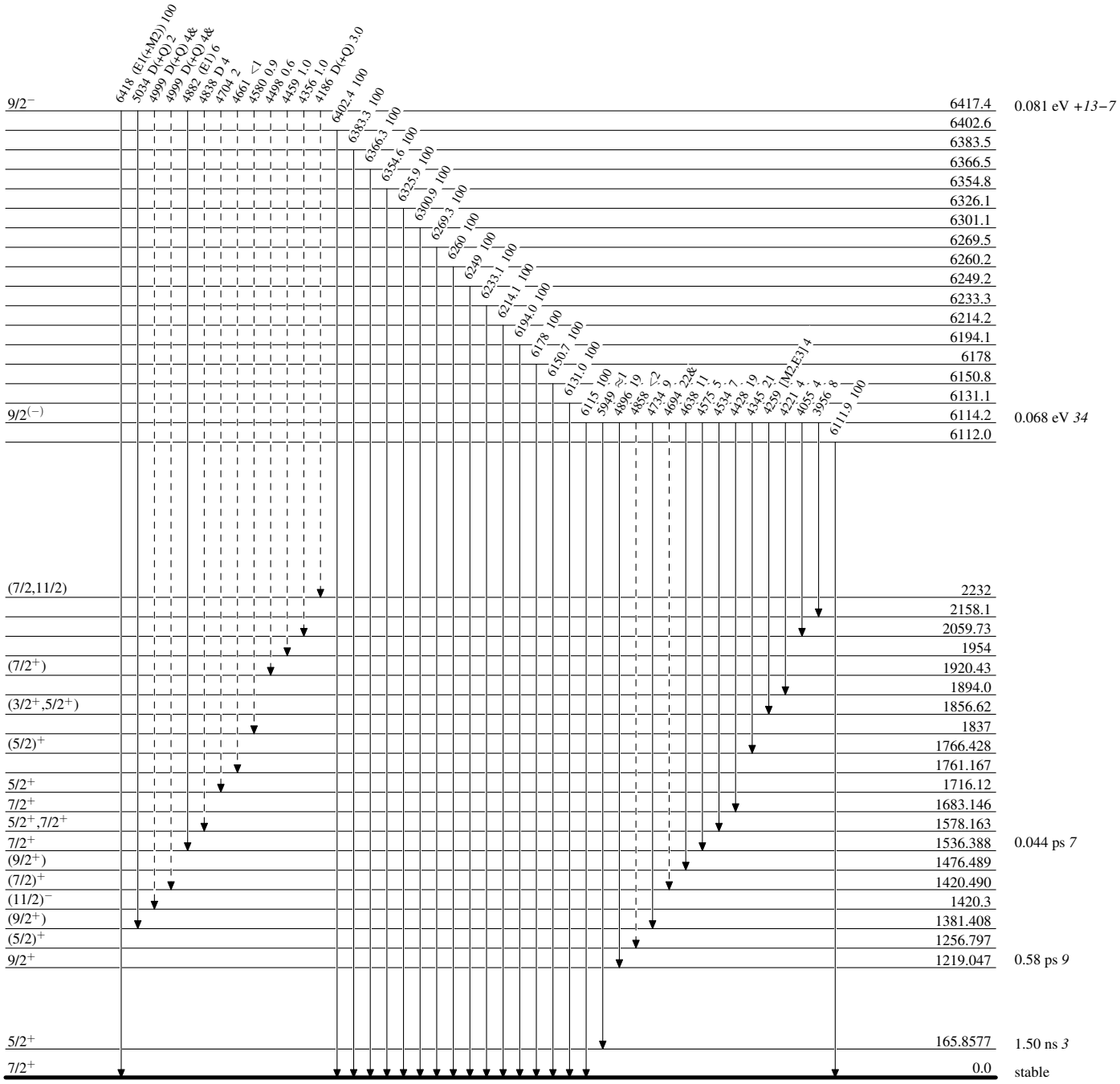
Adopted Levels, Gammas

Legend

Level Scheme (continued)

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

γ Decay (Uncertain)

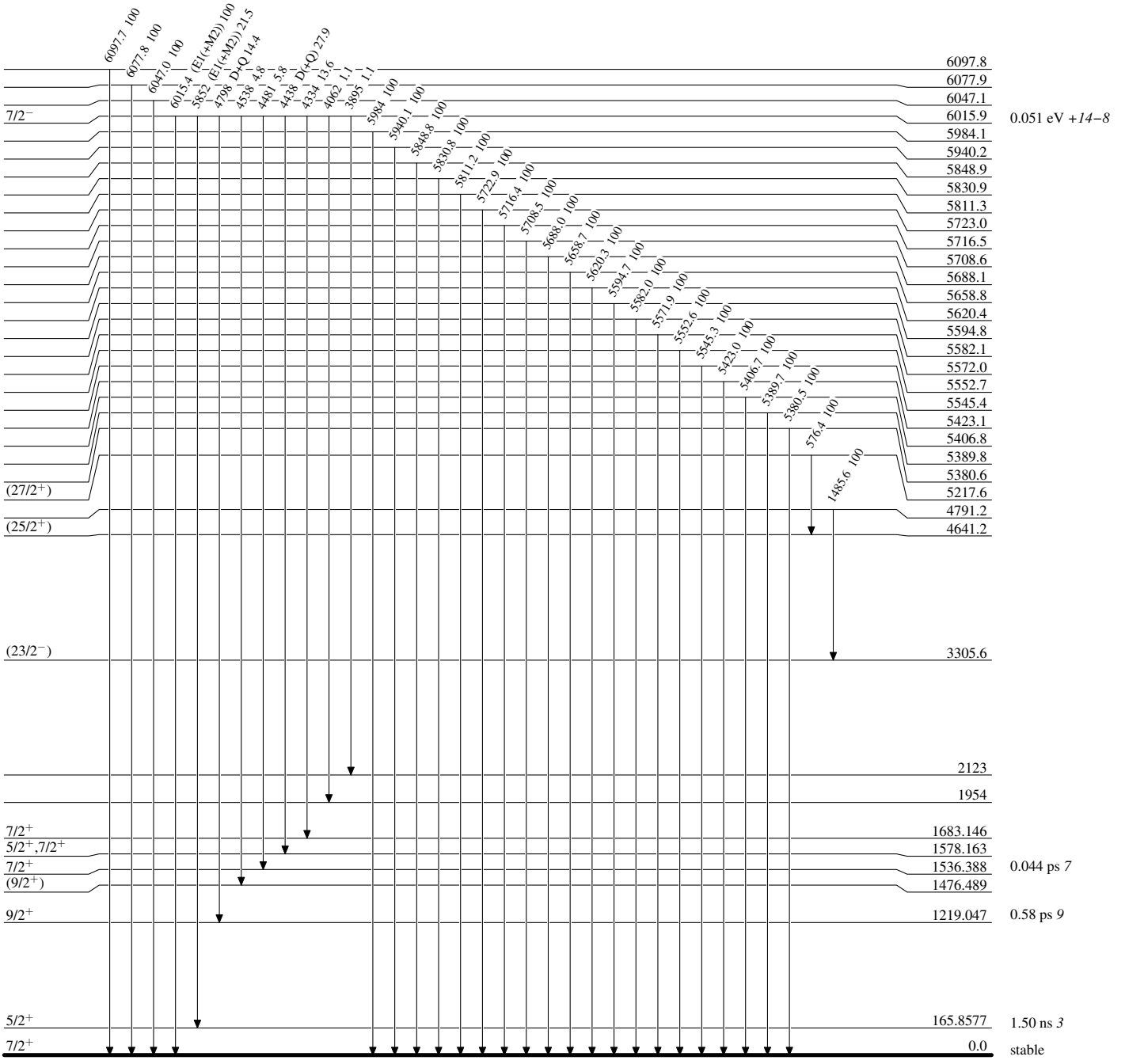


$^{139}_{57}La_{82}$

Adopted Levels, Gammas

Level Scheme (continued)

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

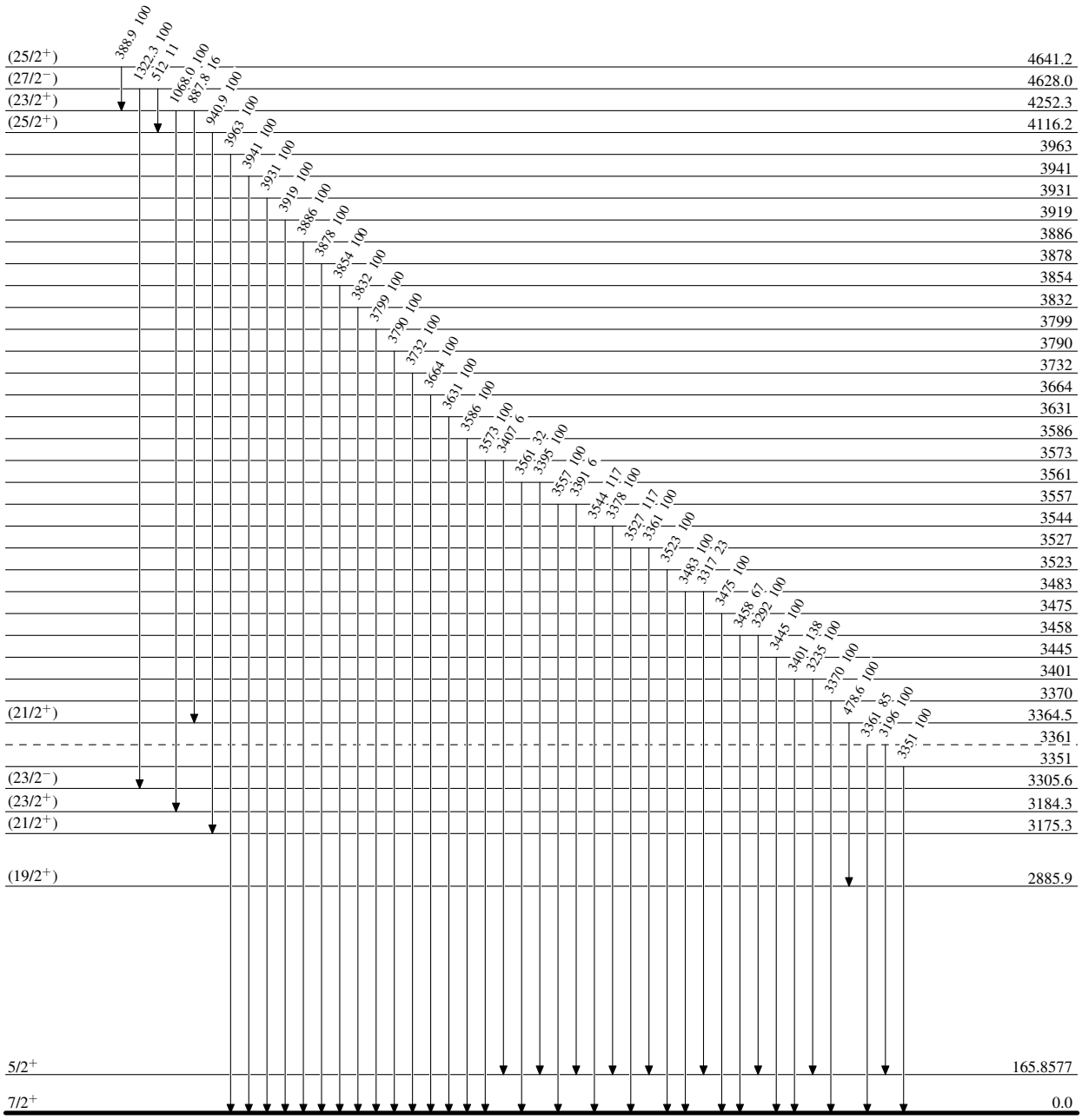


$^{139}_{57}La_{82}$

Adopted Levels, Gammas

Level Scheme (continued)

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



$^{139}_{57}La_{82}$

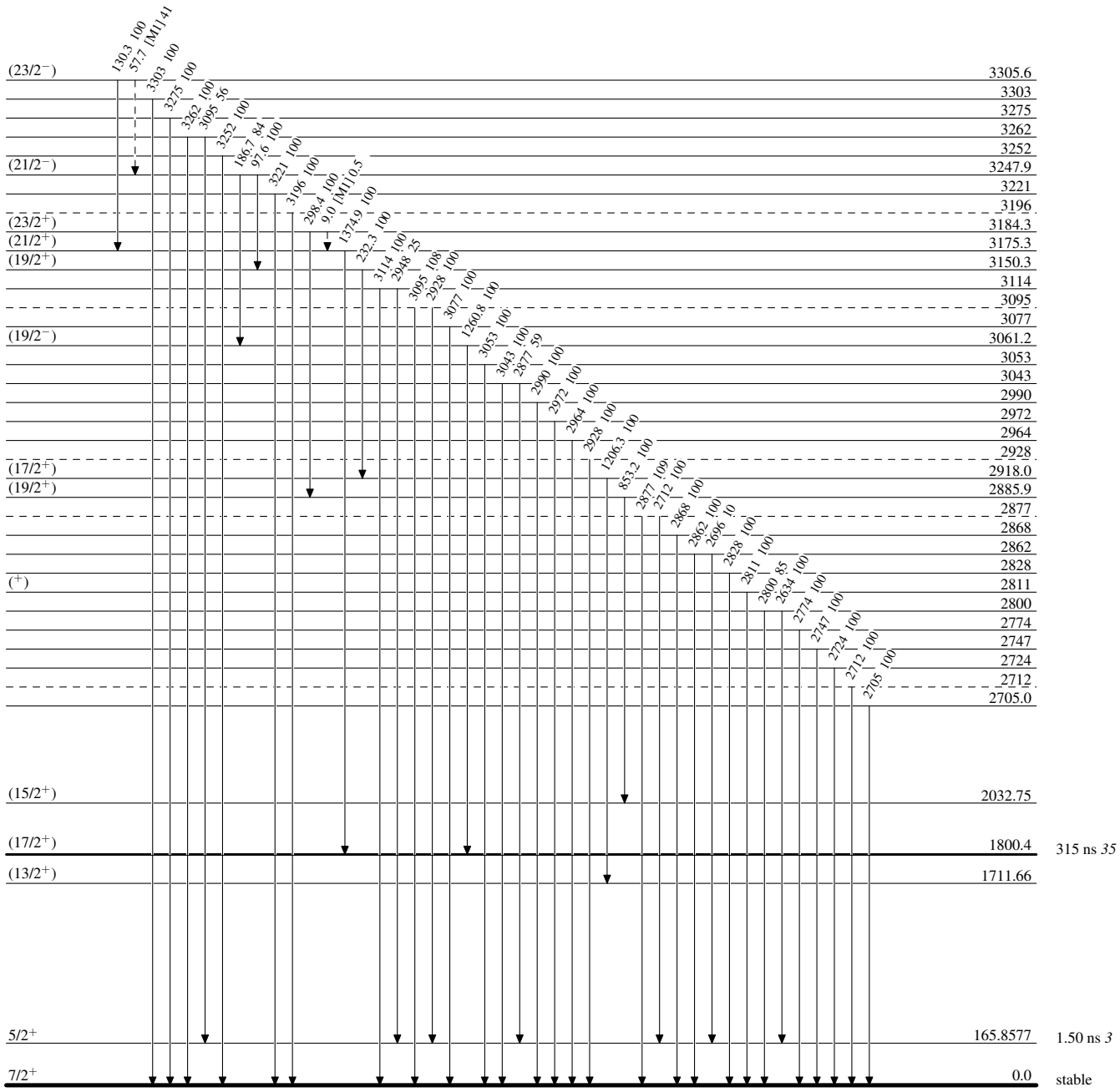
Adopted Levels, Gammas

Legend

Level Scheme (continued)

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

– – – – – – ► γ Decay (Uncertain)



$^{139}_{57}La_{82}$

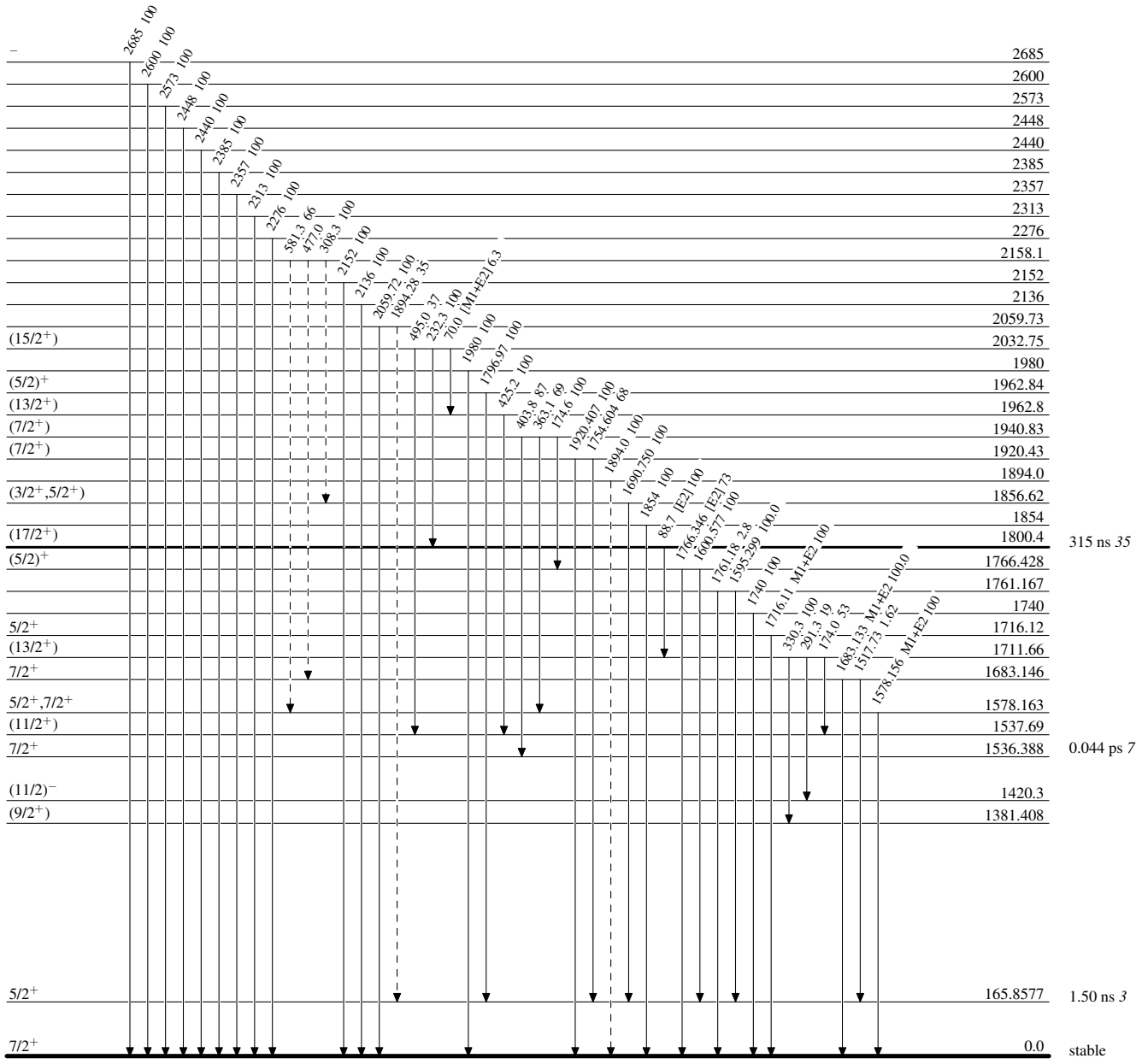
Adopted Levels, Gammas

Legend

Level Scheme (continued)

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

– – – – – – ► γ Decay (Uncertain)

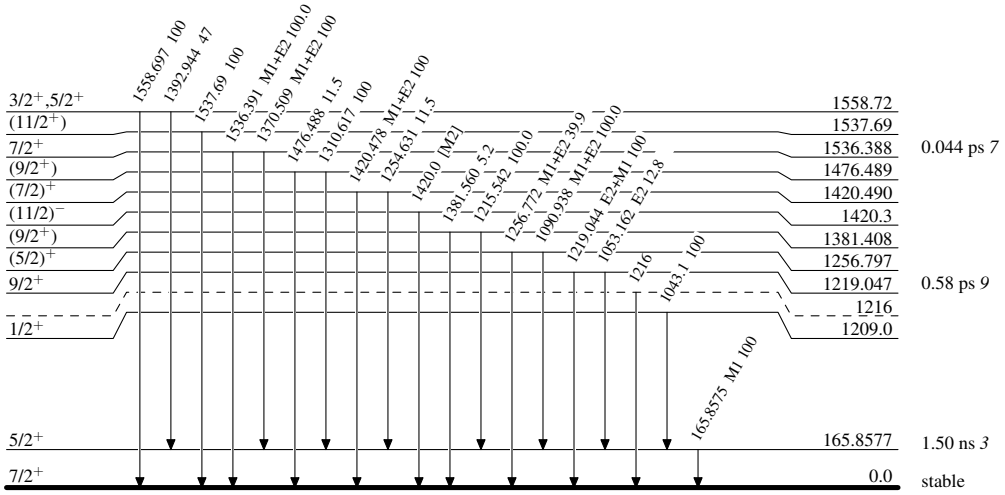


$^{139}_{57}La_{82}$

Adopted Levels, Gammas

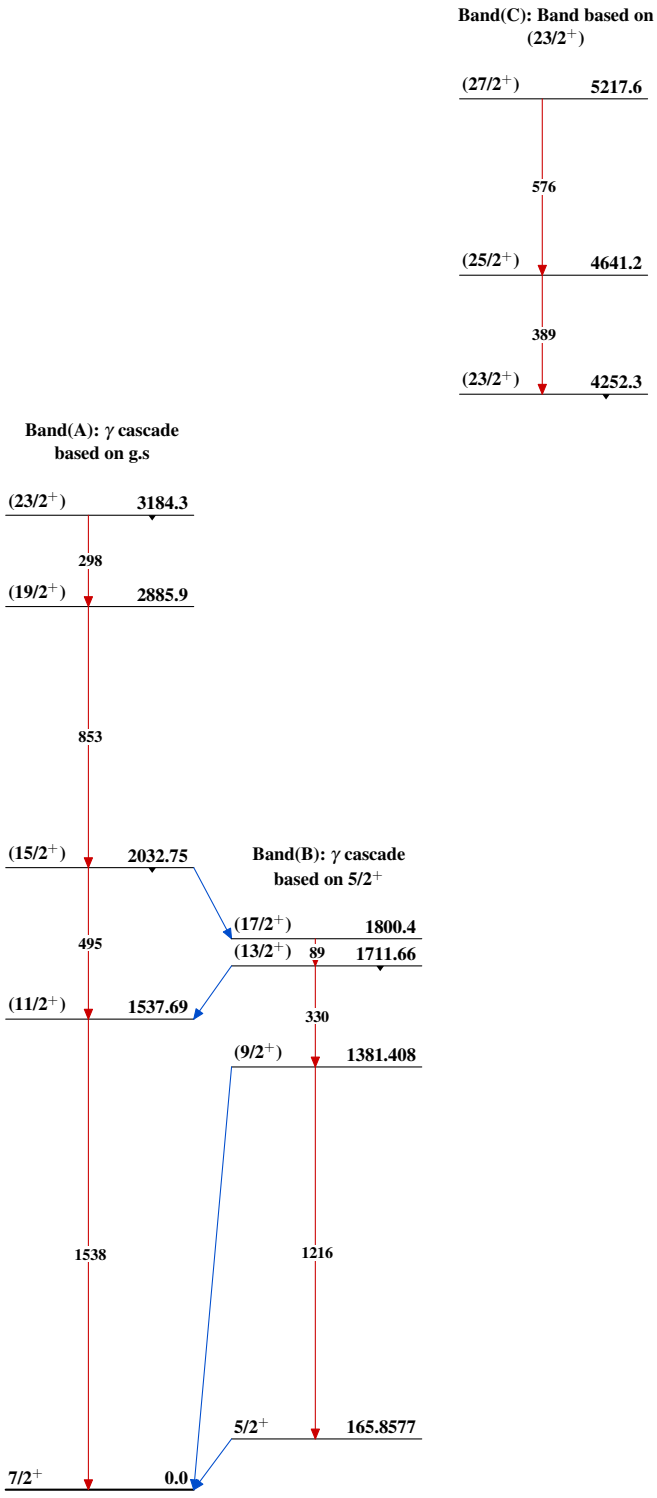
Level Scheme (continued)

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



$^{139}_{57}La_{82}$

Adopted Levels, Gammas



$^{139}_{57}La_{82}$