^{124}Sn(^{30}Si,5nγ) 1991Fl02,1995Fl01,1998By02

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh and Jun Chen	NDS 185, 2 (2022)	23-Aug-2022

1991Fl02: E(^{30}Si)=150 MeV from the MP Tandem at the TASCC facility in Chalk River. Measured γ, $\gamma\gamma$, $\gamma(\theta)$ with the 8π spectrometer. Deduced levels, J^π, γ-ray multipolarities, mixing ratios. Data for weakly-deformed states in the first potential well.

1995Fl01 (also 1994De33,1994De24,1993Fl03,1990Ha31): E(^{30}Si)=158 MeV beam from the tandem accelerator at Daresbury Nuclear Structure Facility. Measured Eγ, $\gamma\gamma$ (multifold) with the Eurogam array. Deduced levels, J^π, band structures. Data for superdeformed states.

1996Sa15: E(^{30}Si)=158 MeV. Measured lifetimes by DSAM; deduced Q (intrinsic).

1998By02: E(^{30}Si)=158 MeV beam from the Vivitron accelerator of the Institut de Recherches Subatomiques of Strasbourg. Measured Eγ, Iγ, $\gamma\gamma$-coin with at least eight detectors firing in Eurogam II spectrometer of 54 HPGe detectors. Deduced levels, J^π, band structures. Seven additional SD bands deduced from these data.

1999Fi12: E(^{30}Si)=158 MeV. Measured Eγ, Iγ, $\gamma\gamma$-coin using Eurogam II array with 30 large volume Ge detectors and 24 Clover type composite Ge detectors. Weak linking transitions from SD-1 band to normal level structures were reported by 1999Fi12, determining the energy of the lowest member of SD-1 band at 10625 and J^π=(47/2$^-$).

1988Ha02: lifetime measurements by DSAM.

1998Kh09: ^{128}Te(^{27}Al,p5nγ),E(^{27}Al)=150 MeV. Measured quadrupole moment for SD-1 band by Doppler-shift attenuation method.

1997St17: population mechanism of yrast SD bands studied through two different reactions: ^{124}Sn(^{30}Si,5nγ) and ^{124}Sn(^{34}S,α5nγ).

Other references for SD bands, dealing with different aspects of population of these bands: 2002By01, 1995Pa02, 1993Fl07, 1993Ha19, 1992Vi03, 1992Fl03, 1991Fl03, 1991Fl02, 1990Wa24, 1990Ha25, 1989Ta12, 1988Ta20. 2002By01 used ^{124}Sn(^{31}P,p5nγ) reaction at E=167 MeV and measured enhanced population with σ(SD)/σ(ND)=6.5 *15*; SD=superdeformed, ND=Normal (weakly)-deformed in the first potential well.

See 1995Xu01, 1995Tw01, 1995Pa02 (for C_4 symmetry), 1994Tw01, 1993Pi13, 1993Sh18, 1993Ra07, 1993Hu06, 1993Lu08 for theoretical studies and systematics of SD structures.

Others:

1983BaZZ: E(^{30}Si)=135 MeV. Measured Eγ, Iγ, $\gamma\gamma$-coin; deduced level lifetimes, yrast sequence, J^π, configurations, and shape.

1980Vr01: ^{142}Nd(^{16}O,n2α) E=126-146 MeV; ^{139}La(^{16}O,p5n) E=146 MeV; ^{141}Pr(^{16}O,3npα). Search for α decay from the 6-ns isomer at 3386.8.

^{149}Gd Levels

1993Fl03 assigned eight SD bands to ^{149}Gd but more recent results (1995DeZZ) assigned the last two SD bands (labeled g and h by 1993Fl03) to ^{148}Gd, instead. Additional bands are from 1998By02. See the Adopted Levels for possible assignment of multi-particle structures to some of the levels below 12 MeV.

E(level)[†]	J^π[‡]
0.0[g]	7/2$^-$
775.1[g] *2*	11/2$^-$
795.8[i] *2*	9/2$^-$
873.0[h] *3*	11/2$^+$
955.2[h] *3*	13/2$^+$
1483.4[g] *3*	15/2$^-$
1609.0[i] *3*	13/2$^-$
1739.1[h] *4*	17/2$^+$
2057.8 *4*	17/2$^-$
2231.3[i] *4*	17/2$^-$
2382.8 *4*	19/2$^-$
2400.4[h] *4*	21/2$^+$
2523.2[i] *4*	21/2$^-$

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^{124}Sn(^{30}Si,5nγ) 1991Fl02,1995Fl01,1998By02 (continued)

^{149}Gd Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$[#]	Comments
3133.9 *4*	23/2−		
3226.8 *4*	23/2+		
3293.7 *5*	25/2+		
3386.4 *5*	27/2+	6.0 ns *5*	$T_{1/2}$: from the Adopted Levels.
3610.4 *4*	25/2−		
3631.2 *4*	27/2−	0.7 ns	
4053.6 *5*	29/2−		
4339.4 *5*	31/2−		
4342.1 *5*	29/2+		
4718.7 *5*	33/2+		
4800.8 *5*	33/2−		
5051.5 *5*	35/2−		
5299.7 *5*	37/2−		
5461.9 *5*	37/2+		
5633.1 *6*	41/2−		
5738.5 *6*	39/2−[d]		
6098.1 *6*	41/2+		
6264.4 *6*	45/2−[d]		
6300.0? *10*	43/2−[d]		
6469.7 *6*	45/2+		
6504? *1*	47/2−[d]		
6655.9 *7*	49/2+	3.3[&] ns *4*	
6786.6? *10*	47/2+[d]		
7071.9? *10*	51/2+[d]		
7740.9[@] *12*	51/2[@]		
7820.9 *7*	53/2+		
7823.9 *7*	51/2−		
7996.0 *8*	53/2−		
8217.1 *7*	53/2+		
8432.7 *7*	55/2+[e]		
8457.8[@] *11*	51/2−[@]		
8464.7[@] *11*	47/2−[@]		
8556.4 *7*	57/2+		
8656.9[@] *12*	51/2−[@]		
8939.8 *7*	57/2−		
9054.7[@] *11*	49/2+[@]		
9272.5 *8*	57/2−[d]		
9325.3 *8*	59/2+[e]		
9437.4 *8*	59/2+[e]		
9501.1 *8*	61/2−		
10361.3 *8*	63/2+[e]		
10509.4 *8*	63/2+[e]		
10601.3 *8*	65/2−		
10624.9[j] *12*	47/2−[b]		
10850.0 *8*	63/2−[e]		
10929.8 *8*	65/2−		
11010.9 *8*	65/2−[e]		
11199.2 *8*	67/2+[e]		
11242.7[j] *12*	51/2−		
11711.1 *8*	67/2−[e]		
11907.0[j] *12*	55/2−		
12267.7 *8*	69/2+[d]		Jπ: (67/2) in 1991Fl02.

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$^{124}Sn(^{30}Si,5n\gamma)$ 1991Fl02,1995Fl01,1998By02 (continued)

^{149}Gd Levels (continued)

E(level)[†]	J$^\pi$[‡]	E(level)[†]	J$^\pi$[‡]	E(level)[†]	J$^\pi$[‡]
12383.2 *8*	$69/2^-$[e]	21275.0+x[k] *10*	$135/2^+$	6369.3+u[n] *8*	J3+14
12468.4 *8*	$69/2^-$	y[l]	J1≈($57/2^+$)	7495.4+u[n] *9*	J3+16
12580.0 *8*	$71/2^-$[e]	649.8+y[l] *4*	J1+2	8678.7+u[n] *9*	J3+18
12618.8[j] *12*	$59/2^-$	1349.6+y[l] *5*	J1+4	9919.6+u[n] *10*	J3+20
12751.4 *8*	$71/2^+$[e]	2098.2+y[l] *5*	J1+6	11218.9+u[n] *10*	J3+22
12966.6 *8*	$71/2^+$[e]	2897.4+y[l] *6*	J1+8	12576.6+u[n] *11*	J3+24
13188.6 *9*	$75/2^-$[e]	3751.5+y[l] *6*	J1+10[a]	13993.6+u[n] *11*	J3+26
13278.0 *9*	$73/2^-$[e]	4647.5+y[l] *6*	J1+12	15469.4+u[n] *12*	J3+28
13378.4[j] *12*	$63/2^-$	5600.8+y[l] *7*	J1+14	17004.0+u[n] *13*	J3+30
13566.6 *9*	$75/2^-$[e]	6605.7+y[l] *7*	J1+16	18599.0+u[n] *17*	J3+32
14108.0 *9*	$77/2^-$[e]	7662.4+y[l] *7*	J1+18	v[o]	J4≈($57/2^-$)
14186.5[j] *13*	$67/2^-$	8772.5+y[l] *8*	J1+20	688.0+v[o] *5*	J4+2
15043.7[j] *13*	$71/2^-$	9935.7+y[l] *8*	J1+22	1420.6+v[o] *6*	J4+4
15162.8 *9*	$81/2^-$[e]	11151.2+y[l] *8*	J1+24	2200.8+v[o] *6*	J4+6
15950.4[j] *13*	$75/2^-$	12420.0+y[l] *8*	J1+26	3030.5+v[o] *6*	J4+8
15996.9 *10*	$85/2^-$[e]	13742.8+y[l] *9*	J1+28	3911.5+v[o] *7*	J4+10
16907.5[j] *13*	$79/2^-$	15119.6+y[l] *9*	J1+30	4845.0+v[o] *7*	J4+12
17916.2[j] *13*	$83/2^-$	16550.5+y[l] *9*	J1+32	5832.1+v[o] *7*	J4+14
18976.9[j] *13*	$87/2^-$	18036.1+y[l] *10*	J1+34	6874.1+v[o] *8*	J4+16
20090.6[j] *13*	$91/2^-$	19576.3+y[l] *11*	J1+36	7971.6+v[o] *8*	J4+18
21257.9[j] *13*	$95/2^-$	21170.7+y[l] *13*	J1+38	9125.8+v[o] *8*	J4+20
22479.7[j] *13*	$99/2^-$	22818.1+y[l] *16*	J1+40	10337.8+v[o] *9*	J4+22
23756.2[j] *13*	$103/2^-$	z[m]	J2≈($63/2^+$)	11608.3+v[o] *9*	J4+24
25088.2[j] *13*	$107/2^-$	725.6+z[m] *4*	J2+2	12937.2+v[o] *11*	J4+26
26475.8[j] *13*	$111/2^-$	1497.5+z[m] *5*	J2+4	14325.5+v[o] *12*	J4+28
27920.0[j] *13*	$115/2^-$	2315.1+z[m] *5*	J2+6	15772.1+v[o] *12*	J4+30
29420.5[j] *13*	$119/2^-$	3180.0+z[m] *6*	J2+8	17278.1+v[o] *14*	J4+32
30978.3[j] *13*	$123/2^-$	4092.1+z[m] *6*	J2+10	18843.3+v[o] *15*	J4+34
32594.0[j] *14*	$127/2^-$	5052.8+z[m] *6*	J2+12	20469.3+v[o] *18*	J4+36
34266.1[j] *14*	$131/2^-$	6058.3+z[m] *7*	J2+14	22155.3+v[o] *21*	J4+38
35996.0[j] *16*	$135/2^-$	7114.6+z[m] *7*	J2+16	w[p]	J5
x[fk]	$63/2^+$	8218.3+z[m] *7*	J2+18	802.9+w[p] *3*	J5+2
858.5+x[k] *3*	$67/2^+$	9369.8+z[m] *8*	J2+20	1655.0+w[p] *5*	J5+4
1746.7+x[k] *4*	$71/2^+$[c]	10568.8+z[m] *8*	J2+22	2556.9+w[p] *6*	J5+6
2624.8+x[k] *5*	$75/2^+$	11815.8+z[m] *8*	J2+24	3509.0+w[p] *7*	J5+8
3525.8+x[k] *5*	$79/2^+$	13110.1+z[m] *8*	J2+26	4512.8+w[p] *8*	J5+10
4468.1+x[k] *5*	$83/2^+$	14451.6+z[m] *9*	J2+28	5562.5+w[p] *9*	J5+12
5455.0+x[k] *5*	$87/2^+$	15839.7+z[m] *9*	J2+30	6667.6+w[p] *10*	J5+14
6488.0+x[k] *5*	$91/2^+$	17274.6+z[m] *10*	J2+32	7824.8+w[p] *10*	J5+16
7569.3+x[k] *5*	$95/2^+$	18757.1+z[m] *11*	J2+34	9034.1+w[p] *11*	J5+18
8699.7+x[k] *5*	$99/2^+$	20285.7+z[m] *13*	J2+36	10296.4+w[p] *11*	J5+20
9880.6+x[k] *5*	$103/2^+$	21860.7+z[m] *17*	J2+38	11612.1+w[p] *11*	J5+22
11113.1+x[k] *5*	$107/2^+$	u[n]	J3≈($63/2^-$)	12981.6+w[p] *12*	J5+24
12399.0+x[k] *5*	$111/2^+$	755.6+u[n] *4*	J3+2	14404.4+w[p] *13*	J5+26
13738.6+x[k] *6*	$115/2^+$	1560.5+u[n] *5*	J3+4	15881.9+w[p] *14*	J5+28
15133.4+x[k] *6*	$119/2^+$	2415.5+u[n] *6*	J3+6	17414.6+w[p] *14*	J5+30
16584.0+x[k] *6*	$123/2^+$	3323.5+u[n] *7*	J3+8	19000.4+w[p] *16*	J5+32

^{124}Sn(^{30}Si,5nγ) 1991Fl02,1995Fl01,1998By02 (continued)

^{149}Gd Levels (continued)

E(level)†	Jπ‡	E(level)†	Jπ‡	E(level)†	Jπ‡
18090.7+x[k] *7*	127/2+	4283.8+u[n] *7*	J3+10	20641.6+w[p] *19*	J5+34
19654.7+x[k] *8*	131/2+	5299.4+u[n] *8*	J3+12	s[q]	J6

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^{124}Sn(^{30}Si,5nγ) 1991Fl02,1995Fl01,1998By02 (continued)

^{149}Gd Levels (continued)

E(level)[†]	J^{π}[‡]	E(level)[†]	J^{π}[‡]	E(level)[†]	J^{π}[‡]
877.5+s[q] *4*	J6+2	a[s]	J8	c[u]	J10
1809.5+s[q] *5*	J6+4	747.4+a[s] *6*	J8+2	854.9+c[u] *10*	J10+2
2794.9+s[q] *6*	J6+6	1543.9+a[s] *8*	J8+4	1757.2+c[u] *12*	J10+4
3833.0+s[q] *7*	J6+8	2391.2+a[s] *9*	J8+6	2713.2+c[u] *14*	J10+6
4924.0+s[q] *7*	J6+10	3289.6+a[s] *10*	J8+8	3725.8+c[u] *14*	J10+8
6066.5+s[q] *8*	J6+12	4239.7+a[s] *11*	J8+10	4795.4+c[u] *15*	J10+10
7259.7+s[q] *8*	J6+14	5242.2+a[s] *12*	J8+12	5921.4+c[u] *16*	J10+12
8502.6+s[q] *9*	J6+16	6304.9+a[s] *12*	J8+14	7103.0+c[u] *17*	J10+14
9794.5+s[q] *9*	J6+18	7422.0+a[s] *13*	J8+16	8337.0+c[u] *18*	J10+16
11132.5+s[q] *10*	J6+20	8594.8+a[s] *14*	J8+18	9619.4+c[u] *19*	J10+18
12518.6+s[q] *10*	J6+22	9826.0+a[s] *14*	J8+20	10946.4+c[u] *20*	J10+20
13948.6+s[q] *11*	J6+24	11114.4+a[s] *15*	J8+22	12320.2+c[u] *22*	J10+22
15420.9+s[q] *12*	J6+26	12461.2+a[s] *16*	J8+24	13740.5+c[u] *24*	J10+24
16934.0+s[q] *14*	J6+28	13868.4+a[s] *16*	J8+26	15212.1+c[u] *25*	J10+26
18483.4+s[q] *16*	J6+30	15331.7+a[s] *17*	J8+28	16738+c[u] *3*	J10+28
t[r]	J7	16863.5+a[s] *20*	J8+30	18321+c[u] *3*	J10+30
874.0+t[r] *3*	J7+2	18451.7+a[s] *24*	J8+32	19960+c[u] *4*	J10+32
1798.6+t[r] *4*	J7+4	b[t]	J9	d[v]	J11
2771.2+t[r] *6*	J7+6	827.5+b[t] *5*	J9+2	850.2+d[v] *10*	J11+2
3797.0+t[r] *8*	J7+8	1697.0+b[t] *7*	J9+4	1741.3+d[v] *15*	J11+4
4813.4+t[r] *8*	J7+10	2621.2+b[t] *7*	J9+6	2677.0+d[v] *17*	J11+6
5851.3+t[r] *9*	J7+12	3596.6+b[t] *8*	J9+8	3663.4+d[v] *19*	J11+8
6941.2+t[r] *9*	J7+14	4627.0+b[t] *9*	J9+10	4701.4+d[v] *21*	J11+10
8086.9+t[r] *10*	J7+16	5715.5+b[t] *9*	J9+12	5792.2+d[v] *23*	J11+12
9289.2+t[r] *10*	J7+18	6863.6+b[t] *10*	J9+14	6935.1+d[v] *24*	J11+14
10549.2+t[r] *11*	J7+20	8072.9+b[t] *11*	J9+16	8130+d[v] *3*	J11+16
11867.6+t[r] *11*	J7+22	9342.9+b[t] *12*	J9+18	9381+d[v] *3*	J11+18
13243.1+t[r] *12*	J7+24	10673.5+b[t] *12*	J9+20	10688+d[v] *3*	J11+20
14683.4+t[r] *12*	J7+26	12063.6+b[t] *13*	J9+22	12049+d[v] *4*	J11+22
16178.0+t[r] *13*	J7+28	13512.5+b[t] *13*	J9+24	13467+d[v] *4*	J11+24
17731.9+t[r] *14*	J7+30	15020.1+b[t] *14*	J9+26	14941+d[v] *4*	J11+26
19346.4+t[r] *15*	J7+32	16586.1+b[t] *18*	J9+28		

[†] From least-squares fit to γ-ray energies, assuming $\Delta E\gamma$=0.3 keV, when not stated. See the Adopted Levels for sequence assignments from 1981Pi09 and 1991Fl02, based on $f_{7/2}$, $h_{9/2}$, $i_{13/2}$ neutron orbitals and $d_{5/2}$, $h_{11/2}$, $g_{7/2}$ proton orbitals.

[‡] As given in 1991Fl02 and 1995Fl01 for normal-deformed level structures, based on $\gamma(\theta)$ and γ-cascades. J^{π} assignments in the Adopted Levels are the same, except that many are placed in parentheses as, in the opinion of evaluators, strong arguments seem lacking. For SD bands, assignments are implied from 1995Fl01, based on configuration assignments and also from decay to normal-deformed levels for SD-1 band.

[#] Quoted by 1991Fl02 from 1983BaZZ, although, in the abstract (1983BaZZ), explicit values are not given. For $49/2^+$ level, value is from 2001Gu31.

[@] From 1999Fi12.

[&] From recoil-shadow anisotropy method (2001Gu31). Other: 2.8 ns (quoted by 1991Fl02 from 1983BaZZ).

[a] J≈(77/2) from 1993Ra07. J=73/2 is also suggested by 1993Ra07.

[b] From 1999Fi12. 1993Ra07 suggest 47/2, 51/2 based on theoretical analysis.

[c] 1993Ra07 suggest 67/2, 71/2 based on theoretical analysis.

[d] From 1995Fl01.

[e] Parity from 1995Fl01. No parity was given by 1991Fl02, where most of the data for weakly-deformed states was reported. In the

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^{124}Sn(^{30}Si,5nγ) 1991Fl02,1995Fl01,1998By02 (continued)

^{149}Gd Levels (continued)

absence of any additional supporting data, it appears that the quoted parity is assumed for analysis of spectral data.

[f] The energies of the first four transitions show a backbend in this band. This has been ascribed to the alignment of a neutron pair (1995Fl01).

[g] Band(A): $\nu 2f^3_{7/2}$.

[h] Band(B): $\nu f^3_{7/2}\otimes(3^-$ in ^{148}Gd).

[i] Band(C): $\nu h_{9/2}\nu 2f^2_{7/2}$.

[j] Band(D): SD-1 band; (π,α)=(-,−1/2). Q(intrinsic)=14.9 *+4−3* (1998Kh09), 15.0 *2* (1996Sa15), 17 *2* (1988Ha02) (from DSAM). Band assignment from 1999Fi12, 1995Fl01, 1993Fl03, 1990Ha31 and 1988Ha02. Percent population=2.5 (1990Ha31), 1.8 (1995Fl01). See also 1992Vi03, 1990Ha25, 1989Ta12, 1988Ta20, 1988Ha02. Configuration=$\pi 6^2\otimes\nu 7^1$ (1993Cu06). Evidence for a ΔJ=4 rotational sequence, associated with an invariance under 90° rotation (1993Fl07). Weak linking transitions have been reported by 1999Fi12. Percentage intensities (1999Fi12) leaking the SD-1 band are: 19% *1* from the (47/2) member, 69% *2* from the (49/2) member and 12% *2* from the (51/2) member of this band. This leaking intensity feeds the following weakly-deformed states in the first potential well: 23% *5* to 5633 level, 9% *3* to 6098 level, 12% *5* to 6470 level, 8% *2* to 6504 level, 23% *5* to 6656 level, 9% *2* to 6787 level, 6% *2* to 7072 level, 5% *1* to 7741 level, 3% *1* to 8458 level and 0.5% *3* to 8657 level (1999Fi12).

[k] Band(E): SD-2 band; (π,α)=(+,−1/2). Band assignment from 1995Fl01, 1993Fl03, 1990Ha31 and 1988Ha02. Percent population=1.0 (1990Ha31), 0.45 (1995Fl01). Q(intrinsic)=15.6 *3* (1996Sa15) (DSAM). Configuration=$\pi 6^2\otimes\nu 7^2\otimes(\nu 1/2[651],\alpha=+1/2)^{-1}$ (1995Fl01,1993Cu06). Energies of first four γ rays show a backbend in this SD band.

[l] Band(F): SD-3 band; (π,α)=(+,+1/2). Band assignment from 1995Fl01, 1993Fl03, 1990Ha31 and 1988Ha02. Percent population=0.3 (1990Ha31), 0.22 (1995Fl01). Q(intrinsic)=15.2 *5* (1996Sa15) (DSAM). Configuration=$\pi 6)^3\otimes(\pi 1/2[301],\alpha=-1/2)^{-1}\otimes\nu 7^1$ (1995Fl01,1993Cu06).

[m] Band(G): SD-4 band; (π,α)=(+,−1/2). Percent population=0.25 (1995Fl01). Q(intrinsic)=17.5 *6* (1996Sa15) (DSAM). Configuration= $\pi 6^4\otimes\pi 1/2[301]^{-2}\otimes\nu 7^2\otimes(\nu 1/2[411],\alpha=+1/2)^{-1}$ (1995Fl01).

[n] Band(H): SD-5 band; (π,α)=(-,−1/2). Band assignment from 1995Fl01, 1994De33 and 1993Fl03. Percent population=0.14 (1995Fl01). Configuration= $\pi 6^2\otimes\nu 7)^1\otimes(\nu 1/2[651],\alpha=+1/2)^{-1}\otimes(\nu 5/2[402],\alpha=+1/2)$ (1995Fl01). SD-5 and SD-6 are signature partners.

[o] Band(I): SD-6 band; (π,α)=(-,+1/2). Band assignment from 1995Fl01, 1994De33 and 1993Fl03. Percent population=0.14 (1995Fl01). Configuration= $\pi 6^2\otimes\nu 7^1\otimes(\nu 1/2[651],\alpha=+1/2)^{-1}\otimes(\nu 5/2[402],\alpha=-1/2)$ (1995Fl01).

[p] Band(J): SD-7 band. Percent population is between 5% and 10% of SD-1 band (1998By02) Configuration=$\pi 6^3\otimes(\pi 1/2[301],\alpha=+1/2)^{-1}\otimes\nu 7^1$ (1998By02).

[q] Band(K): SD-8 band. Percent population is between 5% and 10% of SD-1 band (1998By02). Configuration=$\pi 6)^4\otimes\pi 1/2[301]^{-2}\otimes\nu 7^1$ (1998By02).

[r] Band(L): SD-9 band. Percent population is between 5% and 10% of SD-1 band (1998By02). Configuration=$\pi 6)^2\otimes\nu 7^1\otimes(\nu 1/2[651],\alpha=+1/2)^{-1}\otimes$ $(\nu 9/2[514],\alpha=+1/2)$ (1998By02).

[s] Band(M): SD-10 band. Percent population is between 5% and 10% of SD-1 band (1998By02). Configuration= $\pi 6)^2\otimes\nu 7^1\otimes(\nu 1/2[651],\alpha=+1/2)^{-1}\otimes(\nu 9/2[514],\alpha=-1/2)$ (1998By02).

[t] Band(N): SD-11 band. Percent population is between 5% and 10% of SD-1 band (1998By02). Configuration= $\pi 6^2\otimes\nu 7^1\otimes(\nu 1/2[651],\alpha=+1/2)^{-1}\otimes(\nu 3/2[521],\alpha=-1/2)$ (1998By02).

[u] Band(O): SD-12 band. Percent population is between 5% and 10% of SD-1 band (1998By02). Configuration= $\pi 6^2\otimes\nu 7^1\otimes\nu 1/2[651]^{-2}\otimes(\nu 9/2[514]^2$ or $\nu 5/2[402]^2)$ (1998By02).

[v] Band(P): SD-13 band. Percent population is between 5% and 10% of SD-1 band (1998By02). Configuration= $\pi 6^2\otimes\nu 7^1\otimes(\nu 5/2[642],\alpha=+1/2)^{-1}\otimes(\nu 9/2[514]$ or $\nu 5/2[402])$ (1998By02).

γ(^{149}Gd)

A_2 values are from 1991Fl02. These are from angular distributions at ten angles from 11° to 90° with respect to the nuclear spin axis determined from the hit pattern of several (minimum 10) E2 transitions in a cascade. The sign of A_2 in this experimental arrangement is opposite to that in $\gamma(\theta)$ experiments where angle is with reference to beam direction.

E_γ[†]	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	δ[#]	α[g]	Comments
(21)		3631.2	27/2⁻	3610.4	25/2⁻				
77.0	27.0 2	873.0	11/2⁺	795.8	9/2⁻	(E1)[@a]		0.588 8	A_2=+0.06 2 E1 in 1991Fl02.
81.8	8.2 1	955.2	13/2⁺	873.0	11/2⁺	(M1)[@]		3.59 5	A_2=+0.21 2 δ(Q/D)=−0.04 4. M1 in 1991Fl02.
97.7	12.1 1	873.0	11/2⁺	775.1	11/2⁻	(E1)[@]		0.311 4	A_2=−0.27 1 E1 in 1991Fl02.
105[c]	1.6[c]	5738.5	39/2⁻	5633.1	41/2⁻				
123.3	8.3 1	8556.4	57/2⁺	8432.7	55/2⁺	D			A_2=+0.06 1
159.6	17.2 2	3386.4	27/2⁺	3226.8	23/2⁺	(E2)[&a]		0.478 7	A_2=−0.12 2 E2 in 1991Fl02.
160.7	3.5 1	11010.9	65/2⁻	10850.0	63/2⁻	D			A_2=+0.12 2
164.9	4.1 2	9437.4	59/2⁺	9272.5	57/2⁻	D+Q			A_2=+0.06 3
172.2	57.9 7	7996.0	53/2⁻	7823.9	51/2⁻	(M1(+E2))[@]	−0.02 2	0.433 6	A_2=+0.19 1
175.6	7.3 1	9501.1	61/2⁻	9325.3	59/2⁺	D			A_2=+0.14 2
180.0	18.9 1	955.2	13/2⁺	775.1	11/2⁻	(E1)[@]		0.0600 8	A_2=+0.18 1 E1 in 1991Fl02.
186.2	111.0 5	6655.9	49/2⁺	6469.7	45/2⁺	(E2)		0.282 4	A_2=−0.27 1 E2 in 1991Fl02.
205.4[i]	7.0 5	6469.7	45/2⁺	6264.4	45/2⁻				
215.4[h]	3.5[h] 1	8432.7	55/2⁺	8217.1	53/2⁺	D			A_2=+0.12 3
215.4[h]	2.3[h] 4	12966.6	71/2⁺	12751.4	71/2⁺				
240[ci]	3.1[c]	6504?	47/2⁻	6264.4	45/2⁻				
244.9	14.0 1	3631.2	27/2⁻	3386.4	27/2⁺	D			A_2=−0.22 2 E1 in 1991Fl02. ΔJ=0 transition.
248.0	21.7 1	5299.7	37/2⁻	5051.5	35/2⁻	D			A_2=+0.17 1 M1(+E2), δ(Q/D)=0.00 2 in 1991Fl02.
250.8	7.0 4	5051.5	35/2⁻	4800.8	33/2⁻	D+Q			A_2=+0.12 2 M1+E2 in 1991Fl02.
269.3	4.5 3	11199.2	67/2⁺	10929.8	65/2⁻	D			A_2=+0.09 1
285.6	18.8 1	4339.4	31/2⁻	4053.6	29/2⁻	D			A_2=+0.21 1 M1(+E2), δ(Q/D)=−0.04 3 in 191Fl02.
288.6	9.0 3	13566.6	75/2⁻	13278.0	73/2⁻	D			A_2=+0.14 1
291.8	11.6 2	2523.2	21/2⁻	2231.3	17/2⁻	(Q)[&a]			A_2=−0.17 3 E2 in 1991Fl02.

$^{149}_{64}$Gd$_{85}$-7

γ(^{149}Gd) (continued)

E_γ[†]	I_γ[‡]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[#]	δ[#]	α[g]	Comments
311.4	11.4 *3*	13278.0	73/2⁻	12966.6	71/2⁺	D			A_2=+0.21 *2*
317[ci]	8.0[c]	6786.6?	47/2⁺	6469.7	45/2⁺				
324.5	8.8 *1*	2382.8	19/2⁻	2057.8	17/2⁻	D+Q	−0.09 *5*		A_2=+0.27 *2* M1+E2 in 1991Fl02.
333.2	18.0 *10*	5633.1	41/2⁻	5299.7	37/2⁻	(Q)[&a]			A_2=−0.16 *2* E2 in 1991Fl02.
337.5	18.5 *4*	3631.2	27/2⁻	3293.7	25/2⁺	D			A_2=+0.18 *1* E1 in 1991Fl02.
359.6	29.9 *2*	6098.1	41/2⁺	5738.5	39/2⁻	D			A_2=+0.15 *1* E1 in 1991Fl02.
371.4	141.7 *7*	6469.7	45/2⁺	6098.1	41/2⁺	(Q)			A_2=−0.20 *1* E2 in 1991Fl02.
376.6	4.5 *3*	4718.7	33/2⁺	4342.1	29/2⁺	(Q)[&a]			A_2=−0.15 *1* E2 in 1991Fl02.
379.4	79.5 *6*	4718.7	33/2⁺	4339.4	31/2⁻	D			A_2=+0.17 *1* E1 in 1991Fl02.
383.7	5.7 *2*	3610.4	25/2⁻	3226.8	23/2⁺	D[&a]			A_2=+0.02 *2* E1 in 1991Fl02.
410.5	19.5 *3*	5461.9	37/2⁺	5051.5	35/2⁻	D			A_2=+0.16 *1* E1 in 1991Fl02.
416[ci]	1.4[c]	7071.9?	51/2⁺	6655.9	49/2⁺				
422.5	18.2 *1*	4053.6	29/2⁻	3631.2	27/2⁻	D			A_2=+0.18 *1* M1(+E2), δ(E2/M1)=−0.01 *4* in 1991Fl02.
438.4[c]	15.4[c]	5738.5	39/2⁻	5299.7	37/2⁻	D+Q	+0.16 *2*		A_2=−0.03 *1* M1+E2 in 1991Fl02. Other Iγ: 29 (1991Fl02). The ordering of 359.6-438.4 cascade is from 1995Fl01. It was reversed in their earlier paper (1991Fl02).
448.6	10.5 *3*	2057.8	17/2⁻	1609.0	13/2⁻	(Q)			A_2=−0.27 *3* E2 in 1991Fl02.
461.0	2.5 *1*	4800.8	33/2⁻	4339.4	31/2⁻	D+Q			A_2=+0.30 *5* M1+E2 in 1991Fl02.
465.7	54.5 *1*	2523.2	21/2⁻	2057.8	17/2⁻	(Q)			A_2=−0.20 *1* E2 in 1991Fl02.
497.3	33.4 *7*	3631.2	27/2⁻	3133.9	23/2⁻	(E2)[&a]		0.01415 *20*	A_2=−0.11 *1* E2 in 1991Fl02.
498.8	31.3 *14*	5299.7	37/2⁻	4800.8	33/2⁻	(Q)[&]			A_2=−0.29 *2* E2 in 1991Fl02.
501.4	7.3 *3*	11010.9	65/2⁻	10509.4	63/2⁺	D			A_2=+0.30 *4*
507.1	6.3 *1*	8939.8	57/2⁻	8432.7	55/2⁺	D			A_2=+0.28 *3*
527.6	24.1 *2*	1483.4	15/2⁻	955.2	13/2⁺	D			A_2=+0.16 *1* E1 in 1991Fl02.
541.4	7.7 *3*	14108.0	77/2⁻	13566.6	75/2⁻	D			A_2=+0.16 *2*

γ(^{149}Gd) (continued)

E_γ[†]	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	Comments
561.4	58.5 3	9501.1	61/2⁻	8939.8	57/2⁻	(Q)	A_2=−0.26 1 E2 in 1991Fl02.
568.3	4.8 2	10929.8	65/2⁻	10361.3	63/2⁺		
574.2	51.0 5	2057.8	17/2⁻	1483.4	15/2⁻	D	A_2=+0.15 2 M1(+E2) in 1991Fl02. δ(Q/D)=+0.04 5.
583.1	5.9 3	12966.6	71/2⁺	12383.2	69/2⁻	D	A_2=+0.07 4
598.1	25.3 2	11199.2	67/2⁺	10601.3	65/2⁻	D	A_2=+0.09 2
608.6	6.3 3	13188.6	75/2⁻	12580.0	71/2⁻	(Q)[&a]	A_2=−0.05 3 E2 in 1991Fl02.
611.8	26.2 3	8432.7	55/2⁺	7820.9	53/2⁺	(D+Q)	A_2=+0.02 2
617.8 1	0.16 3	11242.7	51/2⁻	10624.9	47/2⁻		
622.7	5.3 2	2231.3	17/2⁻	1609.0	13/2⁻	(Q)[&a]	A_2=−0.14 3 E2 in 1991Fl02.
631.3[c]	14.2[c]	6264.4	45/2⁻	5633.1	41/2⁻		Other Iγ: 7.0 (1991Fl02).
636.6	103.5 20	6098.1	41/2⁺	5461.9	37/2⁺	(Q)	A_2=−0.24 1 E2 in 1991Fl02.
643.8	13.2 2	2382.8	19/2⁻	1739.1	17/2⁺	D	A_2=+0.12 4 E1 in 1991Fl02.
649.8 4		649.8+y	J1+2	y	J1≈(57/2⁺)		
661.3	50.3 3	2400.4	21/2⁺	1739.1	17/2⁺	(Q)	A_2=−0.29 1 E2 in 1991Fl02.
664.2 1	0.68 7	11907.0	55/2⁻	11242.7	51/2⁻		
667[ci]	1.0[c]	6300.0?	43/2⁻	5633.1	41/2⁻		
672.1	4.0 2	12383.2	69/2⁻	11711.1	67/2⁻	D	A_2=+0.17 5
687[c]	8.0[c]	5738.5	39/2⁻	5051.5	35/2⁻		
688.1 5		688.0+v	J4+2	v	J4≈(57/2⁻)		
698.9	5.3 2	12966.6	71/2⁺	12267.7	69/2⁺	(D+Q)[&a]	A_2=−0.22 1 A_2 consistent with ΔJ=2, Q; ΔJ=0, dipole; or ΔJ=1, D+Q. Revised J^π assignment for 12267 level in 1991Fl02 suggests ΔJ=1, D+Q for the 698.9γ, not E2 as given in 1991Fl02.
699.8 2		1349.6+y	J1+4	649.8+y	J1+2		
703.7	23.8 5	3226.8	23/2⁺	2523.2	21/2⁻	D	A_2=+0.13 3 Mult.: E1 (1991Fl02). E1 in 1991Fl02.
708.0	86.9 25	4339.4	31/2⁻	3631.2	27/2⁻	(Q)	A_2=−0.25 1 E2 in 1991Fl02.
708.7	52.0 15	1483.4	15/2⁻	775.1	11/2⁻	(Q)	A_2=−0.25 1 E2 in 1991Fl02.
711.8 1		12618.8	59/2⁻	11907.0	55/2⁻		
712.3	38.4 2	5051.5	35/2⁻	4339.4	31/2⁻	(Q)	A_2=−0.23 1 E2 in 1991Fl02.
725.6 4		725.6+z	J2+2	z	J2≈(63/2⁺)		

$^{149}_{64}$Gd$_{85}$-9

γ(^{149}Gd) (continued)

E_γ[†]	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	δ[#]	Comments
732.6 *2*		1420.6+v	J4+4	688.0+v	J4+2			
733.7	13.8 *2*	3133.9	23/2⁻	2400.4	21/2⁺	D[&a]		A_2=+0.01 *2* E1 in 1991Fl02.
735.8	26.8 *3*	8556.4	57/2⁺	7820.9	53/2⁺	(Q)		A_2=−0.30 *1* E2 in 1991Fl02.
743.2	88.0 *7*	5461.9	37/2⁺	4718.7	33/2⁺	(Q)		A_2=−0.25 *1* E2 in 1991Fl02.
747.4[h]	5.7[h] *2*	2231.3	17/2⁻	1483.4	15/2⁻			
747.4[h]	23.6[h] *8*	4800.8	33/2⁻	4053.6	29/2⁻	(Q)[a]		A_2=−0.17 *1* E2 in 1991Fl02.
747.6 *6*		747.4+a	J8+2	a	J8			
748.6 *2*		2098.2+y	J1+6	1349.6+y	J1+4			
750.9	27.2 *2*	3133.9	23/2⁻	2382.8	19/2⁻	(Q)[&]		A_2=−0.18 *1* E2 in 1991Fl02.
755.7 *4*		755.6+u	J3+2	u	J3≈(63/2⁻)			
759.7 *1*	0.88 *9*	13378.4	63/2⁻	12618.8	59/2⁻			
768.7	14.0 *2*	9325.3	59/2⁺	8556.4	57/2⁺	D+Q		A_2=+0.03 *2*
771.9 *2*		1497.5+z	J2+4	725.6+z	J2+2			
775.2	100.0 *5*	775.1	11/2⁻	0.0	7/2⁻	(Q)		A_2=−0.21 *1* E2 in 1991Fl02.
780.2 *2*		2200.8+v	J4+6	1420.6+v	J4+4			
784.1	59.0 *3*	1739.1	17/2⁺	955.2	13/2⁺	(Q)		A_2=−0.23 *1* E2 in 1991Fl02.
795.7	47.3 *3*	795.8	9/2⁻	0.0	7/2⁻	D+Q	+0.18 *2*	A_2=−0.02 *1* M1+E2 in 1991Fl02.
796.7 *5*		1543.9+a	J8+4	747.4+a	J8+2			
799.2 *2*		2897.4+y	J1+8	2098.2+y	J1+6			
802.9 *3*		802.9+w	J5+2	w	J5			
804.9 *3*		1560.5+u	J3+4	755.6+u	J3+2			
808.1 *1*	0.96 *10*	14186.5	67/2⁻	13378.4	63/2⁻			
813.2	7.8 *1*	1609.0	13/2⁻	795.8	9/2⁻	(Q)[&]		A_2=−0.11 *4* E2 in 1991Fl02.
817.6 *2*		2315.1+z	J2+6	1497.5+z	J2+4			
826.4	3.3 *4*	3226.8	23/2⁺	2400.4	21/2⁺	(D+Q)		A_2=−0.16 *2* M1+E2 in 1991Fl02.
827.6 *5*		827.5+b	J9+2	b	J9			
829.8 *2*		3030.5+v	J4+8	2200.8+v	J4+6			
834.1	7.7 *2*	1609.0	13/2⁻	775.1	11/2⁻	D+Q		A_2=0.00 *2* M1+E2 in 1991Fl02.
834.1	1.9 *3*	15996.9	85/2⁻	15162.8	81/2⁻			(E2) in 1991Fl02.
838.0	12.7 *4*	11199.2	67/2⁺	10361.3	63/2⁺	(Q)[&]		A_2=−0.17 *2* E2 in 1991Fl02.
847.3 *4*		2391.2+a	J8+6	1543.9+a	J8+4			

$^{149}_{64}$Gd$_{85}$-10

γ(^{149}Gd) (continued)

E_γ [†]	I_γ [‡]	E_i(level)	J^π_i	E_f	J^π_f	Mult. [#]	Comments
850.3 *10*		850.2+d	J11+2	d	J11		
852.2 *4*		1655.0+w	J5+4	802.9+w	J5+2		
854.1 *2*		3751.5+y	J1+10	2897.4+y	J1+8		
855.0 *3*		2415.5+u	J3+6	1560.5+u	J3+4		
855.1 *10*		854.9+c	J10+2	c	J10		
857.1 *1*	1.00	15043.7	71/2⁻	14186.5	67/2⁻		
858.5 *3*		858.5+x	67/2⁺	x	63/2⁺		
860.1	8.5 *2*	10361.3	63/2⁺	9501.1	61/2⁻		
864.9 *2*		3180.0+z	J2+8	2315.1+z	J2+6		
868.9	7.4 *3*	12580.0	71/2⁻	11711.1	67/2⁻	(Q)	A_2=−0.24 *5* E2 in 1991Fl02.
869.7 *4*		1697.0+b	J9+4	827.5+b	J9+2		
874.1 *3*		874.0+t	J7+2	t	J7		
877.8 *4*		877.5+s	J6+2	s	J6		
878.1 *2*	0.40 *6*	2624.8+x	75/2⁺	1746.7+x	71/2⁺		
881.0 *2*		3911.5+v	J4+10	3030.5+v	J4+8		
881.1	16.2 *3*	9437.4	59/2⁺	8556.4	57/2⁺	D+Q	A_2=0.00 *2*
888.2 *2*		1746.7+x	71/2⁺	858.5+x	67/2⁺		
891.2 *10*		1741.3+d	J11+4	850.2+d	J11+2		
893.3	33.1 *2*	3293.7	25/2⁺	2400.4	21/2⁺	(Q)	A_2=−0.28 *1* E2 in 1991Fl02.
896.0 *2*	0.64 *16*	4647.5+y	J1+12	3751.5+y	J1+10		
898.5 *4*		3289.6+a	J8+8	2391.2+a	J8+6		
899.6	10.1 *2*	2382.8	19/2⁻	1483.4	15/2⁻	(Q)	A_2=−0.26 *3* E2 in 1991Fl02.
901.0 *1*	0.44 *6*	3525.8+x	79/2⁺	2624.8+x	75/2⁺		
902.0 *3*		2556.9+w	J5+6	1655.0+w	J5+4		
902.4 *6*		1757.2+c	J10+4	854.9+c	J10+2		
906.7 *1*	1.05 *10*	15950.4	75/2⁻	15043.7	71/2⁻		
908.0 *2*		3323.5+u	J3+8	2415.5+u	J3+6		
912.1 *2*		4092.1+z	J2+10	3180.0+z	J2+8		
919.5	5.7 *3*	14108.0	77/2⁻	13188.6	75/2⁻	D	A_2=+0.07 *4*
924.0	18.7 *9*	10361.3	63/2⁺	9437.4	59/2⁺	(Q) [&]	A_2=−0.08 *3* E2 in 1991Fl02.
924.2 *3*		2621.2+b	J9+6	1697.0+b	J9+4		
924.6 *2*		1798.6+t	J7+4	874.0+t	J7+2		
932.0 *3*		1809.5+s	J6+4	877.5+s	J6+2		
933.5 *2*		4845.0+v	J4+12	3911.5+v	J4+10		
935.7 *9*		2677.0+d	J11+6	1741.3+d	J11+4		
942.3 *1*		4468.1+x	83/2⁺	3525.8+x	79/2⁺		
943.8	76.3 *4*	8939.8	57/2⁻	7996.0	53/2⁻	(Q)	A_2=−0.24 *1* E2 in 1991Fl02.
950.2 *4*		4239.7+a	J8+10	3289.6+a	J8+8		
952.1 *2*		3509.0+w	J5+8	2556.9+w	J5+6		

$^{149}_{64}$Gd$_{85}$-11

γ(^{149}Gd) (continued)

E_γ †	I_γ ‡	E_i(level)	J_i^π	E_f	J_f^π	Mult.#	Comments
953.3 2		5600.8+y	J1+14	4647.5+y	J1+12		
955.6	8.2 3	4342.1	29/2+	3386.4	27/2+	D+Q	A_2=+0.03 2 M1+E2 in 1991Fl02.
956.1 6		2713.2+c	J10+6	1757.2+c	J10+4		
957.1 1	0.98 10	16907.5	79/2−	15950.4	75/2−		
960.3 2		4283.8+u	J3+10	3323.5+u	J3+8		
960.7 2		5052.8+z	J2+12	4092.1+z	J2+10		
972.6 4		2771.2+t	J7+6	1798.6+t	J7+4		
975.4 3		3596.6+b	J9+8	2621.2+b	J9+6		
985.5 3		2794.9+s	J6+6	1809.5+s	J6+4		
986.5 9		3663.4+d	J11+8	2677.0+d	J11+6		
986.9 1		5455.0+x	87/2+	4468.1+x	83/2+		
987.1 2		5832.1+v	J4+14	4845.0+v	J4+12		
1002.5 4		5242.2+a	J8+12	4239.7+a	J8+10		
1003.8 4		4512.8+w	J5+10	3509.0+w	J5+8		
1004.9 2	0.64 16	6605.7+y	J1+16	5600.8+y	J1+14		
1005.5 2		6058.3+z	J2+14	5052.8+z	J2+12		
1008.3	10.9 4	10509.4	63/2+	9501.1	61/2−		
1008.7 1	0.95 10	17916.2	83/2−	16907.5	79/2−		
1012.6 5		3725.8+c	J10+8	2713.2+c	J10+6		
1015.6 3		5299.4+u	J3+12	4283.8+u	J3+10		
1016.4 3		4813.4+t	J7+10	3797.0+t	J7+8		
1025.9 5		3797.0+t	J7+8	2771.2+t	J7+6		
1030.4 3		4627.0+b	J9+10	3596.6+b	J9+8		
1033.0 1	0.86 12	6488.0+x	91/2+	5455.0+x	87/2+		
1037.9 3		5851.3+t	J7+12	4813.4+t	J7+10		
1038.0 8		4701.4+d	J11+10	3663.4+d	J11+8		
1038.3 3		3833.0+s	J6+8	2794.9+s	J6+6		
1042.0 2		6874.1+v	J4+16	5832.1+v	J4+14		
1049.7 4		5562.5+w	J5+12	4512.8+w	J5+10		
1054.7	5.8 3	15162.8	81/2−	14108.0	77/2−	(Q)&	A_2=−0.17 3 E2 in 1991Fl02.
1056.2 2		7114.6+z	J2+16	6058.3+z	J2+14		
1056.7 2	0.64 16	7662.4+y	J1+18	6605.7+y	J1+16		
1060.7 1	0.90 9	18976.9	87/2−	17916.2	83/2−		
1062.8 4		6304.9+a	J8+14	5242.2+a	J8+12		
1068.6	3.4 2	12267.7	69/2+	11199.2	67/2+	(D+Q)	A_2=−0.15 6 A_2 consistent with ΔJ=2, Q; ΔJ=0, dipole; or ΔJ=1, D+Q. Revised J^π assignment in 1991Fl02 suggests ΔJ=1, D+Q.
1069.6 5		4795.4+c	J10+10	3725.8+c	J10+8		
1069.9 3		6369.3+u	J3+14	5299.4+u	J3+12		
1081.3 1		7569.3+x	95/2+	6488.0+x	91/2+		
1085f 1		7740.9	51/2	6655.9	49/2+		

γ(^{149}Gd) (continued)

E_γ †	I_γ ‡	E_i(level)	J^π_i	E_f	J^π_f	Mult. #	Comments
1087.3	46.5 5	3610.4	25/2⁻	2523.2	21/2⁻	(Q)	A_2=−0.27 1 E2 in 1991Fl02.
1088.5 3		5715.5+b	J9+12	4627.0+b	J9+10		
1089.9 3		6941.2+t	J7+14	5851.3+t	J7+12		
1090.8 8		5792.2+d	J11+12	4701.4+d	J11+10		
1091.0 2		4924.0+s	J6+10	3833.0+s	J6+8		
1097.5 2		7971.6+v	J4+18	6874.1+v	J4+16		
1100.5	47.2 3	10601.3	65/2⁻	9501.1	61/2⁻	(Q)	A_2=−0.26 1 E2 in 1991Fl02.
1103.7 2		8218.3+z	J2+18	7114.6+z	J2+16		
1105.2 4		6667.6+w	J5+14	5562.5+w	J5+12		
1109.9	19.2 3	11711.1	67/2⁻	10601.3	65/2⁻	D	A_2=+0.15 4
1110.1 2	0.80 16	8772.5+y	J1+20	7662.4+y	J1+18		
1113.8 1	0.83 8	20090.6	91/2⁻	18976.9	87/2⁻		
1117.1 4		7422.0+a	J8+16	6304.9+a	J8+14		
1126.1 3		7495.4+u	J3+16	6369.3+u	J3+14		
1126.1 5		5921.4+c	J10+12	4795.4+c	J10+10		
1130.4 1	1.00 14	8699.7+x	99/2⁺	7569.3+x	95/2⁺		
1142.5 2		6066.5+s	J6+12	4924.0+s	J6+10		
1142.9 8		6935.1+d	J11+14	5792.2+d	J11+12		
1145.6 3		8086.9+t	J7+16	6941.2+t	J7+14		
1148.2 4		6863.6+b	J9+14	5715.5+b	J9+12		
1151.5 2		9369.8+z	J2+20	8218.3+z	J2+18		
1154.3 2		9125.8+v	J4+20	7971.6+v	J4+18		
1157.2 3		7824.8+w	J5+16	6667.6+w	J5+14		
1163.2 2	0.96 16	9935.7+y	J1+22	8772.5+y	J1+20		
1165.3	62.0 5	7820.9	53/2⁺	6655.9	49/2⁺	(Q)	A_2=−0.29 1 E2 in 1991Fl02.
1167.2 2		21257.9	95/2⁻	20090.6	91/2⁻		
1168.0	83.5 5	7823.9	51/2⁻	6655.9	49/2⁺	D	A_2=+0.19 1 E1 in 1991Fl02.
1172.8 4		8594.8+a	J8+18	7422.0+a	J8+16		
1180.9 1	1.02 14	9880.6+x	103/2⁺	8699.7+x	99/2⁺		
1181.6 5		7103.0+c	J10+14	5921.4+c	J10+12		
1183.4 3		8678.7+u	J3+18	7495.4+u	J3+16		
1183.9	3.1 3	12383.2	69/2⁻	11199.2	67/2⁺	D	A_2=+0.13 8
1193.3 3		7259.7+s	J6+14	6066.5+s	J6+12		
1195.2 9		8130+d	J11+16	6935.1+d	J11+14		
1199.0 2		10568.8+z	J2+22	9369.8+z	J2+20		
1202.4 3		9289.2+t	J7+18	8086.9+t	J7+16		
1209.3 3		9034.1+w	J5+18	7824.8+w	J5+16		
1209.3 4		8072.9+b	J9+16	6863.6+b	J9+14		
1212.0 3		10337.8+v	J4+22	9125.8+v	J4+20		
1215.5 2	0.96 16	11151.2+y	J1+24	9935.7+y	J1+22		

γ(^{149}Gd) (continued)

E_γ[†]	I_γ[‡]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[#]	Comments
1221.8 *1*	0.80 *8*	22479.7	99/2$^-$	21257.9	95/2$^-$		
1231.3 *5*		9826.0+a	J8+20	8594.8+a	J8+18		
1232.5 *1*	0.58 *10*	11113.1+x	107/2$^+$	9880.6+x	103/2$^+$		
1234.0 *6*		8337.0+c	J10+16	7103.0+c	J10+14		
1240.9 *3*		9919.6+u	J3+20	8678.7+u	J3+18		
1242.9 *3*		8502.6+s	J6+16	7259.7+s	J6+14		
1247.0 *2*	1.00[b] *5*	11815.8+z	J2+24	10568.8+z	J2+22		
1251.1 *10*		9381+d	J11+18	8130+d	J11+16		
1260.0 *3*		10549.2+t	J7+20	9289.2+t	J7+18		
1262.3 *3*		10296.4+w	J5+20	9034.1+w	J5+18		
1268.8 *2*	0.96 *16*	12420.0+y	J1+26	11151.2+y	J1+24		
1270.0 *4*		9342.9+b	J9+18	8072.9+b	J9+16		
1270.5 *3*		11608.3+v	J4+24	10337.8+v	J4+22		
1276.4	5.4 *3*	9272.5	57/2$^-$	7996.0	53/2$^-$	(Q)	A_2=−0.24 *5* E2 in 1991Fl02.
1276.5 *1*	0.72 *7*	23756.2	103/2$^-$	22479.7	99/2$^-$		
1282.5 *6*		9619.4+c	J10+18	8337.0+c	J10+16		
1285.8 *1*	0.66 *10*	12399.0+x	111/2$^+$	11113.1+x	107/2$^+$		
1288.4 *4*		11114.4+a	J8+22	9826.0+a	J8+20		
1291.9 *3*		9794.5+s	J6+18	8502.6+s	J6+16		
1294.3 *2*	0.87[b] *5*	13110.1+z	J2+26	11815.8+z	J2+24		
1299.3 *3*		11218.9+u	J3+22	9919.6+u	J3+20		
1306.7 *7*		10688+d	J11+20	9381+d	J11+18		
1315.7 *3*		11612.1+w	J5+22	10296.4+w	J5+20		
1318.4 *3*		11867.6+t	J7+22	10549.2+t	J7+20		
1322.8 *2*	1.20 *24*	13742.8+y	J1+28	12420.0+y	J1+26		
1327.1 *7*		10946.4+c	J10+20	9619.4+c	J10+18		
1328.9 *5*		12937.2+v	J4+26	11608.3+v	J4+24		
1330.6 *4*		10673.5+b	J9+20	9342.9+b	J9+18		
1332.0 *1*	0.60 *6*	25088.2	107/2$^-$	23756.2	103/2$^-$		
1338.1 *3*		11132.5+s	J6+20	9794.5+s	J6+18		
1339.6 *1*	0.56 *10*	13738.6+x	115/2$^+$	12399.0+x	111/2$^+$		
1341.5 *3*	0.72[b] *5*	14451.6+z	J2+28	13110.1+z	J2+26		
1346.8 *4*		12461.2+a	J8+24	11114.4+a	J8+22		
1348.7	7.5 *2*	10850.0	63/2$^-$	9501.1	61/2$^-$	D	A_2=+0.18 *3*
1357.7 *3*		12576.6+u	J3+24	11218.9+u	J3+22		
1360.6 *15*		12049+d	J11+22	10688+d	J11+20		
1369.5 *3*		12981.6+w	J5+24	11612.1+w	J5+22		
1372.0	2.2 *3*	12383.2	69/2$^-$	11010.9	65/2$^-$	(Q)	A_2=−0.30 *8* E2 in 1991Fl02.
1373.8 *8*		12320.2+c	J10+22	10946.4+c	J10+20		
1375.5 *3*		13243.1+t	J7+24	11867.6+t	J7+22		
1376.8 *2*	1.12 *24*	15119.6+y	J1+30	13742.8+y	J1+28		

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γ(^{149}Gd) (continued)

E_γ[†]	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	Comments
1386.1 3		12518.6+s	J6+22	11132.5+s	J6+20		
1387.6 1	0.51 5	26475.8	111/2$^-$	25088.2	107/2$^-$		
1388.1 3	0.62[b] 5	15839.7+z	J2+30	14451.6+z	J2+28		
1388.3 5		14325.5+v	J4+28	12937.2+v	J4+26		
1390.1 3		12063.6+b	J9+22	10673.5+b	J9+20		
1394.8 2	0.52 10	15133.4+x	119/2$^+$	13738.6+x	115/2$^+$		
1407.2 5		13868.4+a	J8+26	12461.2+a	J8+24		
1417.0 4		13993.6+u	J3+26	12576.6+u	J3+24		
1418.0 13		13467+d	J11+24	12049+d	J11+22		
1420.3 10		13740.5+c	J10+24	12320.2+c	J10+22		
1422.8 4		14404.4+w	J5+26	12981.6+w	J5+24		
1428.7	3.9 2	10929.8	65/2$^-$	9501.1	61/2$^-$	(Q)	A_2=−0.21 6 E2 in 1991Fl02.
1430.0 4		13948.6+s	J6+24	12518.6+s	J6+22		
1430.9 3	0.56 16	16550.5+y	J1+32	15119.6+y	J1+30		
1434.9 3	0.42[b] 5	17274.6+z	J2+32	15839.7+z	J2+30		
1440.3 4		14683.4+t	J7+26	13243.1+t	J7+24		
1444.2 1	0.38 5	27920.0	115/2$^-$	26475.8	111/2$^-$		
1446.6 4		15772.1+v	J4+30	14325.5+v	J4+28		
1448.9 4		13512.5+b	J9+24	12063.6+b	J9+22		
1450.6 2	0.42 8	16584.0+x	123/2$^+$	15133.4+x	119/2$^+$		
1463.3 6		15331.7+a	J8+28	13868.4+a	J8+26		
1471.7 8		15212.1+c	J10+26	13740.5+c	J10+24		
1472.3 5		15420.9+s	J6+26	13948.6+s	J6+24		
1474.0 15		14941+d	J11+26	13467+d	J11+24		
1475.8 4		15469.4+u	J3+28	13993.6+u	J3+26		
1477.5 5		15881.9+w	J5+28	14404.4+w	J5+26		
1482.5 4	0.22[b] 5	18757.1+z	J2+34	17274.6+z	J2+32		
1485.6 4	0.56 16	18036.1+y	J1+34	16550.5+y	J1+32		
1494.6 4		16178.0+t	J7+28	14683.4+t	J7+26		
1500.5 2	0.28 4	29420.5	119/2$^-$	27920.0	115/2$^-$		
1506.0 6		17278.1+v	J4+32	15772.1+v	J4+30		
1506.7 3	0.26 6	18090.7+x	127/2$^+$	16584.0+x	123/2$^+$		
1507.6 5		15020.1+b	J9+26	13512.5+b	J9+24		
1513.1 6		16934.0+s	J6+28	15420.9+s	J6+26		
1525.6 8		16738+c	J10+28	15212.1+c	J10+26		
1528.6 8	0.12[b] 5	20285.7+z	J2+36	18757.1+z	J2+34		
1531.8 10		16863.5+a	J8+30	15331.7+a	J8+28		
1532.7 5		17414.6+w	J5+30	15881.9+w	J5+28		
1534.6 5		17004.0+u	J3+30	15469.4+u	J3+28		
1540.2 5		19576.3+y	J1+36	18036.1+y	J1+34		
1549.4 8		18483.4+s	J6+30	16934.0+s	J6+28		

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γ(^{149}Gd) (continued)

E_γ †	I_γ ‡	E_i(level)	J^π_i	E_f	J^π_f	Mult.#	Comments
1552.4	3.2 *5*	12751.4	71/2+	11199.2	67/2+	(Q)	A_2=−0.22 *5* E2 in 1991Fl02.
1553.9 *4*		17731.9+t	J7+30	16178.0+t	J7+28		
1557.8 *2*	0.19 *3*	30978.3	123/2−	29420.5	119/2−		
1560.9	5.0 *1*	8217.1	53/2+	6655.9	49/2+	(Q)	A_2=−0.28 *5* E2 in 1991Fl02.
1564.0 *3*		19654.7+x	131/2+	18090.7+x	127/2+		
1565.2 *6*		18843.3+v	J4+34	17278.1+v	J4+32		
1566.0 *11*		16586.1+b	J9+28	15020.1+b	J9+26		
1575.0 *10*		21860.7+z	J2+38	20285.7+z	J2+36		
1583.1 *12*		18321+c	J10+30	16738+c	J10+28		
1585.8 *6*		19000.4+w	J5+32	17414.6+w	J5+30		
1588.2 *13*		18451.7+a	J8+32	16863.5+a	J8+30		
1594.4 *7*		21170.7+y	J1+38	19576.3+y	J1+36		
1595.0 *10*		18599.0+u	J3+32	17004.0+u	J3+30		
1614.5 *7*		19346.4+t	J7+32	17731.9+t	J7+30		
1615.7 *3*	0.10 *2*	32594.0	127/2−	30978.3	123/2−		
1620.3 *7*		21275.0+x	135/2+	19654.7+x	131/2+		
1626.0 *10*		20469.3+v	J4+36	18843.3+v	J4+34		
1639.2 *13*		19960+c	J10+32	18321+c	J10+30		
1641.2 *11*		20641.6+w	J5+34	19000.4+w	J5+32		
1647.4 *9*		22818.1+y	J1+40	21170.7+y	J1+38		
1672.1 *4*	0.06 *2*	34266.1	131/2−	32594.0	127/2−		
1686.0 *10*		22155.3+v	J4+38	20469.3+v	J4+36		
1729.9 *8*	0.03[d] *1*	35996.0	135/2−	34266.1	131/2−		
1767.4	3.5 *2*	12966.6	71/2+	11199.2	67/2+	(Q)	A_2=−0.31 *5* E2 in 1991Fl02.
1802[f] *1*		8457.8	51/2−	6655.9	49/2+		I_γ: 0.005 *2* relative to Iγ(857)=1.0 in SD-1 band.
1867.1	2.4 *4*	12468.4	69/2−	10601.3	65/2−	(Q)	A_2=−0.15 *8* E2 in 1991Fl02.
1995[f] *1*		8464.7	47/2−	6469.7	45/2+		I_γ: 0.006 *3* relative to Iγ(857)=1.0 in SD-1 band.
2001[f] *1*		8656.9	51/2−	6655.9	49/2+		I_γ: 0.005 *3* relative to Iγ(857)=1.0 in SD-1 band.
2188[e] *1*	0.024[e] *6*	11242.7	51/2−	9054.7	49/2+		
2585[f] *1*		9054.7	49/2+	6469.7	45/2+		I_γ: 0.005 *2* relative to Iγ(857)=1.0 in SD-1 band.
2778[ei] *2*	<0.005[e]	11242.7	51/2−	8464.7	47/2−		
2785[ei] *2*	<0.005[e]	11242.7	51/2−	8457.8	51/2−		I_γ: Iγ(2778+2785)=0.005 *3*.

† From 1991Fl02. For SD bands, values are from 1995Fl01 for bands SD-1 to SD-6 and from 1998By02 for SD-7 to SD-13. Exceptions are noted.

‡ From 1991Fl02. For SD bands, values are from 1990Ha31 (see also 1995Fl01) and are relative intensities (normalized to ≈1 for one of the most intense

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γ(^{149}Gd) (continued)

transitions in the band) within each band. For these bands, intensity relative to the 775γ in the normal band can be obtained by multiplying by the percent population values given under comments with the first level in each band. Exceptions are noted.

[#] 1991Fl02 assign multipolarities to a large number of transitions based on A_2 values from their γ(θ) data (relative to nuclear spin axis). 1991Fl02 have assigned E2 to transitions with negative A_2 and E1 or M1 to transitions with positive A_2. Since γ(θ) data are insensitive to parity, the assignments given here are mult=Q for negative A_2 and mult=dipole for positive A_2. But using RUL for E2 and M2 and assuming $T_{1/2}$(level)<5 ns, mult=Q is restricted to E2 for Eγ<850. From systematics of population of levels in (HI,xnγ) experiments, mult=Q most likely corresponds to E2 in all cases.

[@] Deduced from intensity balance (1991Fl02).

[&] From γ(θ) (1991Fl02) for a mixed line.

[a] A_2 value from γ(θ) is for a mixed line.

[b] From 1995Fl01.

[c] γ from 1995Fl01. Intensity obtained by evaluators as priv. comm. from authors of 1995Fl01.

[d] Estimated (by evaluators) from spectrum shown by 1995Fl01.

[e] From 1999Fi12.

[f] From 1999Fi12.

[g] 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.

[h] Multiply placed with intensity suitably divided.

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

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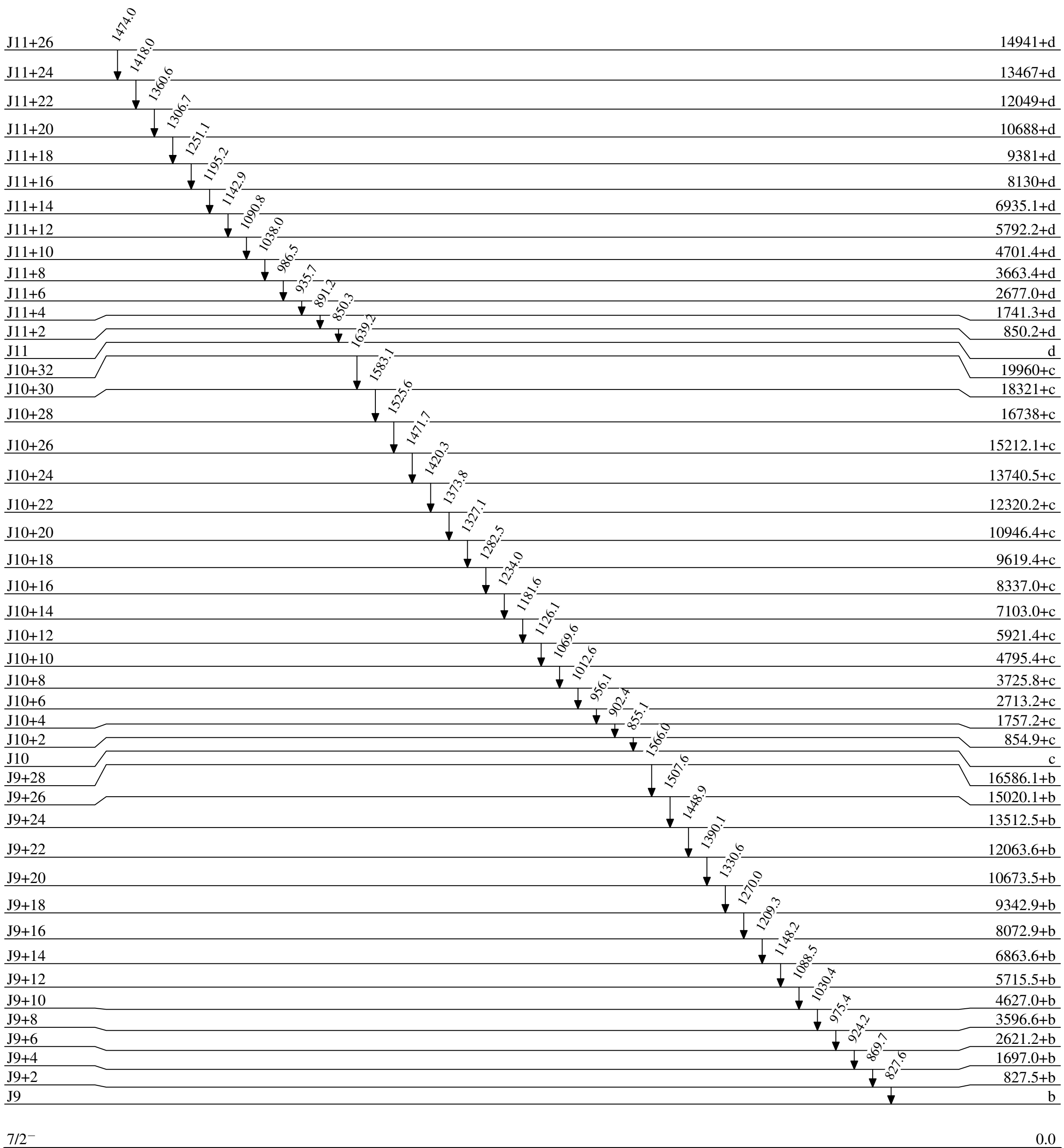
^{124}Sn(^{30}Si,5nγ) 1991Fl02,1995Fl01,1998By02

Level Scheme

Intensities: Relative I_γ

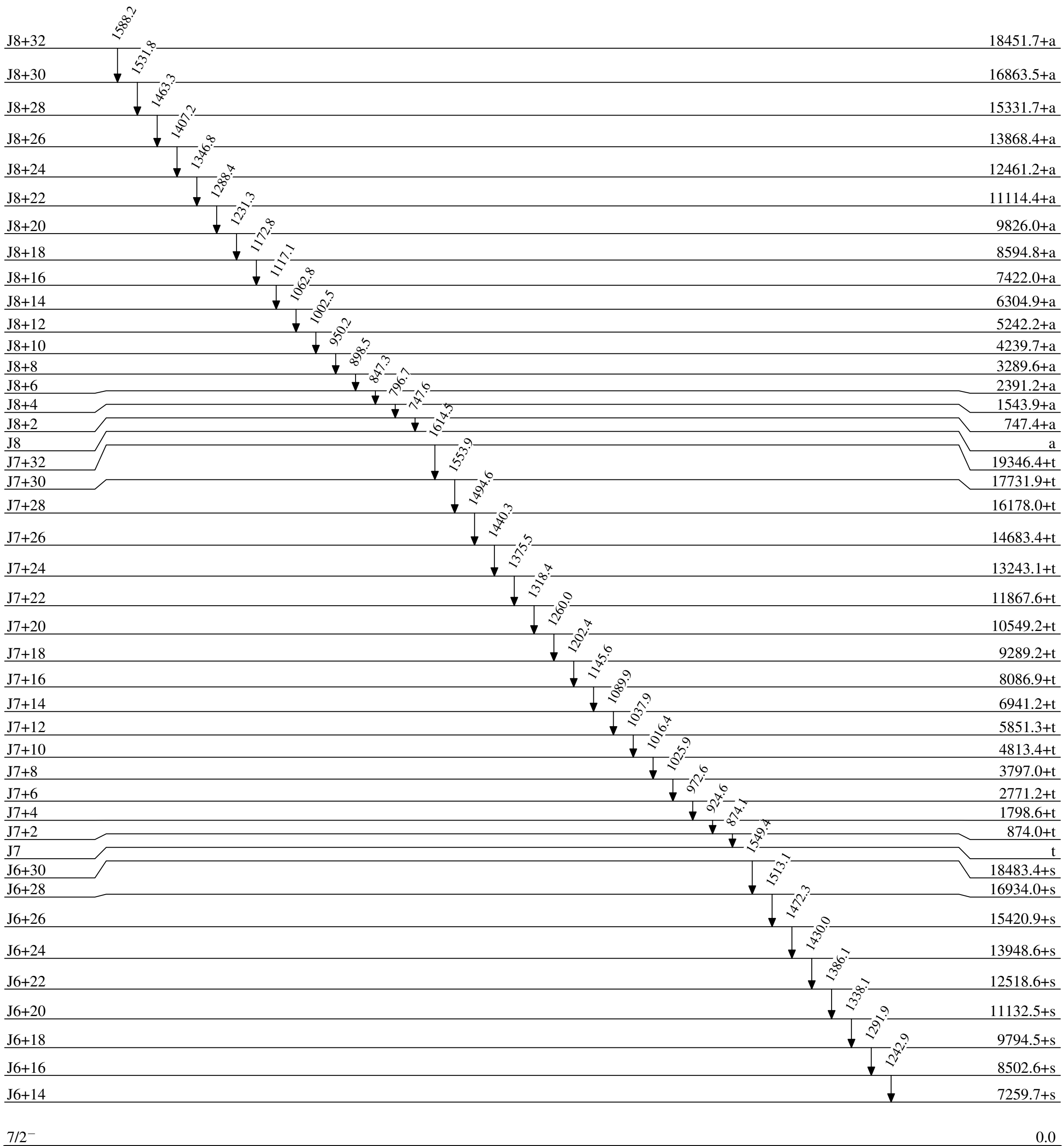


$^{149}_{64}Gd_{85}$

^{124}Sn(^{30}Si,5nγ) 1991Fl02,1995Fl01,1998By02

Level Scheme (continued)

Intensities: Relative I_γ

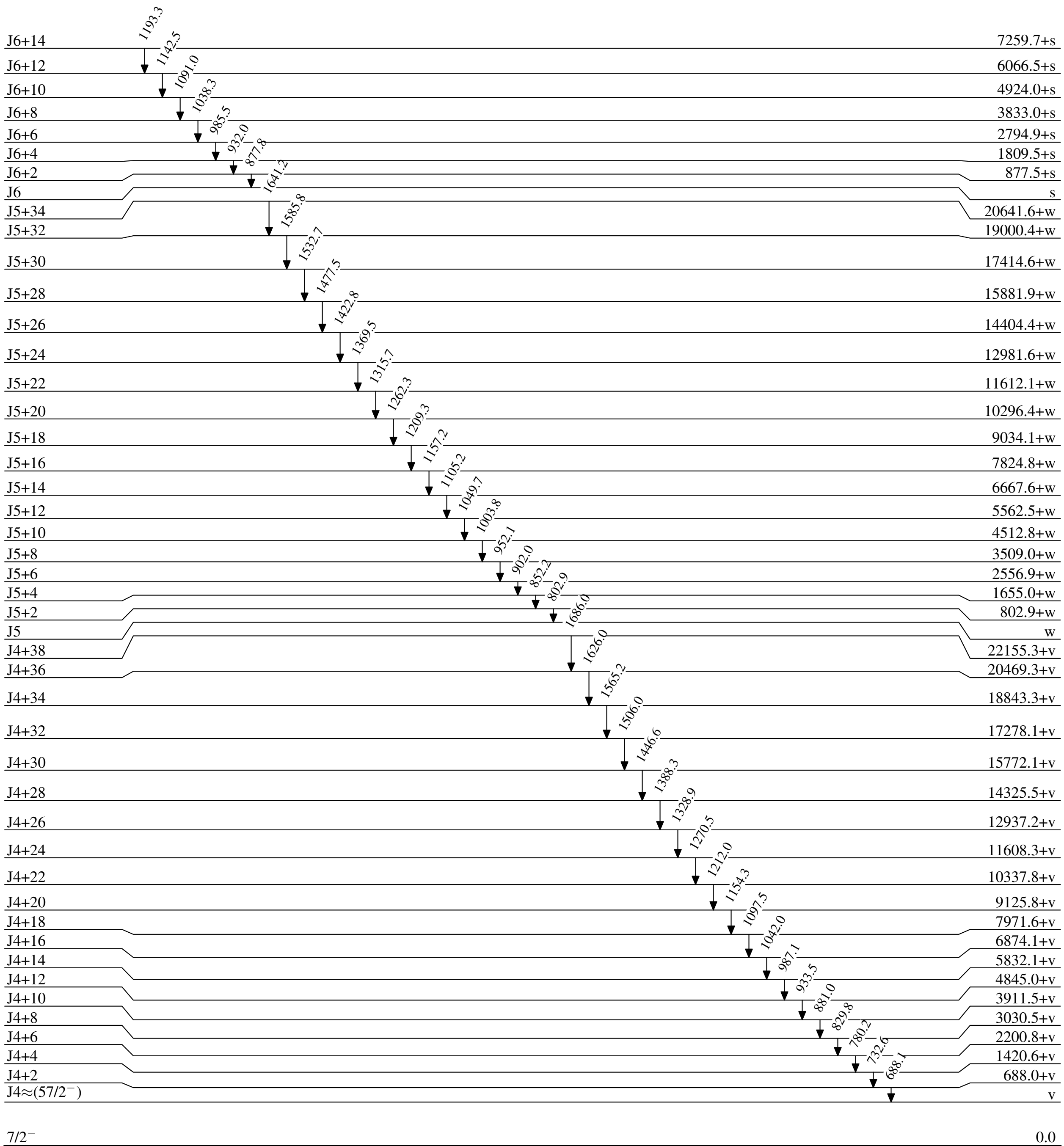


$^{149}_{64}Gd_{85}$

$^{124}Sn(^{30}Si,5n\gamma)$ 1991Fl02,1995Fl01,1998By02

Level Scheme (continued)

Intensities: Relative I_γ

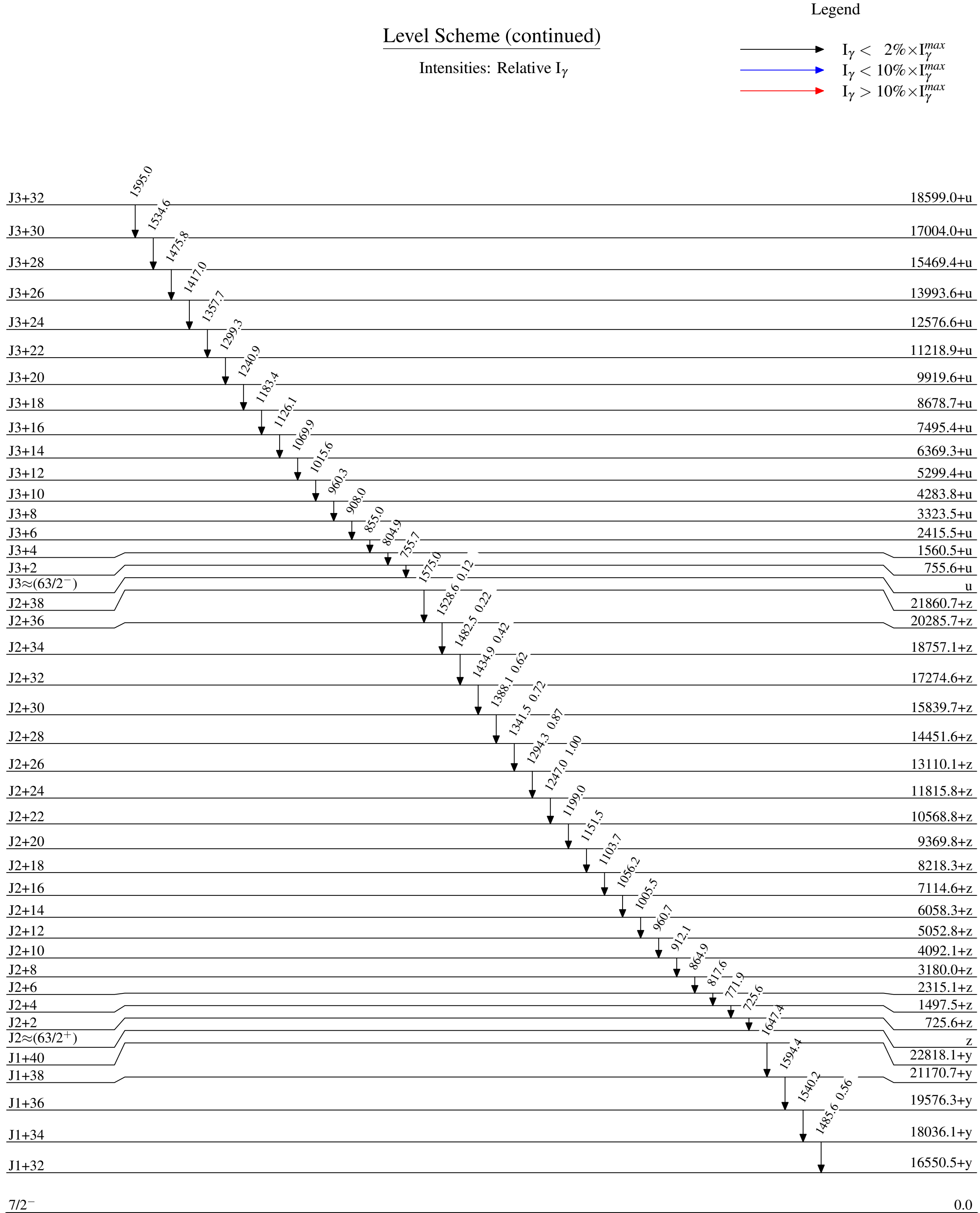


$^{149}_{64}Gd_{85}$

$^{124}Sn(^{30}Si,5n\gamma)$ 1991Fl02,1995Fl01,1998By02

Level Scheme (continued)

Intensities: Relative I_γ



$^{149}_{64}Gd_{85}$

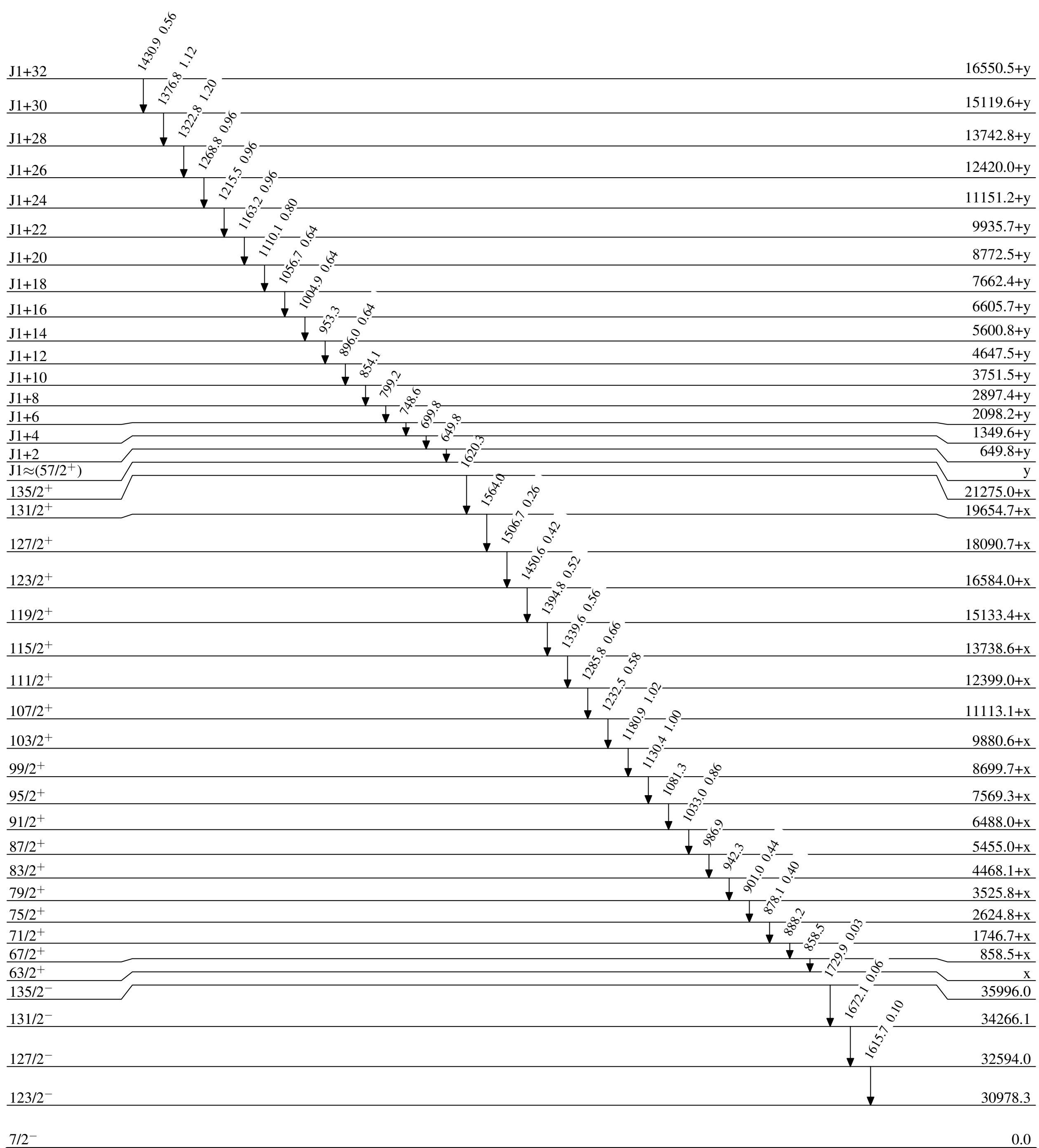
$^{124}Sn(^{30}Si,5n\gamma)$ 1991Fl02,1995Fl01,1998By02

Legend

Level Scheme (continued)

Intensities: Relative I_γ

$I_\gamma < 2\% \times I_\gamma^{max}$
$I_\gamma < 10\% \times I_\gamma^{max}$
$I_\gamma > 10\% \times I_\gamma^{max}$

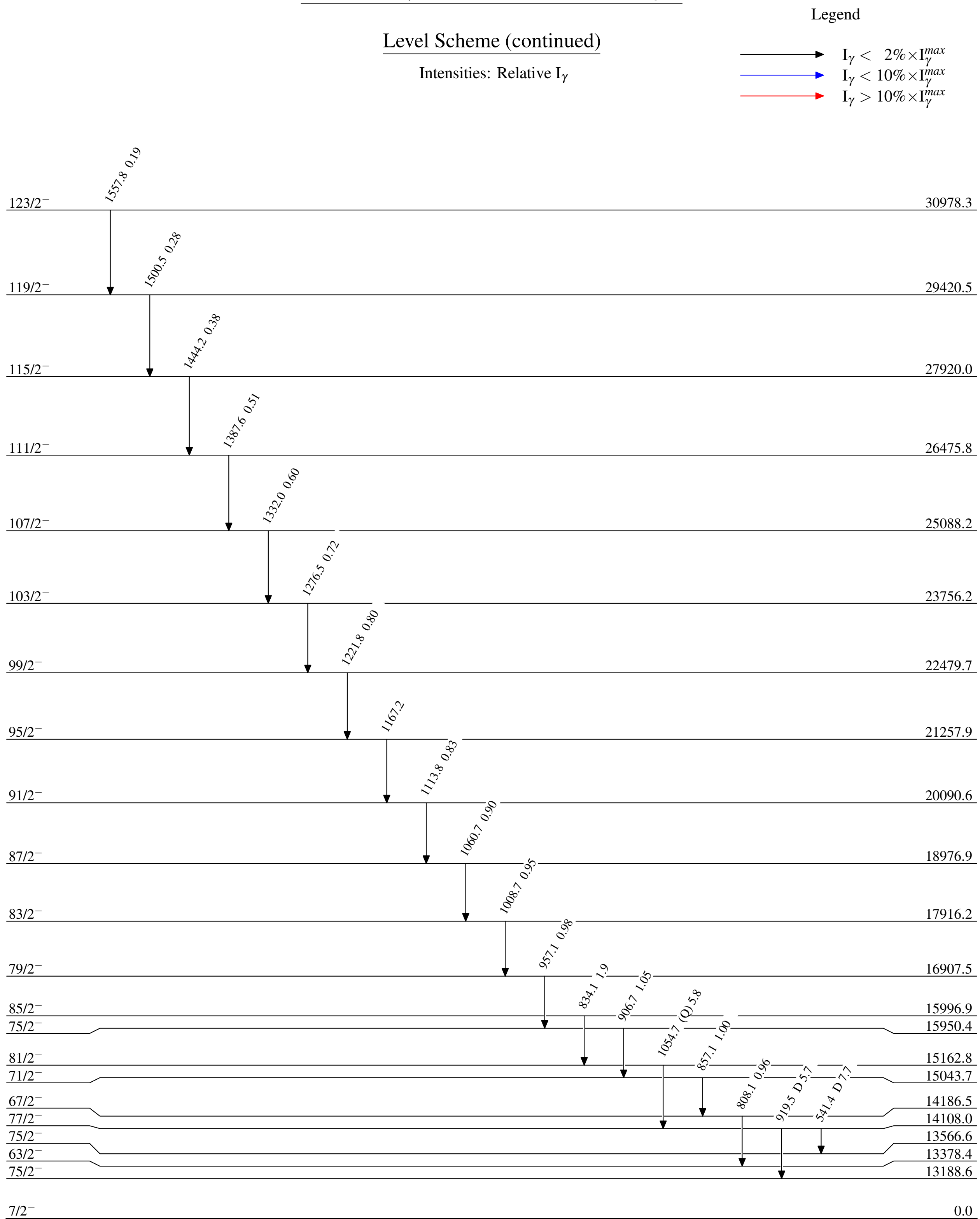


$^{149}_{64}Gd_{85}$

$^{124}Sn(^{30}Si,5n\gamma)$ 1991Fl02,1995Fl01,1998By02

Level Scheme (continued)

Intensities: Relative I_γ



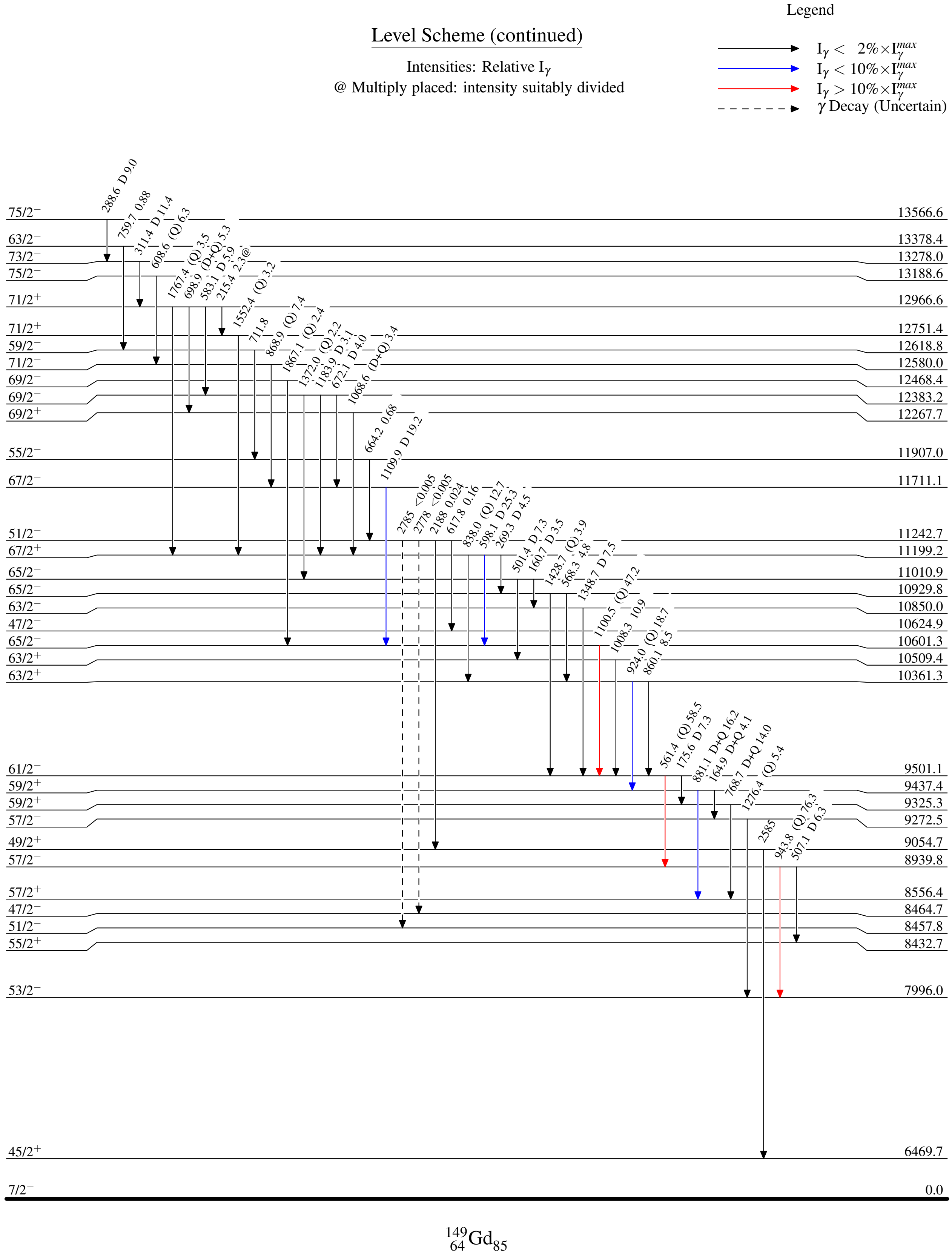
$^{149}_{64}Gd_{85}$

$^{124}Sn(^{30}Si,5n\gamma)$ 1991Fl02,1995Fl01,1998By02

Level Scheme (continued)

Intensities: Relative I_γ

@ Multiply placed: intensity suitably divided



$^{124}Sn(^{30}Si,5n\gamma)$ 1991Fl02,1995Fl01,1998By02

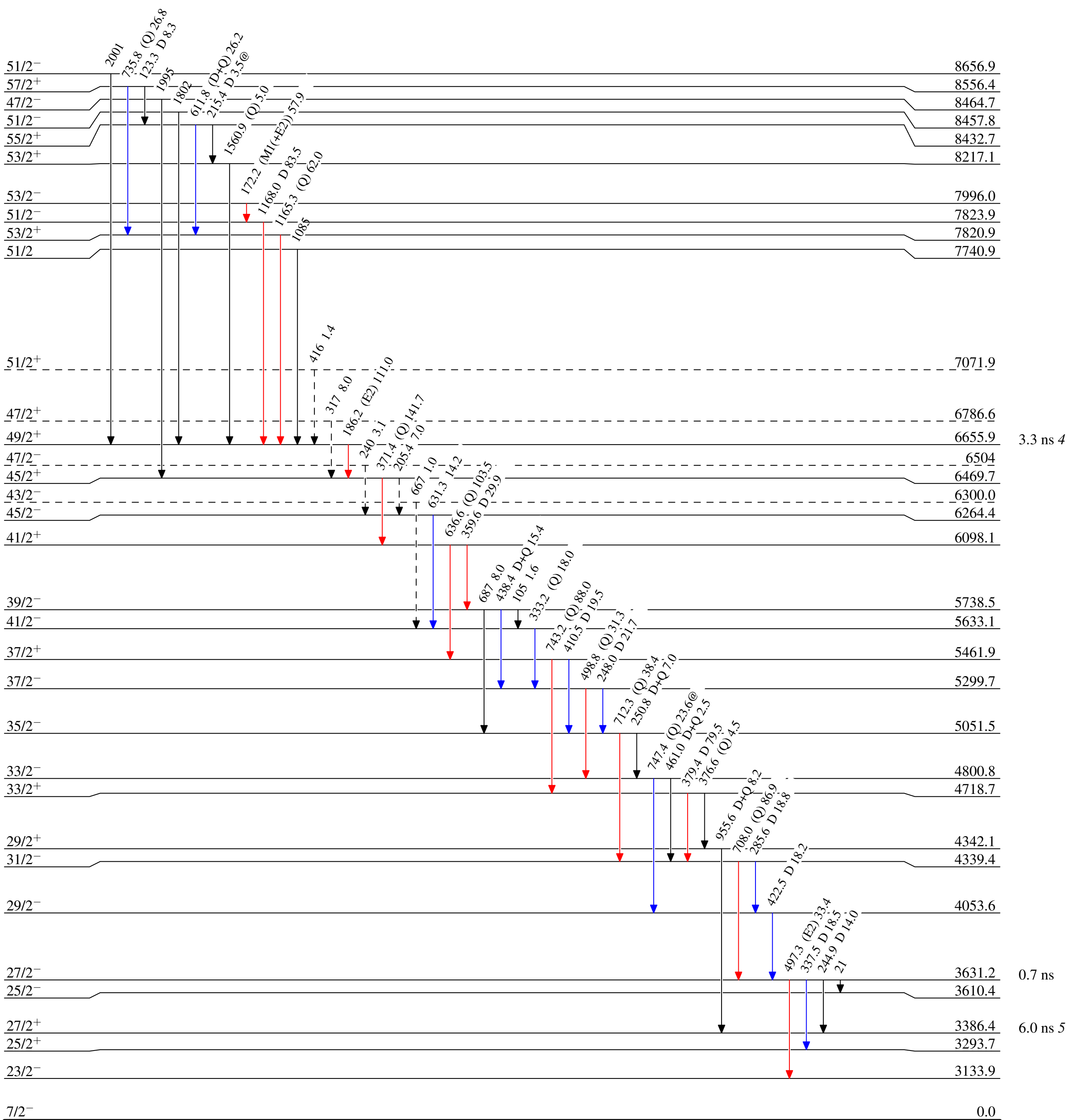
Level Scheme (continued)

Intensities: Relative I_γ

@ Multiply placed: intensity suitably divided

Legend

- $I_\gamma < 2\% \times I_\gamma^{max}$
- $I_\gamma < 10\% \times I_\gamma^{max}$
- $I_\gamma > 10\% \times I_\gamma^{max}$
- γ Decay (Uncertain)



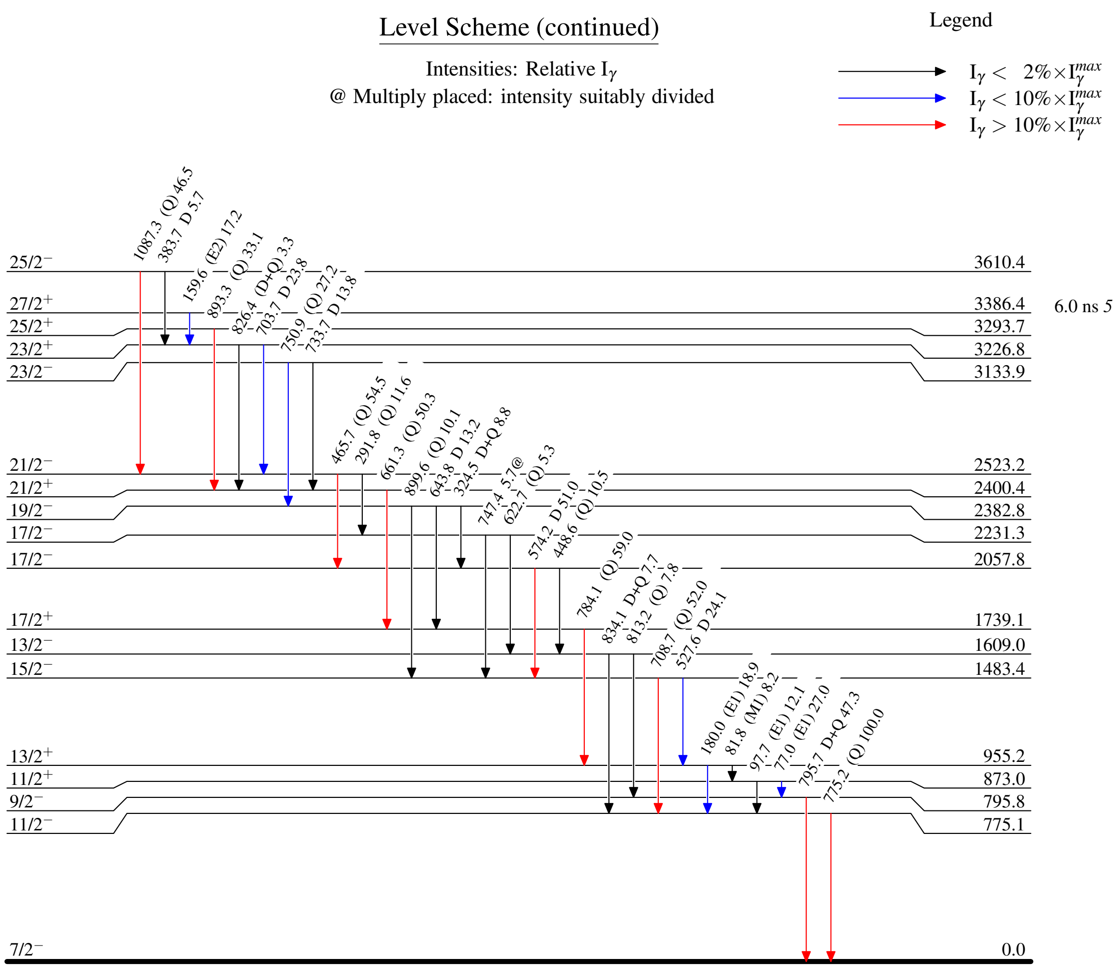
$^{149}_{64}Gd_{85}$

$^{124}Sn(^{30}Si,5n\gamma)$ 1991Fl02,1995Fl01,1998By02

Level Scheme (continued)

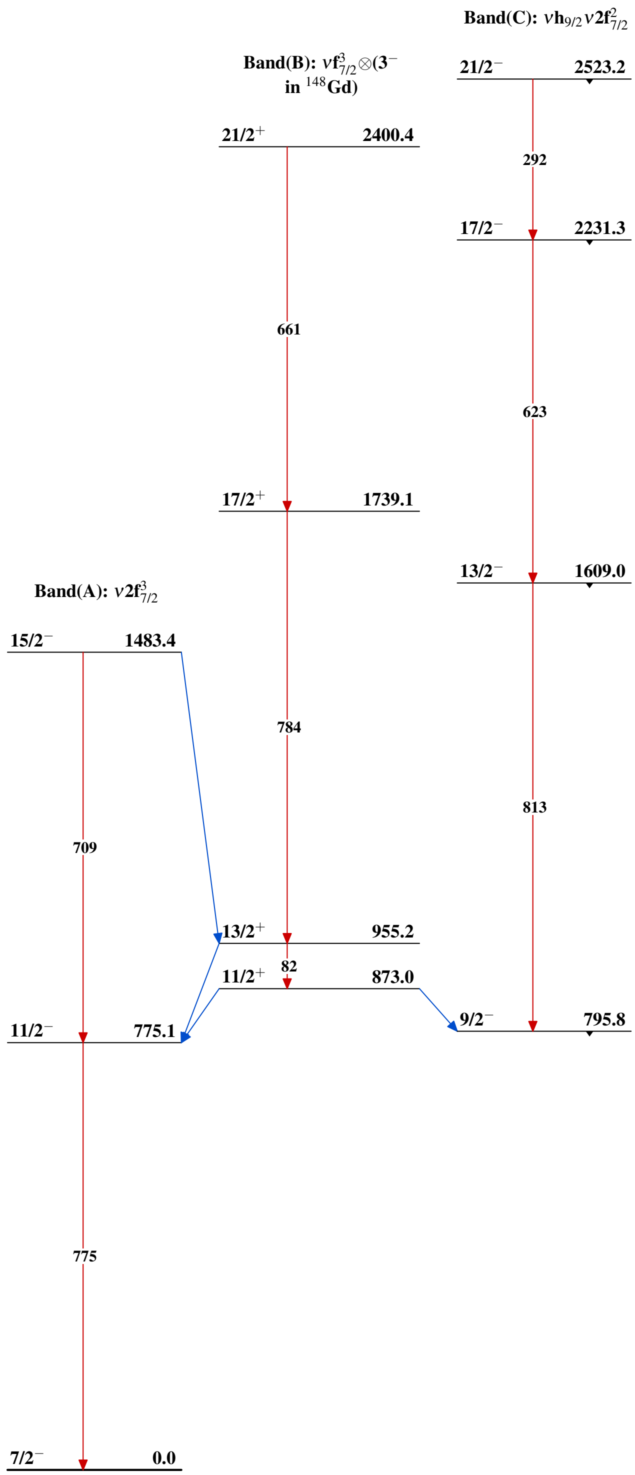
Intensities: Relative I_γ

@ Multiply placed: intensity suitably divided



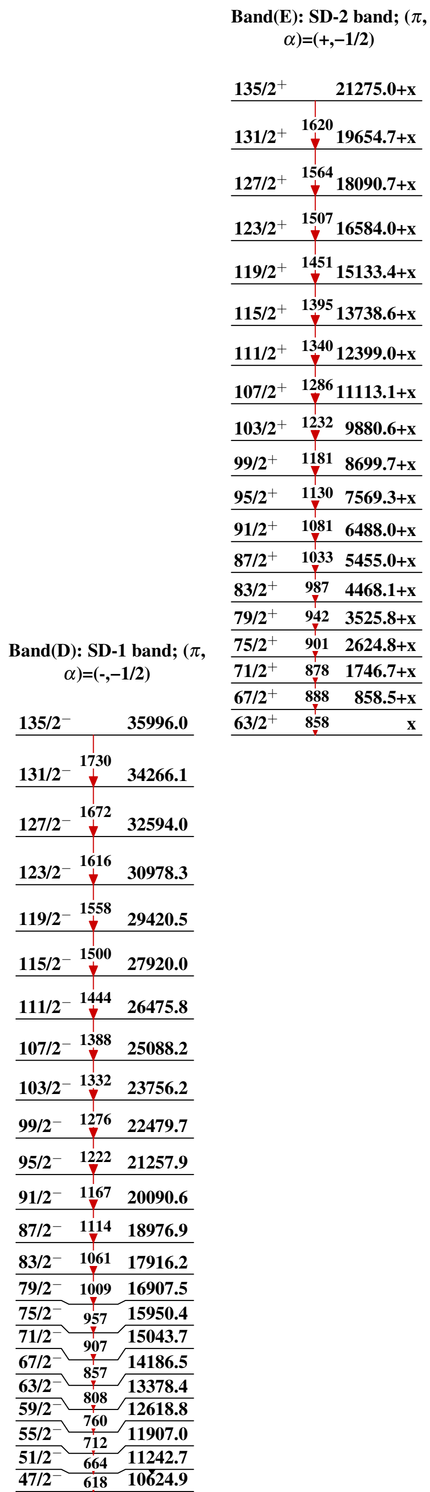
$^{149}_{64}Gd_{85}$

$^{124}Sn(^{30}Si,5n\gamma)$ **1991Fl02,1995Fl01,1998By02**



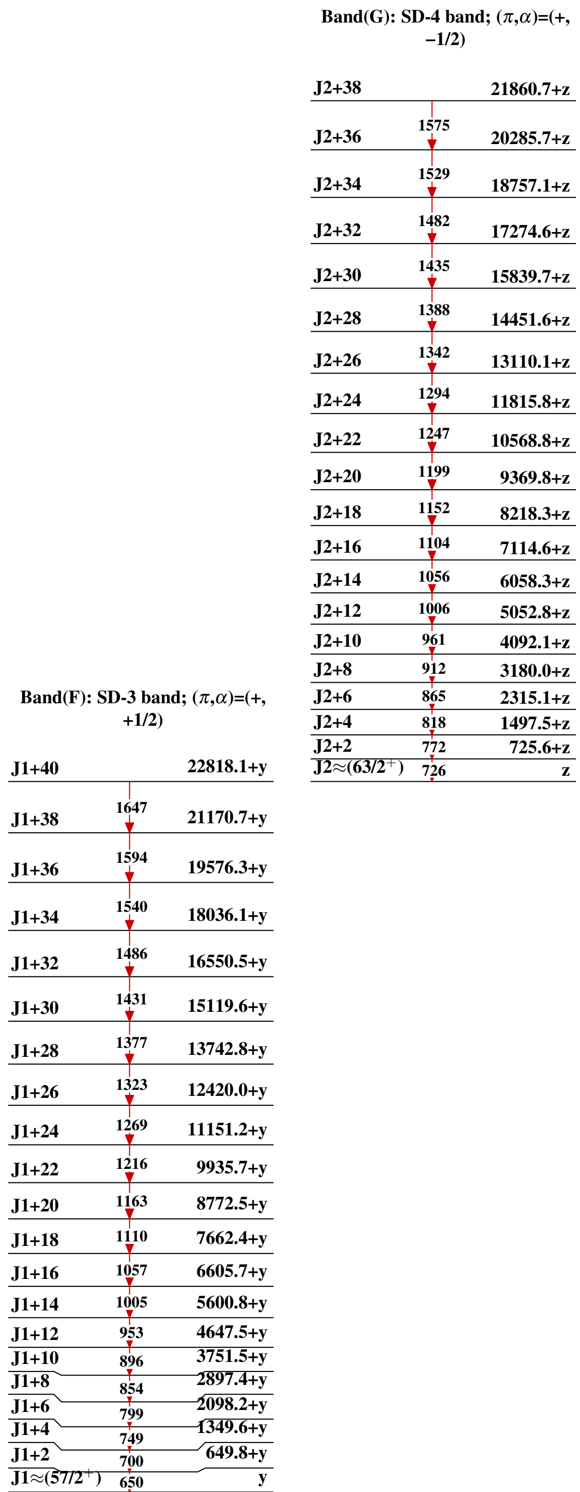
$^{149}_{64}Gd_{85}$

$^{124}Sn(^{30}Si,5n\gamma)$ 1991Fl02,1995Fl01,1998By02 (continued)



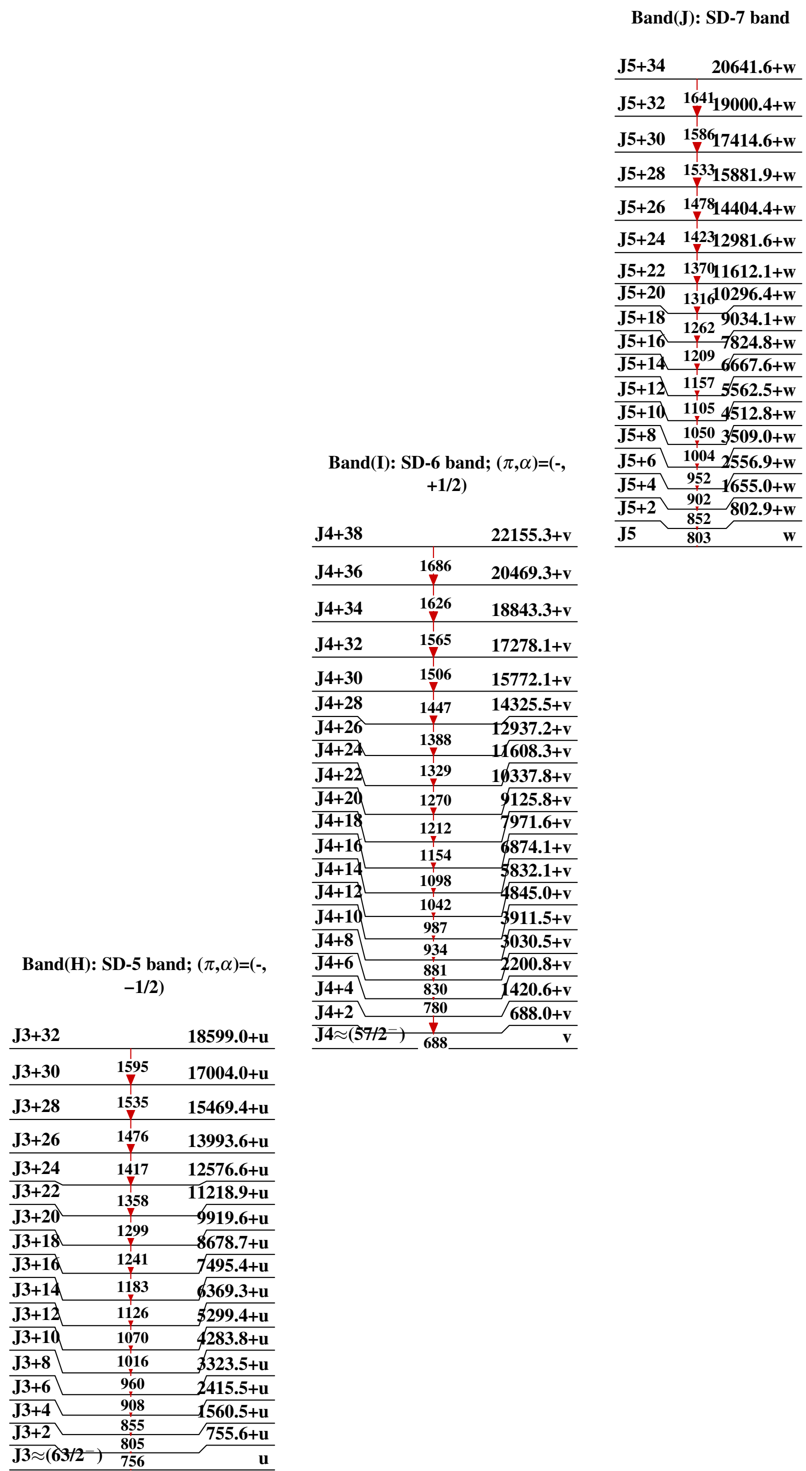
$^{149}_{64}Gd_{85}$

$^{124}Sn(^{30}Si,5n\gamma)$ 1991Fl02,1995Fl01,1998By02 (continued)



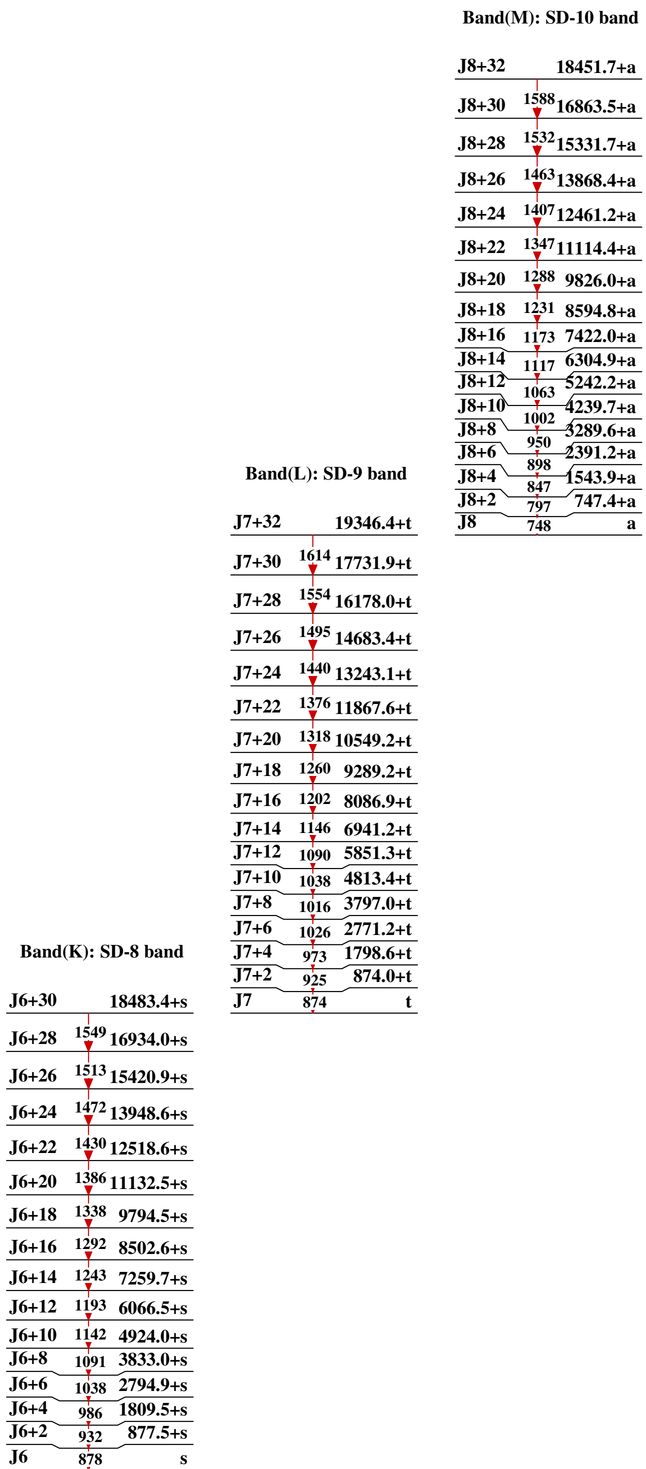
$^{149}_{64}Gd_{85}$

^{124}Sn(^{30}Si,5nγ) 1991Fl02,1995Fl01,1998By02 (continued)



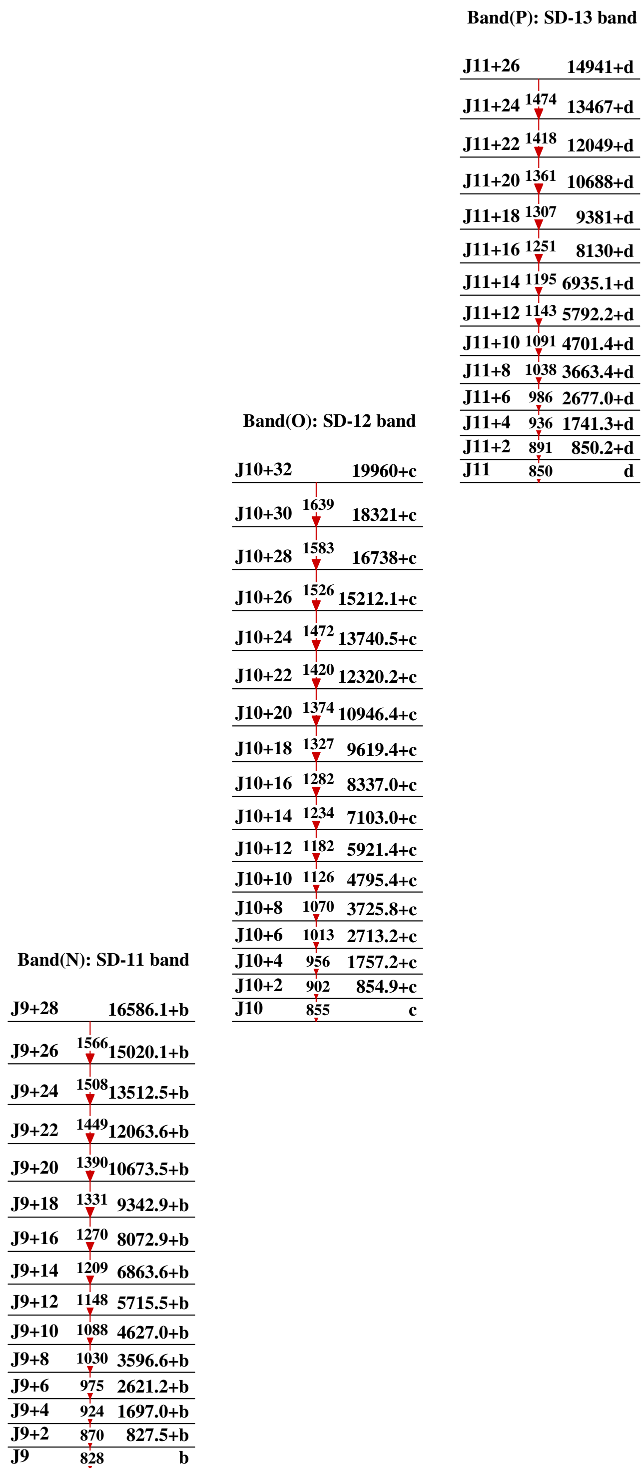
$^{149}_{64}$Gd$_{85}$

$^{124}Sn(^{30}Si,5n\gamma)$ 1991Fl02,1995Fl01,1998By02 (continued)



$^{149}_{64}Gd_{85}$

$^{124}Sn(^{30}Si,5n\gamma)$ 1991Fl02,1995Fl01,1998By02 (continued)



$^{149}_{64}Gd_{85}$