Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	M. Shamsuzzoha Basunia	NDS 143, 1 (2017)	31-Mar-2017

Q(β^-)=−5280 *50*; S(n)=9680 *30*; S(p)=2755 *17*; Q(α)=3680 *21* 2017Wa10

^{193}Tl Levels

The level scheme, the bands, and the band labeling are those proposed by 1992Re08. The level scheme has been constructed with the help of coincidence relationships, energy sums and intensity ratios, and γ directional correlation (DCO) ratios. For a discussion of the structure of levels and bands, see 1992Re08.

Cross Reference (XREF) Flags

A	^{193}Tl IT decay (2.11 min)	D	(HI,xnγ)
B	^{193}Pb ε decay (5.8 min)	E	(HI,xnγ):SD
C	^{197}Bi α decay (5.15 min)		

E(level)†	J$^\pi$‡	T$_{1/2}$	XREF	Comments
0.0	1/2$^{(+)}$	21.6 min *8*	ABCD	%ε+%β^+=100 μ=+1.591 *2* Limit for possible α decay: <2×10^{-4}% (1963Ka17). 1961Fo06 assign a 5800-keV α group to either ^{193}Tl or ^{194}Tl. μ: from collinear fast atom beam laser spectroscopy (1987Bo44,2014StZZ). J$^\pi$: J from atomic beam (1976Ek03); parity from shell model, μ. (3s1/2 level is the only J=1/2 level available for Z=81). T$_{1/2}$: weighted average of 22.6 min *10* (1961An03) and 21.0 min *8* (1974Va23). Other values: 30 min *3* (1960Ch05), 25 min *3* (1963Di10). Isotope shift: Δ<r^2> =−0.465 *55* fm^2, relative to ^{205}Tl (1989MeZZ). RMS charge radius: 5.4302 *58* fm (2004An14).
365.2	3/2$^{(+)}$		AB D	J$^\pi$: M1+E2 γ to 1/2$^+$.
365.2+x#	(9/2$^-$)	2.11 min *15*	AB D	%IT≤75; %ε+%β^+≥25 μ=+3.948 *4*; Q=−2.20 *2* μ: From 1987Bo44,2014StZZ: collinear fast atom beam laser spectroscopy. Other value: +3.82 *3* (2014StZZ,2012Ba32). Q: From 1987Bo44,2014StZZ: collinear fast atom beam laser spectroscopy. E(level): x<13 from IT decay. J$^\pi$: Long half-life indicates high-spin state. From shell model and measured μ the g9/2 level is the only available level for Z=81 (one proton-hole nucleus). μ also agrees with near-prolate nucleus described by 9/2[505] with β(2)=0.15, β(4)=−0.02 and γ=−0.55° (1992Re08). Systematics of ^{191}Tl, ^{195}Tl, ^{197}Tl, ^{199}Tl. T$_{1/2}$: from 1963Di10. %IT: deduced from relative I(γ+ce) values for transitions in ^{193}Hg and ^{193}Tl (1976GoZP). Isotope shift: Δ<r^2> =−0.395 *46* fm^2, relative to ^{205}Tl (1989MeZZ).
757.51+x# *24*	(11/2$^-$)		B D	J$^\pi$: M1+E2 γ to 9/2$^-$ level; band structure.
1081.10+x# *24*	(13/2$^-$)		B D	J$^\pi$: M1+E2 γ to 11/2$^-$ level, E2 γ to 9/2$^-$ level; band structure.
1163.7+x			B	
1423.7+x			B	
1493.4+x *3*	(13/2$^-$)		B D	J$^\pi$: Q γ to (9/2$^-$).
1512.1+x# *3*	(15/2$^-$)		B D	J$^\pi$: M1 γ to 13/2$^-$ level, E2 γ to 11/2$^-$ level; band structure.
1833.2+x# *3*	(17/2$^-$)		D	J$^\pi$: E2 γ to 13/2$^-$ level, D γ to 15/2$^-$ level; band structure.

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Adopted Levels, Gammas (continued)

^{193}Tl Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$	XREF	Comments
1871.0+x			B	
1899.6+x *4*	(15/2$^-$)		B D	Jπ: M1 γ to (13/2)$^+$ level.
1928.4+x *4*	(17/2$^-$)		D	Jπ: D γ to 15/2$^-$ level, (Q) γ to 13/2$^-$ level.
1960.0+x *5*	(15/2$^-$)		B D	Jπ: M1 γ to (13/2$^-$) level.
2008.1+x[a] *5*	(17/2$^+$)	0.6 ns	D	
2105.4+x[a] *6*	(19/2$^+$)		D	
2231.5+x[a] *7*	(21/2$^+$)		D	
2303.8+x[#] *5*	(19/2$^-$)		D	
2393.4+x[a] *8*	(23/2$^+$)		D	
2393.7+x *5*	(19/2$^-$)		D	
2452.0+x *8*	(23/2)		D	
2506.3+x[@] *5*	(21/2$^-$)		D	
2576.2+x[#] *6*	(21/2$^-$)		D	
2591.3+x[@] *6*	(23/2$^-$)		D	
2672.5+x *8*	(25/2)		D	
2687.3+x[@] *7*	(25/2$^-$)		D	
2710.2+x[a] *6*	(25/2$^+$)		D	
2798.3+x *9*	(27/2)		D	
2931.5+x *9*	(27/2)		D	
2956.3+x[@] *8*	(27/2$^-$)		D	
3026.9+x[a] *7*	(27/2$^+$)		D	
3030.3+x *10*	(29/2)		D	
3087.5+x *11*	(29/2)		D	
3164.3+x[@] *8*	(29/2$^-$)		D	
3407.0+x[a] *7*	(29/2$^+$)		D	
3428.5+x *12*	(31/2)		D	
3457.3+x[b] *7*	(27/2$^-$)		D	
3556.8+x[@] *9*	(31/2$^-$)		D	
3616.3+x[b] *8*	(29/2$^-$)		D	
3630.5+x *12*	(33/2)		D	
3747.1+x[a] *8*	(31/2$^+$)		D	
3767.2+x[&] *9*	(29/2$^-$)		D	
3767.3+x[b] *9*	(31/2$^-$)		D	
3849.8+x[@] *9*	(33/2$^-$)		D	
3966.2+x[&] *10*	(31/2$^-$)		D	
3988.9+x[b] *10*	(33/2$^-$)		D	
4008.0+x[a] *8*	(33/2$^+$)		D	
4114.6+x *8*	(33/2)		D	
4157.5+x[a] *10*	(35/2$^+$)		D	
4227.4+x[b] *10*	(35/2$^-$)		D	
4262.5+x *13*	(37/2)		D	
4306.8+x[@] *9*	(35/2$^-$)		D	
4307.6+x *10*	(35/2)		D	
4319.3+x[a] *11*	(37/2$^+$)		D	
4335.2+x[&] *11*	(33/2$^-$)		D	
4525.7+x[a] *12*	(39/2$^+$)		D	
4532.6+x *11*	(37/2)		D	
4553.4+x[b] *11*	(37/2$^-$)		D	
4587.2+x[&] *11*	(35/2$^-$)		D	
4646.4+x[@] *9*	(37/2$^-$)		D	

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Adopted Levels, Gammas (continued)

^{193}Tl Levels (continued)

E(level)[†]	Jπ[‡]	XREF	Comments
4804.9+x[a] *12*	(41/2$^+$)	D	
4890.4+x[b] *11*	(39/2$^-$)	D	
4956.2+x[&] *12*	(37/2$^-$)	D	
5039.5+x *14*	(41/2)	D	
5124.4+x[@] *10*	39/2$^-$	D	
5125.0+x[a] *12*	43/2$^+$	D	
5264.2+x[b]	41/2$^-$	D	
5312.2+x[&] *13*	39/2$^-$	D	
5469.8+x[@] *10*	41/2$^-$	D	
5490.6+x[a] *12*	45/2$^+$	D	
5853.8+x[@] *11*	43/2$^-$	D	
5888.6+x[a] *13*	47/2$^+$	D	
6271.2+x[@] *12*	45/2$^-$	D	
v[c]	(17/2$^+$)	E	E(level): 3134 keV *4* depopulating from this state. Proposed feeding by 1998Bo20 does not fit to members of normal band of (HI,xnγ) 2016NdZZ. Jπ: from 1998Bo20. Also from least-squares fits to Eγ′s using empirical expansions relating second moment of inertia and angular frequency.
98+v[d]	(19/2$^+$)	E	E(level): 3113 keV *5* depopulating from this state. Proposed feeding by 1998Bo20 does not fit to members of normal band of (HI,xnγ) 2016NdZZ. Jπ: calculated J=19/2 (1992Wu01,1993Hu06,1994Zh40).
206+v[c]	(21/2$^+$)	E	E(level): 3046 keV *6* depopulating from this state. Proposed feeding by 1998Bo20 does not fit to members of normal band of (HI,xnγ) 2016NdZZ. Jπ: calculated J=21/2 (1992Wu01,1993Hu06,1994Zh40).
325+v[d] *3*	(23/2$^+$)	E	
454+v[c] *3*	(25/2$^+$)	E	
593+v[d] *3*	(27/2$^+$)	E	
741+v[c] *3*	(29/2$^+$)	E	
901+v[d] *3*	(31/2$^+$)	E	
1069+v[c] *3*	(33/2$^+$)	E	
1249+v[d] *3*	(35/2$^+$)	E	
1435+v[c] *3*	(37/2$^+$)	E	
1636+v[d] *3*	(39/2$^+$)	E	
1840+v[c] *3*	(41/2$^+$)	E	
2062+v[d] *3*	(43/2$^+$)	E	
2283+v[c] *3*	(45/2$^+$)	E	
2525+v[d] *3*	(47/2$^+$)	E	
2763+v[c] *3*	(49/2$^+$)	E	
3027+v[d] *3*	(51/2$^+$)	E	
3279+v[c] *3*	(53/2$^+$)	E	
3564+v[d] *3*	(55/2$^+$)	E	
3830+v[c] *3*	(57/2$^+$)	E	
4137+v[d] *3*	(59/2$^+$)	E	
4417+v[c] *3*	(61/2$^+$)	E	
4746+v[d] *3*	(63/2$^+$)	E	
5037+v[c] *3*	(65/2$^+$)	E	
5390+v[d] *3*	(67/2$^+$)	E	
5691+v[c] *3*	(69/2$^+$)	E	
6069+v[d] *3*	(71/2$^+$)	E	
6377+v[c] *3*	(73/2$^+$)	E	

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Adopted Levels, Gammas (continued)

^{193}Tl Levels (continued)

E(level)[†]	J$^{\pi}$[‡]	XREF	Comments
6782+v[d] 3	(75/2$^+$)	E	
7096+v[c] 3	(77/2$^+$)	E	
7529+v[d] 3	(79/2$^+$)	E	
7847+v[c] 3	(81/2$^+$)	E	
8311+v[d] 3	(83/2$^+$)	E	
8630+v[c] 4	(85/2$^+$)	E	
y[e]	J	E	J$^{\pi}$: ≈(15/2).
187.9+y[e] 3	J+2	E	
418.6+y[e] 5	J+4	E	
691.4+y[e] 6	J+6	E	
1005.7+y[e] 6	J+8	E	
1360.7+y[e] 7	J+10	E	
1755.8+y[e] 8	J+12	E	
2190.3+y[e] 8	J+14	E	
2663.4+y[e] 9	J+16	E	
3174.0+y[e] 9	J+18	E	
3721.5+y[e] 10	J+20	E	
4304.9+y[e] 10	J+22	E	
4923.3+y[e] 11	J+24	E	
5576.4+y[e] 11	J+26	E	
6263.1+y[e] 12	J+28	E	
6977.1+y[e] 14	J+30	E	
7712.1+y[e] 17	J+32	E	
z[f]	J1	E	J$^{\pi}$: ≈(23/2).
250.8+z[f] 3	J1+2	E	
542.8+z[f] 5	J1+4	E	
875.5+z[f] 6	J1+6	E	
1248.2+z[f] 6	J1+8	E	
1660.1+z[f] 7	J1+10	E	
2110.6+z[f] 8	J1+12	E	
2598.7+z[f] 8	J1+14	E	
3123.9+z[f] 9	J1+16	E	
3685.6+z[f] 9	J1+18	E	
4282.5+z[f] 10	J1+20	E	
4914.3+z[f] 10	J1+22	E	
5580.7+z[f] 11	J1+24	E	
6285.4+z[f] 13	J1+26	E	
7033.4+z[f] 16	J1+28	E	
u[g]	J2	E	J$^{\pi}$: ≈(21/2).
271.5+u[g] 5	J2+2	E	
584.8+u[g] 7	J2+4	E	
938.9+u[g] 7	J2+6	E	
1332.2+u[g] 9	J2+8	E	
1764.5+u[g] 9	J2+10	E	
2234.4+u[g] 10	J2+12	E	
2741.7+u[g] 10	J2+14	E	
3285.4+u[g] 10	J2+16	E	
3864.8+u[g] 11	J2+18	E	

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Adopted Levels, Gammas (continued)

^{193}Tl Levels (continued)

E(level)[†]	Jπ[‡]	XREF
4479.3+u[g] *12*	J2+20	E
5128.8+u[g] *13*	J2+22	E
5813.0+u[g] *13*	J2+24	E
6531.8+u[g] *15*	J2+26	E

[†] From least squares fit to Eγ. For the levels built on the 365.2+x level, the uncertainties given for E(level) are relative uncertainties within that part of the level scheme; they do not include the uncertainty in Eγ=365.2 (not known) nor the uncertainty in the unknown x. Similarly, the uncertainties on the E(level) in the SD-bands are the relative uncertainties within the band.

[‡] From (HI,xnγ) based on combined analysis of γ-ray multipolarities, coincidence data, rotational structure, and systematics of odd-mass Tl nuclei in (HI,xnγ), except where noted.

[#] Band(A): Band 1.

[@] Band(B): Band 2 *9*/2(505).

[&] Band(C): Band 3.

[a] Band(D): Band 4.

[b] Band(E): Band 5.

[c] Band(F): SD-1 band α=+1/2 (1990Fe07,1996Bo02,1998Bo20,1999Kr19) Percent population is ≈0.5 of total yield for ^{193}Tl (1990Fe07). Q(intrinsic)=18.3 *10* (1999Kr19). From competing M1 (interband) and E2 (intraband) transitions, g_K=1.46 *17* (1996Bo02) and g_s^{eff}/g_s^{free}=0.7 *2* (1996Bo02).

[d] Band(f): SD-2 band α=−1/2 (1990Fe07,1996Bo02,1998Bo20,1999Kr19) percent population is ≈0.5 of total yield for ^{193}Tl (1990Fe07). Q(intrinsic)=17.4 *10* (1999Kr19). The two SD bands are interpreted as signature partners influenced by i13/2 proton intruder orbital. From competing M1 (interband) and E2 (intraband) transitions, g_K=1.46 *17* (1996Bo02) and g_s^{eff}/g_s^{free}=0.7 *2* (1996Bo02).

[e] Band(G): SD-3 band (1998Bo32) Population intensity=60% of SD-2 band. Interaction observed between SD-3 and SD-4 bands, and the identical energies (within 2 keV) of transitions in SD-3 and SD-5 bands, indicate involvement of 1/2[411], α=±1/2 and 1/2[651], α=−1/2 proton orbitals. At high frequencies SD-3 is interpreted to be due to 1/2[651], α=−1/2, while at low frequencies, it is expected to be due to 1/2[411] α=−1/2.

[f] Band(H): SD-4 band (1998Bo32) Population intensity=33% of SD-2 band. Interaction is observed between SD-3 and SD-4 bands. At high frequencies SD-4 is interpreted to be due to 1/2[411], α=−1/2, while at low frequencies it is interpreted as 1/2[651], α=−1/2.

[g] Band(I): SD-5 band (1998Bo32) Population intensity=16% of SD-2 band. Identical energies (within 2 keV) of transitions in SD-3 and SD-5 bands indicate that these bands may be signature partners. SD-5 band is interpreted as 1/2[411], α=+1/2.

Adopted Levels, Gammas (continued)

γ(^{193}Tl)

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[#]	α[e]	Comments
365.2	3/2$^{(+)}$	365.2	100	0.0	1/2$^{(+)}$	M1+E2	1.7 *+5−4*	0.106 *20*	E_γ: unweighted average of measurements in ^{193}Tl IT decay (365.0 keV, 1976Ha25) and (HI,xnγ) (365.3 keV, 1974Ne16). Mult.,δ: from ^{193}Tl IT decay (2.11 min).
365.2+x	(9/2$^-$)	(x)		365.2	3/2$^{(+)}$	[E3]			E_γ: E<13 keV, see ^{193}Tl IT decay (2.11 min). B(E3)(W.u.) varies from 0.005 for Eγ=13 to 0.14 for Eγ=2.2.
757.51+x	(11/2$^-$)	392.5	100	365.2+x	(9/2$^-$)	M1+E2	−0.59 *14*	0.160 *13*	δ: Other values: −0.14<δ<−0.03 (1999Fu05), from e$^-$-γ and γγ angular correlations.
1081.10+x	(13/2$^-$)	323.9	89.7 *2*	757.51+x	(11/2$^-$)	M1+E2	0.6 *+4−5*		I_γ: Other: 37.3 (^{193}Pb ε decay (5.8 min)).
		716.4	100.0 *2*	365.2+x	(9/2$^-$)	E2		0.0126	
1163.7+x		406.5	100	757.51+x	(11/2$^-$)				E_γ: 406.6γ placed from 1900.2+x level in (HI,xnγ) data.
1423.7+x		666.2[&]	100	757.51+x	(11/2$^-$)				
1493.4+x	(13/2$^-$)	412.0	11.75 *11*	1081.10+x	(13/2$^-$)	D+Q			
		735.9	100.00 *11*	757.51+x	(11/2$^-$)	D			
		1128.4	3.06 *4*	365.2+x	(9/2$^-$)	Q			
1512.1+x	(15/2$^-$)	431.2	73.49 *5*	1081.10+x	(13/2$^-$)	M1			I_γ: Other: 30.8 (^{193}Pb ε decay (5.8 min)).
		755.1	100.00 *21*	757.51+x	(11/2$^-$)	E2		0.0113	
1833.2+x	(17/2$^-$)	321.0	31.31 *2*	1512.1+x	(15/2$^-$)	D			
		752.2	100.00 *17*	1081.10+x	(13/2$^-$)	E2			
1871.0+x		1113.5[&]	100	757.51+x	(11/2$^-$)				
1899.6+x	(15/2$^-$)	406.2	100.0 *5*	1493.4+x	(13/2$^-$)	M1		0.180	
		818.6	6.09 *1*	1081.10+x	(13/2$^-$)	D			
1928.4+x	(17/2$^-$)	416.9	<34.59	1512.1+x	(15/2$^-$)	D			
		848.1	100.0 *2*	1081.10+x	(13/2$^-$)	Q			
1960.0+x	(15/2$^-$)	466.9	100.00 *8*	1493.4+x	(13/2$^-$)	M1		0.125	
		878.9	9.92 *2*	1081.10+x	(13/2$^-$)	D			
2008.1+x	(17/2$^+$)	47.5	100.00 *25*	1960.0+x	(15/2$^-$)	D			
		107.8	32.59 *3*	1899.6+x	(15/2$^-$)	D			
		495.2	30.32 *5*	1512.1+x	(15/2$^-$)	E1			
2105.4+x	(19/2$^+$)	97.0	100	2008.1+x	(17/2$^+$)	D			
2231.5+x	(21/2$^+$)	125.9	100	2105.4+x	(19/2$^+$)	D			
2303.8+x	(19/2$^-$)	470.0	62.05 *7*	1833.2+x	(17/2$^-$)	D			
		791.0	100.00 *7*	1512.1+x	(15/2$^-$)	(E2)			
2393.4+x	(23/2$^+$)	161.8	100	2231.5+x	(21/2$^+$)				
2393.7+x	(19/2$^-$)	464.1	100.0 *20*	1928.4+x	(17/2$^-$)	D			
		881.0	14.43 *2*	1512.1+x	(15/2$^-$)	Q			
2452.0+x	(23/2)	220.5	100	2231.5+x	(21/2$^+$)	D			
2506.3+x	(21/2$^-$)	112.5	2.40 *1*	2393.7+x	(19/2$^-$)				
		202.5	10.36 *2*	2303.8+x	(19/2$^-$)	D			
		672.5	100.0 *1*	1833.2+x	(17/2$^-$)	E2			
2576.2+x	(21/2$^-$)	272.4	24.38 *4*	2303.8+x	(19/2$^-$)	D			

$^{193}_{81}Tl_{112}$-6

Adopted Levels, Gammas (continued)

γ(^{193}Tl) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.[#]
2576.2+x	(21/2$^-$)	742.4	100.0 *1*	1833.2+x	(17/2$^-$)	Q
2591.3+x	(23/2$^-$)	85.0		2506.3+x	(21/2$^-$)	
		287.5		2303.8+x	(19/2$^-$)	(Q)
2672.5+x	(25/2)	220.5[c]	100.0 *23*	2452.0+x	(23/2)	D
		441.0	33.59 *4*	2231.5+x	(21/2$^+$)	(Q)
2687.3+x	(25/2$^-$)	96.0	100	2591.3+x	(23/2$^-$)	D
2710.2+x	(25/2$^+$)	316.7	100.00 *9*	2393.4+x	(23/2$^+$)	D
		478.5	32.40 *8*	2231.5+x	(21/2$^+$)	Q
2798.3+x	(27/2)	111.0	100	2687.3+x	(25/2$^-$)	D
2931.5+x	(27/2)	259.0[c]	100	2672.5+x	(25/2)	D
2956.3+x	(27/2$^-$)	269.0	100	2687.3+x	(25/2$^-$)	M1
3026.9+x	(27/2$^+$)	316.7	35.09 *4*	2710.2+x	(25/2$^+$)	D
		633.4	100.00 *11*	2393.4+x	(23/2$^+$)	E2
3030.3+x	(29/2)	232.0[b]	100	2798.3+x	(27/2)	D
3087.5+x	(29/2)	156.0[c]	100	2931.5+x	(27/2)	D
3164.3+x	(29/2$^-$)	208.0	100.0 *2*	2956.3+x	(27/2$^-$)	D
		477.0	49.28 *7*	2687.3+x	(25/2$^-$)	Q
3407.0+x	(29/2$^+$)	380.1	100.00 *12*	3026.9+x	(27/2$^+$)	M1
		696.8	88.38 *6*	2710.2+x	(25/2$^+$)	(E2)
3428.5+x	(31/2)	341.0[c]	100	3087.5+x	(29/2)	D
3457.3+x	(27/2$^-$)	770.0	100.00 *21*	2687.3+x	(25/2$^-$)	M1
		866.0	62.33 *16*	2591.3+x	(23/2$^-$)	(E2)
3556.8+x	(31/2$^-$)	392.5	100.00 *12*	3164.3+x	(29/2$^-$)	M1
		600.5	21.56 *8*	2956.3+x	(27/2$^-$)	
3616.3+x	(29/2$^-$)	159.0	71.15 *14*	3457.3+x	(27/2$^-$)	D
		929.0	100.00 *23*	2687.3+x	(25/2$^-$)	Q
3630.5+x	(33/2)	543.0[b]	100	3087.5+x	(29/2)	Q
3747.1+x	(31/2$^+$)	340.1	70.0 *6*	3407.0+x	(29/2$^+$)	M1
		720.2	100.00 *8*	3026.9+x	(27/2$^+$)	E2
3767.2+x	(29/2$^-$)	210.4	65.8 *11*	3556.8+x	(31/2$^-$)	D
		810.9	100.00 *22*	2956.3+x	(27/2$^-$)	M1
3767.3+x	(31/2$^-$)	151.0	100	3616.3+x	(29/2$^-$)	D
3849.8+x	(33/2$^-$)	293.0	100.00 *13*	3556.8+x	(31/2$^-$)	D
		685.5	85.06 *18*	3164.3+x	(29/2$^-$)	E2
3966.2+x	(31/2$^-$)	199.0	100	3767.2+x	(29/2$^-$)	(M1)
3988.9+x	(33/2$^-$)	221.6	100	3767.3+x	(31/2$^-$)	M1
4008.0+x	(33/2$^+$)	260.9	100.0 *13*	3747.1+x	(31/2$^+$)	M1
		601.0	66.81 *15*	3407.0+x	(29/2$^+$)	Q
4114.6+x	(33/2)	367.5	44.34 *10*	3747.1+x	(31/2$^+$)	D
		707.7	100.00 *22*	3407.0+x	(29/2$^+$)	Q
4157.5+x	(35/2$^+$)	149.5	100	4008.0+x	(33/2$^+$)	D
4227.4+x	(35/2$^-$)	238.5	100.00 *12*	3988.9+x	(33/2$^-$)	M1
		460.1	71.31 *20*	3767.3+x	(31/2$^-$)	Q
4262.5+x	(37/2)	632.0	100	3630.5+x	(33/2)	Q
4306.8+x	(35/2$^-$)	457.0	100.23 *23*	3849.8+x	(33/2$^-$)	M1
		750.0	59.40 *20*	3556.8+x	(31/2$^-$)	Q
4307.6+x	(35/2)	193.0[d]	100	4114.6+x	(33/2)	D
4319.3+x	(37/2$^+$)	161.8	100	4157.5+x	(35/2$^+$)	D
4335.2+x	(33/2$^-$)	369.0	100	3966.2+x	(31/2$^-$)	D
4525.7+x	(39/2$^+$)	206.4	100	4319.3+x	(37/2$^+$)	D
4532.6+x	(37/2)	225.0[d]	100	4307.6+x	(35/2)	D
4553.4+x	(37/2$^-$)	326.0	100	4227.4+x	(35/2$^-$)	D
4587.2+x	(35/2$^-$)	252.0	97.8 *3*	4335.2+x	(33/2$^-$)	D
		621.0	100.0 *3*	3966.2+x	(31/2$^-$)	Q
4646.4+x	(37/2$^-$)	339.6	68.17 *15*	4306.8+x	(35/2$^-$)	M1
		796.6	100.00 *18*	3849.8+x	(33/2$^-$)	(E2)
4804.9+x	(41/2$^+$)	279.2	100.00 *15*	4525.7+x	(39/2$^+$)	M1
		485.6	13.5 *4*	4319.3+x	(37/2$^+$)	Q
4890.4+x	(39/2$^-$)	337.0	100.00 *21*	4553.4+x	(37/2$^-$)	D
		663.0	50.69 *14*	4227.4+x	(35/2$^-$)	Q
4956.2+x	(37/2$^-$)	369.0	100	4587.2+x	(35/2$^-$)	D
5039.5+x	(41/2)	777.0[b]	100	4262.5+x	(37/2)	Q
5124.4+x	39/2$^-$	478.0	100.00 *18*	4646.4+x	(37/2$^-$)	D
		817.6	54.51 *8*	4306.8+x	(35/2$^-$)	Q
5125.0+x	43/2$^+$	320.1	84.87 *12*	4804.9+x	(41/2$^+$)	D
		599.3	100.00 *23*	4525.7+x	(39/2$^+$)	Q
5264.2+x	41/2$^-$	374.0[f]	100	4890.4+x	(39/2$^-$)	D
5312.2+x	39/2$^-$	356.0	100	4956.2+x	(37/2$^-$)	D
5469.8+x	41/2$^-$	345.4	100.0 *17*	5124.4+x	39/2$^-$	M1
		823.4	76.9 *23*	4646.4+x	(37/2$^-$)	Q
5490.6+x	45/2$^+$	365.6	100.0 *21*	5125.0+x	43/2$^+$	D
		685.7	25.79 *4*	4804.9+x	(41/2$^+$)	Q
5853.8+x	43/2$^-$	384.0	100.0 *3*	5469.8+x	41/2$^-$	D
		729.4[f]	21.68 *8*	5124.4+x	39/2$^-$	Q
5888.6+x	47/2$^+$	398.0	100	5490.6+x	45/2$^+$	D
6271.2+x	45/2$^-$	417.4	100.0 *3*	5853.8+x	43/2$^-$	D
		801.4[f]	29.03 *7*	5469.8+x	41/2$^-$	
206+v	(21/2$^+$)	108.0 *3*		98+v	(19/2$^+$)	
		206.6 *3*		v	(17/2$^+$)	
325+v	(23/2$^+$)	118.9 *3*		206+v	(21/2$^+$)	
		227.3 *3*	0.98 *10*	98+v	(19/2$^+$)	
454+v	(25/2$^+$)	128.3 *3*		325+v	(23/2$^+$)	

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Adopted Levels, Gammas (continued)

$\gamma(^{193}Tl)$ (continued)

E_i(level)	J_i^π	E_γ [†]	I_γ [‡]	E_f	J_f^π	Mult.[#]	Comments
454+v	(25/2$^+$)	247.3 *3*	0.39 *6*	206+v	(21/2$^+$)		
593+v	(27/2$^+$)	139.2 *3*		454+v	(25/2$^+$)	(M1)[a]	Mult.: α(exp)(139γ+148γ)=2.6 *8* (1996Bo02); theory: α(K)(M1)=2.73.
		267.9 *3*	1.13[@] *23*	325+v	(23/2$^+$)		
741+v	(29/2$^+$)	148.2 *3*		593+v	(27/2$^+$)	(M1)[a]	Mult.: α(exp)(139γ+148γ)=2.6 *8* and α(exp)(148γ+160γ)=3.0 *8* (1996Bo02); theory: α(K)(M1)=2.29.
		287.7 *3*	0.45 *5*	454+v	(25/2$^+$)		
901+v	(31/2$^+$)	160.1 *3*		741+v	(29/2$^+$)	(M1)[a]	Mult.: α(exp)(148γ+160γ)=3.0 *8* (1996Bo02); theory: α(K)(M1)=1.84.
		308.2 *3*	0.86 *9*	593+v	(27/2$^+$)		
1069+v	(33/2$^+$)	167.4 *3*		901+v	(31/2$^+$)	(M1)[a]	Mult.: α(exp)(167γ+181γ)=2.2 *5* (1996Bo02): theory: α(K)(M1)=1.622.
		327.4 *3*	0.53 *5*	741+v	(29/2$^+$)		
1249+v	(35/2$^+$)	180.6 *3*		1069+v	(33/2$^+$)	(M1)[a]	Mult.: α(exp)(167γ+181γ)=2.2 *5* and α(exp)(181γ+186γ)=1.8 *7* (1996Bo02); theory: α(K)(M1)=1.31.
		348.0 *3*	1.01 *11*	901+v	(31/2$^+$)		
1435+v	(37/2$^+$)	185.8 *3*		1249+v	(35/2$^+$)	(M1)[a]	Mult.: α(exp)(181γ+186γ)=1.8 *7* and α(exp)(186γ+201γ)=1.4 *6* (1996Bo02); theory: α(K)(M1)=1.21.
		366.4 *3*	1.15 *23*	1069+v	(33/2$^+$)		
1636+v	(39/2$^+$)	201.4 *3*		1435+v	(37/2$^+$)	(M1)[a]	Mult.: α(exp)(186γ+201γ)=1.4 *6* (1996Bo02); theory: α(K)(M1)=0.965.
		387.0 *3*	1.4 *4*	1249+v	(35/2$^+$)		
1840+v	(41/2$^+$)	203.5 *3*		1636+v	(39/2$^+$)		
		405.3 *4*	0.93 *19*	1435+v	(37/2$^+$)		
2062+v	(43/2$^+$)	221.5 *3*		1840+v	(41/2$^+$)		
		425.4 *3*	1.22 *12*	1636+v	(39/2$^+$)		
2283+v	(45/2$^+$)	442.9 *3*		1840+v	(41/2$^+$)		
2525+v	(47/2$^+$)	463.7 *3*	1.60[@] *16*	2062+v	(43/2$^+$)		
2763+v	(49/2$^+$)	479.7 *3*	0.72 *17*	2283+v	(45/2$^+$)		
3027+v	(51/2$^+$)	501.1 *3*		2525+v	(47/2$^+$)		
3279+v	(53/2$^+$)	516.1 *3*	1.11 *17*	2763+v	(49/2$^+$)		
3564+v	(55/2$^+$)	537.5 *3*	1.30 *14*	3027+v	(51/2$^+$)		
3830+v	(57/2$^+$)	551.6 *3*	1.00 *14*	3279+v	(53/2$^+$)		
4137+v	(59/2$^+$)	573.4 *3*	1.00 *10*	3564+v	(55/2$^+$)		
4417+v	(61/2$^+$)	586.5 *3*	0.84 *17*	3830+v	(57/2$^+$)		
4746+v	(63/2$^+$)	608.8 *3*	0.96 *10*	4137+v	(59/2$^+$)		
5037+v	(65/2$^+$)	620.3 *3*	0.81 *13*	4417+v	(61/2$^+$)		
5390+v	(67/2$^+$)	643.8 *3*	1.09 *22*	4746+v	(63/2$^+$)		
5691+v	(69/2$^+$)	653.6 *4*	0.42 *11*	5037+v	(65/2$^+$)		
6069+v	(71/2$^+$)	678.7 *4*	0.75 *14*	5390+v	(67/2$^+$)		
6377+v	(73/2$^+$)	686.1 *4*	0.46 *11*	5691+v	(69/2$^+$)		
6782+v	(75/2$^+$)	713.2 *5*		6069+v	(71/2$^+$)		
7096+v	(77/2$^+$)	718.7 *5*		6377+v	(73/2$^+$)		
7529+v	(79/2$^+$)	747.5 *5*		6782+v	(75/2$^+$)		
7847+v	(81/2$^+$)	751.3 *5*		7096+v	(77/2$^+$)		
8311+v	(83/2$^+$)	781.9 *5*		7529+v	(79/2$^+$)		
8630+v	(85/2$^+$)	783.4 *5*		7847+v	(81/2$^+$)		

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Adopted Levels, Gammas (continued)

$\gamma(^{193}Tl)$ (continued)

E_i(level)	J_i^π	E_γ †	E_f	J_f^π	E_i(level)	J_i^π	E_γ †	E_f	J_f^π	E_i(level)	J_i^π	E_γ †	E_f	J_f^π
187.9+y	J+2	187.9 *3*	y	J	7712.1+y	J+32	735.0 *10*	6977.1+y	J+30	271.5+u	J2+2	271.5 *5*	u	J2
418.6+y	J+4	230.7 *3*	187.9+y	J+2	250.8+z	J1+2	250.8 *3*	z	J1	584.8+u	J2+4	313.4 *4*	271.5+u	J2+2
691.4+y	J+6	272.8 *3*	418.6+y	J+4	542.8+z	J1+4	292.0 *3*	250.8+z	J1+2	938.9+u	J2+6	354.1 *3*	584.8+u	J2+4
1005.7+y	J+8	314.3 *3*	691.4+y	J+6	875.5+z	J1+6	332.7 *3*	542.8+z	J1+4	1332.2+u	J2+8	393.3 *4*	938.9+u	J2+6
1360.7+y	J+10	355.0 *3*	1005.7+y	J+8	1248.2+z	J1+8	372.7 *3*	875.5+z	J1+6	1764.5+u	J2+10	432.3 *3*	1332.2+u	J2+8
1755.8+y	J+12	395.1 *3*	1360.7+y	J+10	1660.1+z	J1+10	411.9 *3*	1248.2+z	J1+8	2234.4+u	J2+12	469.9 *3*	1764.5+u	J2+10
2190.3+y	J+14	434.5 *3*	1755.8+y	J+12	2110.6+z	J1+12	450.5 *3*	1660.1+z	J1+10	2741.7+u	J2+14	507.3 *3*	2234.4+u	J2+12
2663.4+y	J+16	473.1 *3*	2190.3+y	J+14	2598.7+z	J1+14	488.1 *3*	2110.6+z	J1+12	3285.4+u	J2+16	543.7 *3*	2741.7+u	J2+14
3174.0+y	J+18	510.6 *3*	2663.4+y	J+16	3123.9+z	J1+16	525.2 *3*	2598.7+z	J1+14	3864.8+u	J2+18	579.4 *4*	3285.4+u	J2+16
3721.5+y	J+20	547.5 *3*	3174.0+y	J+18	3685.6+z	J1+18	561.7 *3*	3123.9+z	J1+16	4479.3+u	J2+20	614.5 *4*	3864.8+u	J2+18
4304.9+y	J+22	583.4 *3*	3721.5+y	J+20	4282.5+z	J1+20	596.9 *3*	3685.6+z	J1+18	5128.8+u	J2+22	649.5 *4*	4479.3+u	J2+20
4923.3+y	J+24	618.4 *3*	4304.9+y	J+22	4914.3+z	J1+22	631.8 *3*	4282.5+z	J1+20	5813.0+u	J2+24	684.2 *4*	5128.8+u	J2+22
5576.4+y	J+26	653.1 *3*	4923.3+y	J+24	5580.7+z	J1+24	666.4 *3*	4914.3+z	J1+22	6531.8+u	J2+26	718.8 *7*	5813.0+u	J2+24
6263.1+y	J+28	686.7 *4*	5576.4+y	J+26	6285.4+z	J1+26	704.7 *7*	5580.7+z	J1+24					
6977.1+y	J+30	714.0 *7*	6263.1+y	J+28	7033.4+z	J1+28	748.0 *10*	6285.4+z	J1+26					

† From (HI,xnγ) for level scheme based on the 365.2+x level and from (HI,xnγ):SD in superdeformed bands.
‡ From (HI,xnγ). Relative photon branching from each level.
# From (HI,xnγ), unless otherwise noted.
@ Relative intensity within the SD band.
& From ^{193}Pb decay (5.8 min).
a From (HI,xnγ):SD.
b Member of a sequence.
c Member of a sequence.
d Member of a sequence.
e 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.
f Placement of transition in the level scheme is uncertain.

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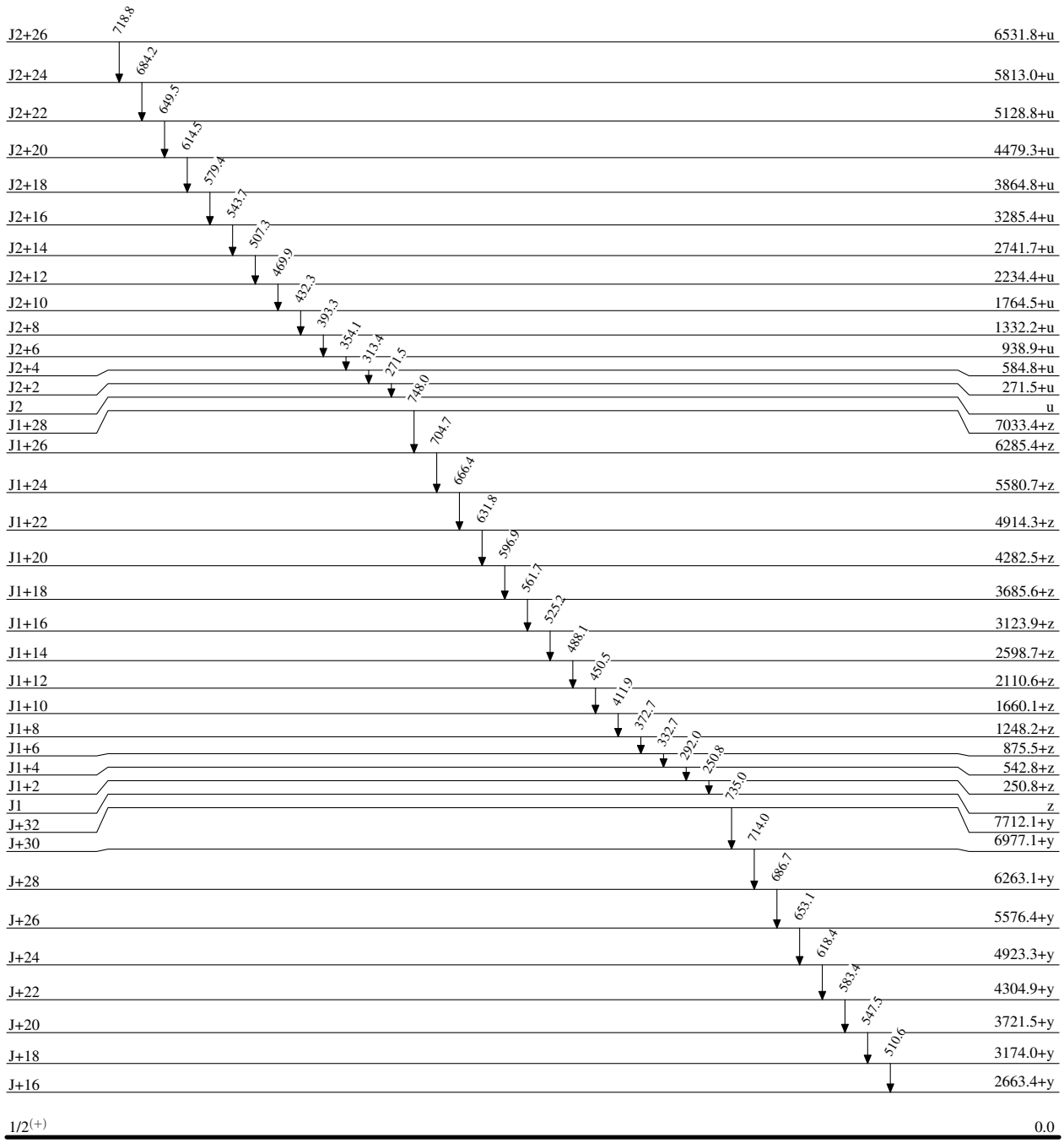
Adopted Levels, Gammas

Level Scheme

Intensities: Relative photon branching from each level



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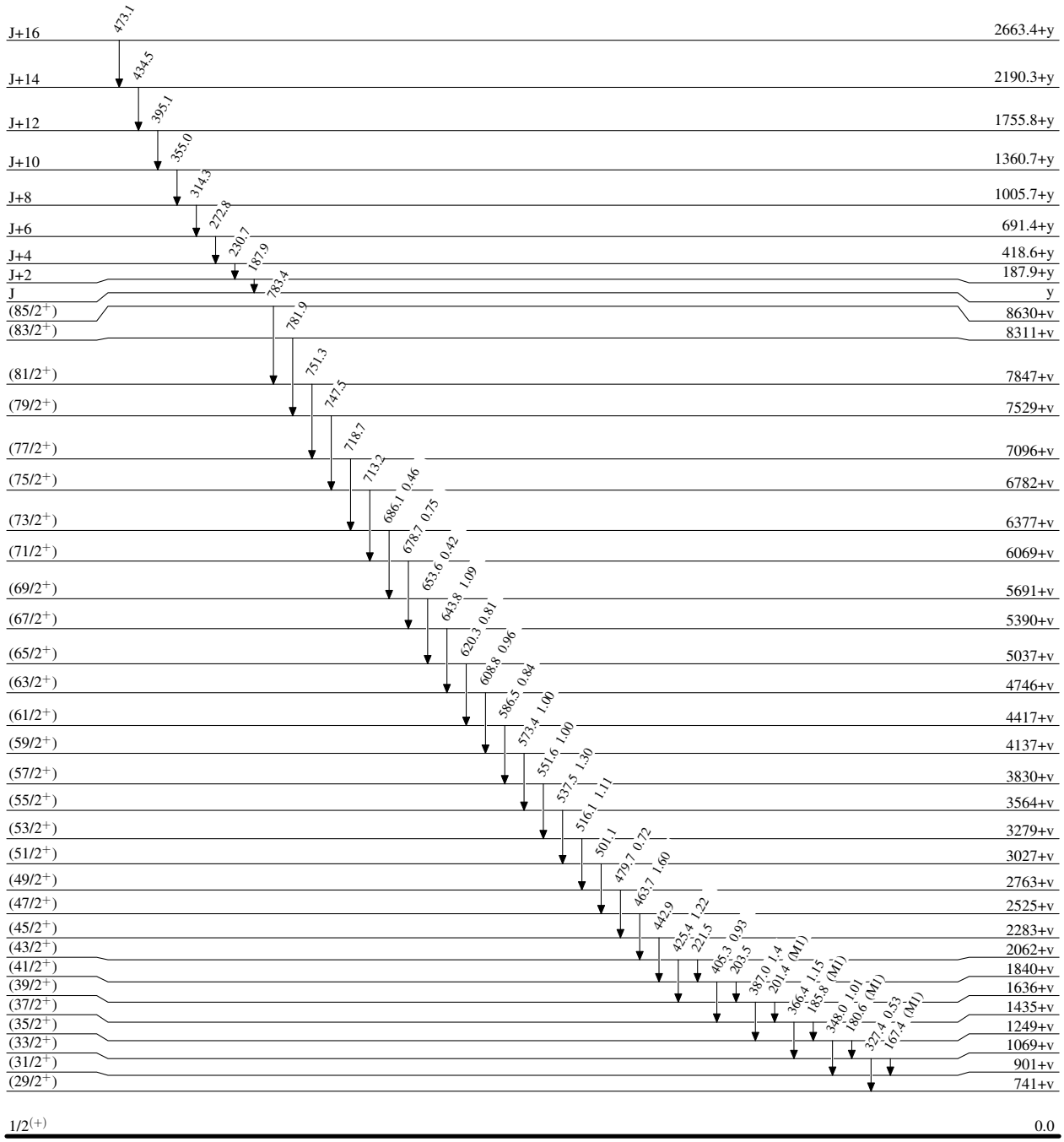
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



21.6 min *8*

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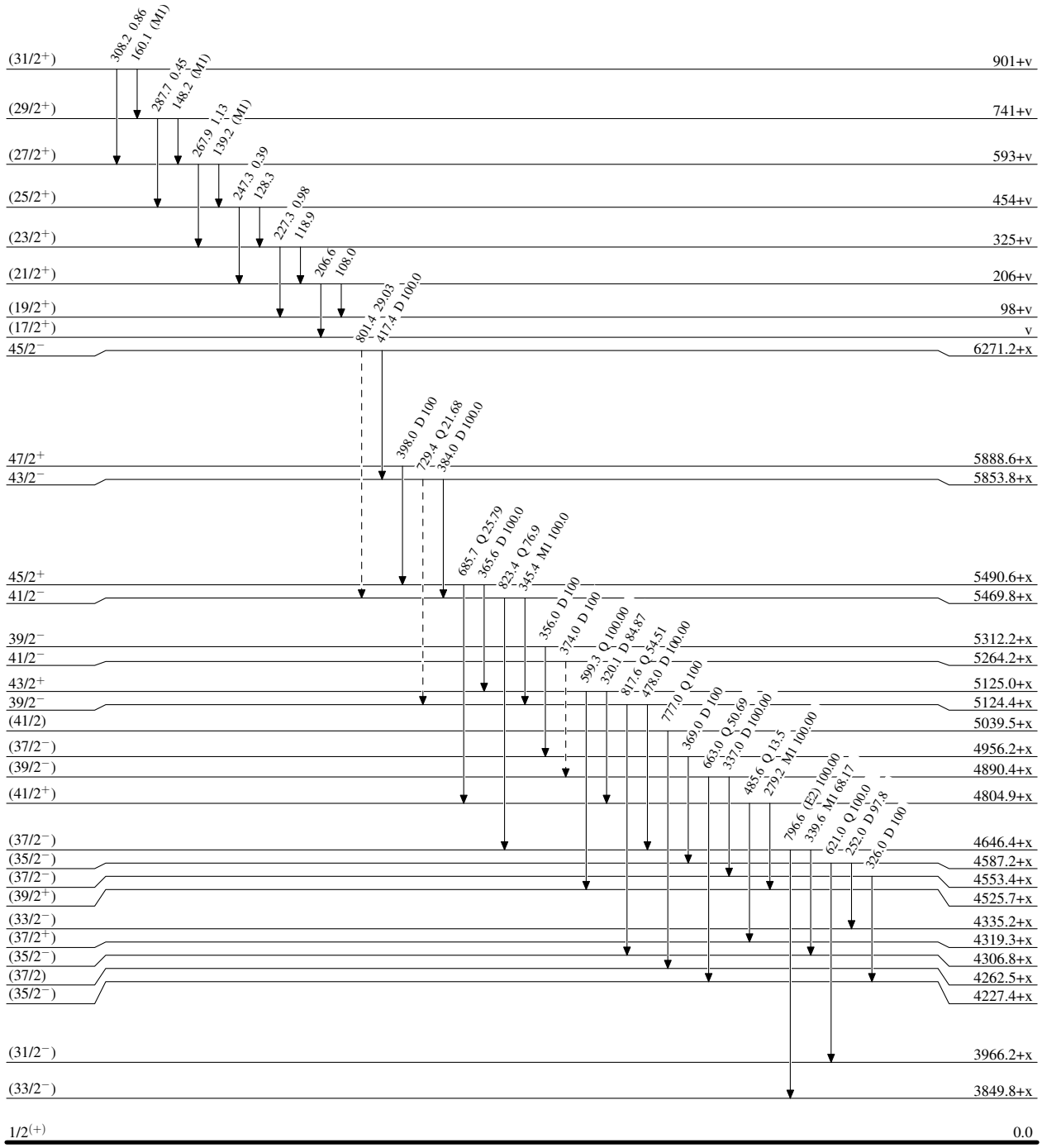
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

γ Decay (Uncertain)



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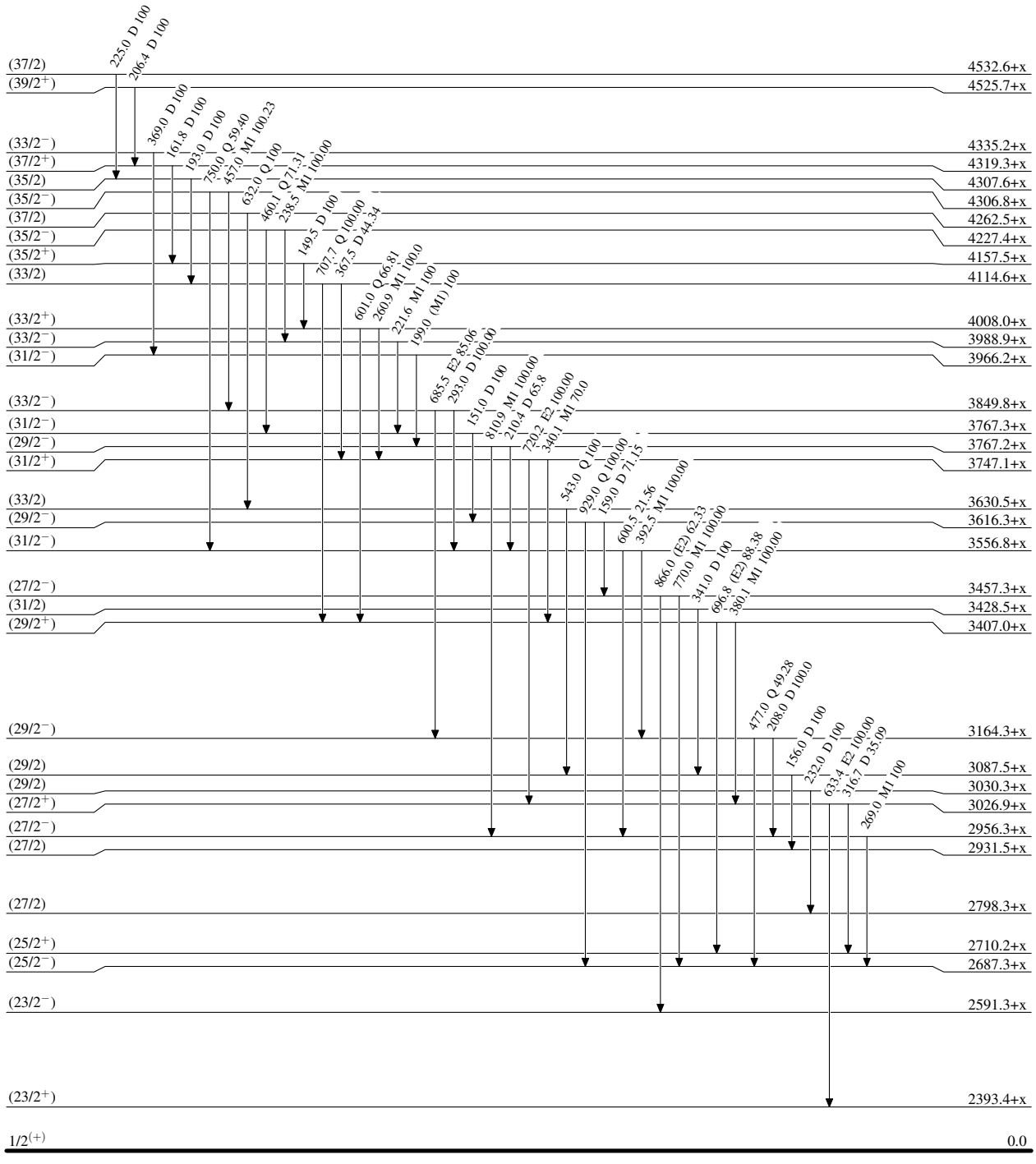
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



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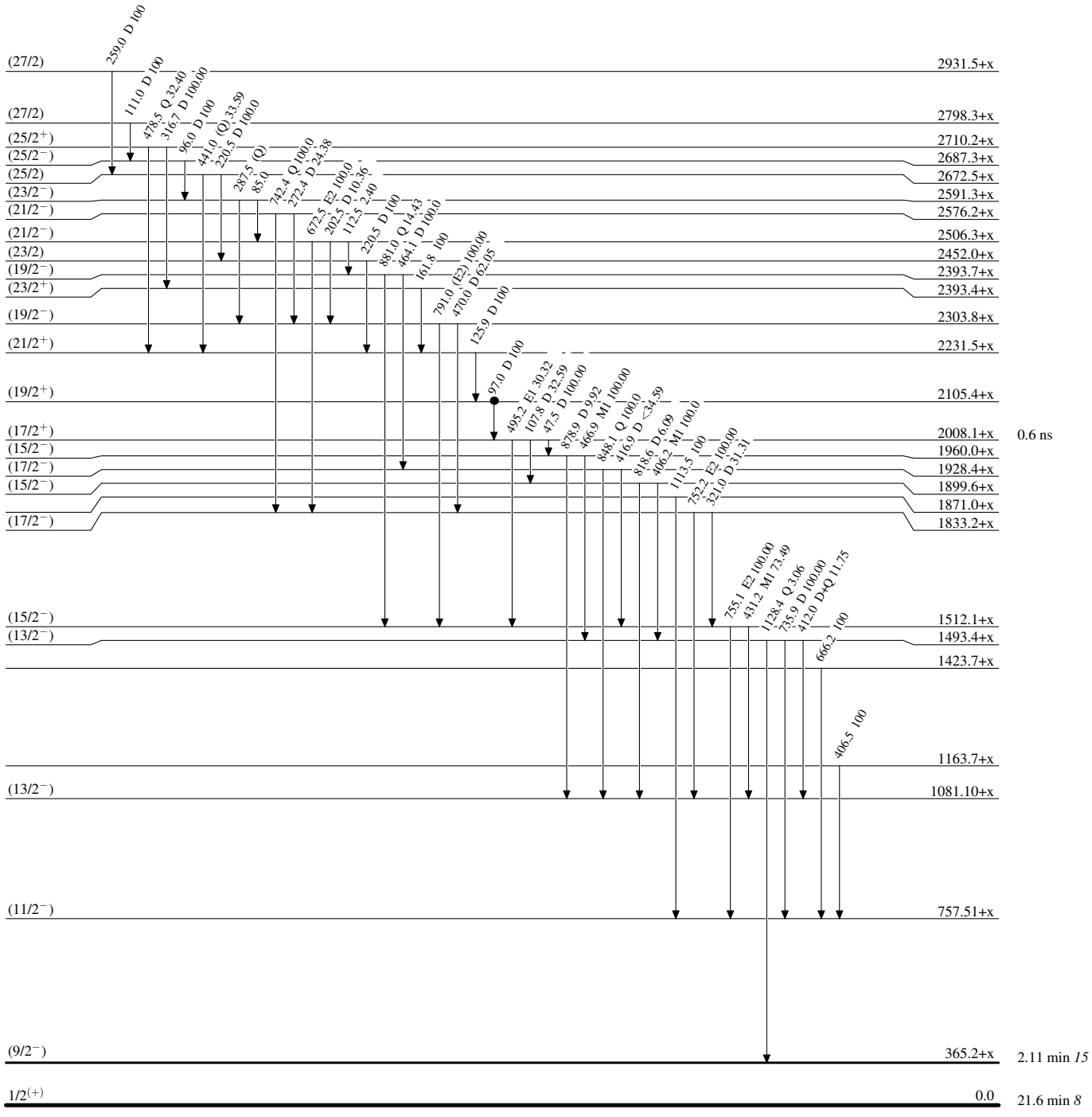
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

● Coincidence



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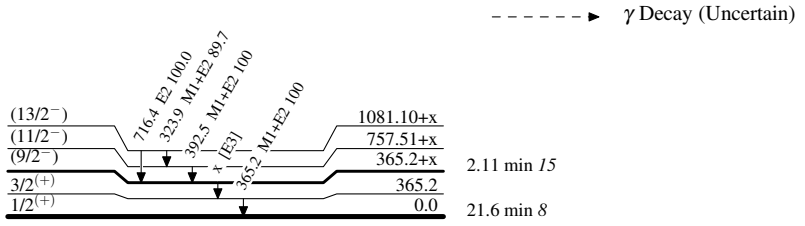
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level



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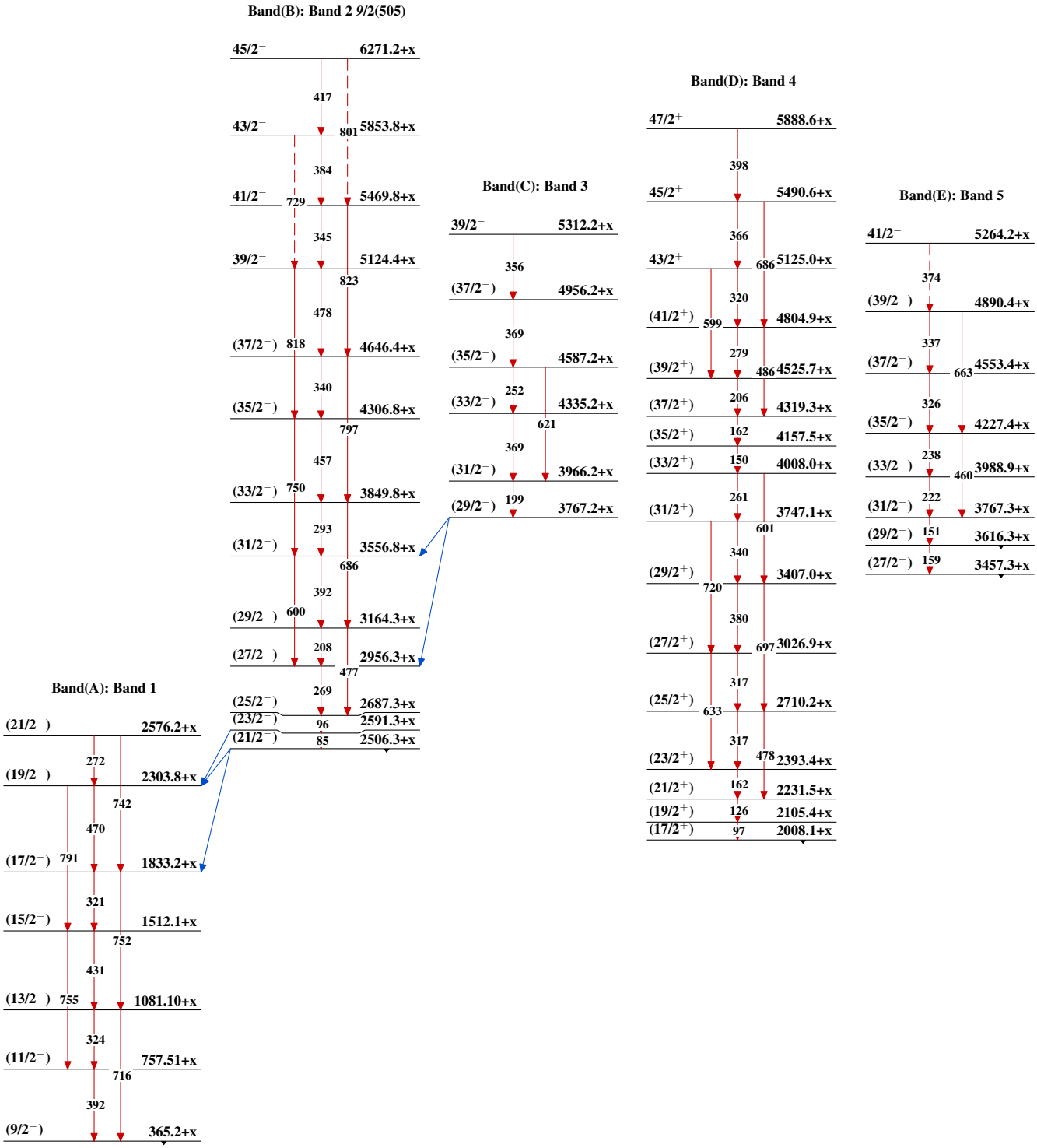
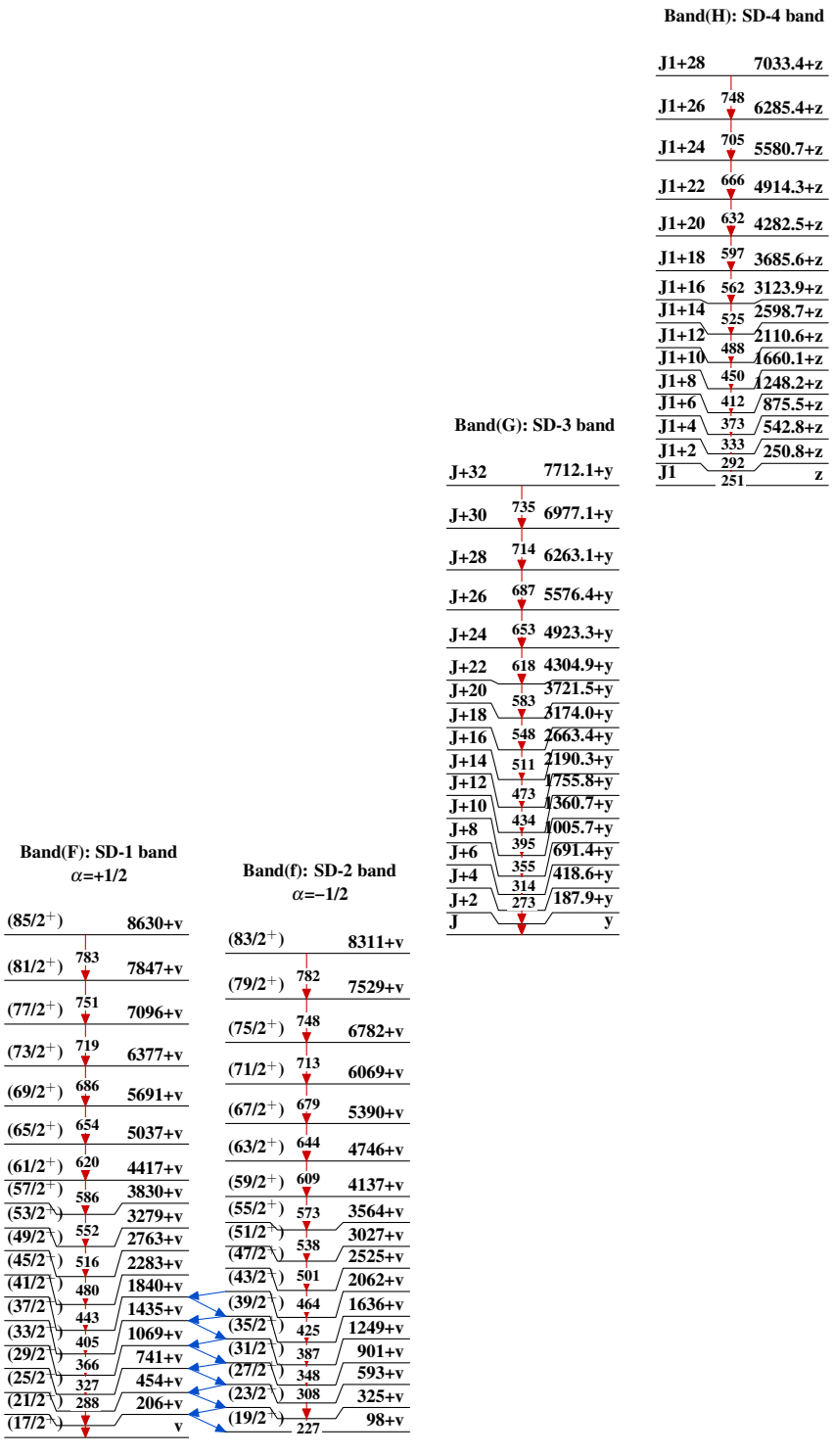
Adopted Levels, Gammas



Adopted Levels, Gammas (continued)



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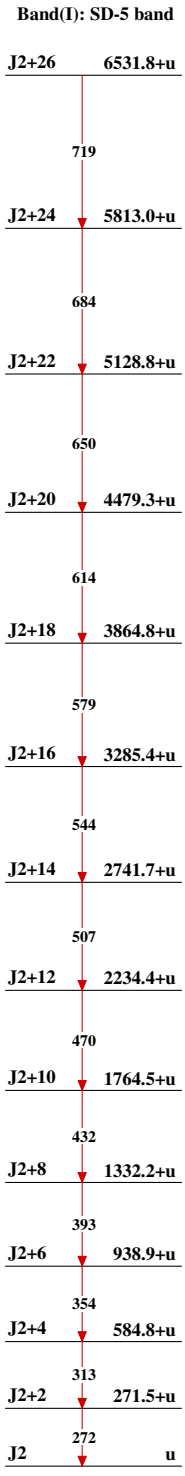
Adopted Levels, Gammas (continued)



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