^{124}Sn(^{51}V,4nγ) 2005Ha71

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Coral M. Baglin, E. A. Mccutchan	NDS 151, 334 (2018)	30-Jun-2018

2005Ha71: E=228 MeV. Measured Eγ, Iγ, $\gamma\gamma$, $\gamma\gamma(\theta)$ with the Gammasphere array of 100 Compton-suppressed Ge detectors.
1985Ba48: E(^{51}V)=230 MeV. Enriched targets; TESSA2 array (6 Compton-suppressed Ge detectors and inner ball of 50 BGO crystals); measured Eγ, Iγ, Iγ(30°)/Iγ(90°) (normalized to be 1 for stretched Q transitions); cranked shell model and a semiclassical vector-coupling scheme used to interpret level structure.
No evidence was found by 2005Ha71 for wobbling mode excitation.

^{171}Ta Levels

E(level)†	Jπ	E(level)†	Jπ	E(level)†	Jπ	E(level)†	Jπ
0.0‡	5/2+	1311.0g 4	19/2−	3048.5h 5	31/2(−)	4961.6‡ 5	(45/2+)
31.3f 5	5/2−	1340.8d 4	19/2+	3081.5‡ 4	(33/2+)	5063.7c 6	(45/2+)
51.6& 3	7/2+	1353.4@ 3	21/2+	3179.1f 5	37/2−	5073.3j 6	47/2−
112.64# 16	7/2+	1378.1i 5	21/2−	3190.7c 4	(33/2+)	5245.4& 4	47/2+
118.2d 5	3/2+	1475.6f 4	25/2−	3259.7& 4	35/2+	5281.7f 5	49/2−
126.3f 4	9/2−	1479.9‡ 3	21/2+	3267.2j 5	35/2−	5322.5g 5	(47/2−)
182.2@ 3	9/2+	1594.4& 3	23/2+	3368.5# 4	35/2+	5357.9# 5	(47/2+)
235.2i 4	9/2−	1624.0j 5	23/2−	3422.0d 5	35/2+	5418.9d 6	47/2+
246.4c 5	5/2+	1630.4c 4	21/2+	3431.4g 5	35/2−	5428.5e 5	49/2+
251.56‡ 16	9/2+	1733.7# 3	23/2+	3518.9e 4	37/2+	5450.6i 6	49/2−
292.1d 5	7/2+	1782.7g 4	23/2−	3532.6i 5	37/2−	5535.8h 6	47/2(−)
323.6f 4	13/2−	1793.7d 4	23/2+	3568.0@ 3	37/2+	5584.8@ 4	49/2+
331.4g 6	(7/2−)	1845.6@ 3	25/2+	3610.4h 5	35/2(−)	5630.9a 6	(49/2+)
335.75& 25	11/2+	1889.6i 5	25/2−	3641.2‡ 4	(37/2+)	5731.7‡ 5	(49/2+)
365.8j 4	11/2−	1983.6‡ 3	25/2+	3768.7c 5	(37/2+)	5738.8c 9	(49/2+)
414.27# 19	11/2+	2000.5f 5	29/2−	3805.7j 5	39/2−	5821.8j 6	(51/2−)
491.5c 5	9/2+	2079.2e 3	25/2+	3829.2f 5	41/2−	5959.8& 4	51/2+
509.11@ 25	13/2+	2108.0& 3	27/2+	3887.1& 4	39/2+	6033.9b 5	51/2+
526.5i 4	13/2−	2120.5c 4	25/2+	3960.6# 4	(39/2+)	6072.3g 6	(51/2−)
573.3d 4	11/2+	2154.5j 5	27/2−	4017.0g 5	39/2−	6090.5f 6	53/2−
577.8g 5	(11/2−)	2257.4# 3	27/2+	4054.7d 5	39/2+	6114.7d 6	(51/2+)
596.41‡ 21	13/2+	2291.8d 4	27/2+	4093.1i 5	41/2−	6153.4# 7	(51/2+)
621.8f 4	17/2−	2304.8g 5	27/2−	4105.2e 4	41/2+	6167.0e 6	53/2+
699.74& 25	15/2+	2379.7@ 3	29/2+	4197.6@ 4	41/2+	6245.6i 6	(53/2−)
708.4j 4	15/2−	2434.1i 5	29/2−	4208.1h 5	39/2(−)	6292.9h 6	(51/2−)
798.29# 23	15/2+	2492.4e 3	29/2+	4268.2‡ 4	(41/2+)	6310.0@ 5	53/2+
816.9c 4	13/2+	2545.8‡ 3	29/2+	4389.2c 5	(41/2+)	6413.4a 5	(53/2+)
905.2@ 3	17/2+	2570.5f 5	33/2−	4399.9j 6	43/2−	6432.8c 9	(53/2+)
905.6g 5	15/2−	2646.8c 4	29/2+	4528.4f 5	45/2−	6542.1‡ 7	(53/2+)
916.2i 4	17/2−	2664.0& 3	31/2+	4542.8& 4	43/2+	6637.1j 6	(55/2−)
930.9d 4	15/2+	2711.4j 5	31/2−	4623.4# 4	(43/2+)	6689.8& 5	55/2+
1010.8f 4	21/2−	2806.3# 3	31/2+	4640.4g 5	43/2−	6847.9d 7	(55/2+)
1012.18‡ 24	17/2+	2836.0d 5	31/2+	4728.2d 6	43/2+	6861.8b 5	(55/2+)
1123.6& 3	19/2+	2859.4g 5	31/2−	4730.8i 6	45/2−	6888.9g 6	(55/2−)
1135.7j 5	19/2−	2953.1@ 3	33/2+	4741.3e 5	45/2+	6953.3f 6	57/2−
1201.8c 4	17/2+	2988.3e 3	33/2+	4845.3h 5	43/2(−)	6957.1e 6	57/2+
1243.46# 25	19/2+	2993.6i 5	33/2−	4866.8@ 4	45/2+	6986.2# 9	(55/2+)

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^{124}Sn(^{51}V,4nγ) 2005Ha71 (continued)

^{171}Ta Levels (continued)

E(level)†	Jπ	E(level)†	Jπ	E(level)†	Jπ	E(level)†	Jπ
7071.2[@] 5	57/2+	8152.8[a] 9	(61/2+)	9634.3[e] 7	69/2+	11785.7[@] 11	(77/2+)
7106.9[i] 7	(57/2−)	8214.1?[‡] 10	(61/2+)	9670.2?[#] 12	(67/2+)	12016.4[f] 9	(77/2−)
7263.8[a] 7	(57/2+)	8350.9[&] 5	(63/2+)	9736.0[@] 8	(69/2+)	12479.8[&] 12	(79/2+)
7370.1[‡] 9	(57/2+)	8438.8[j] 7	(63/2−)	9851.8[f] 7	(69/2−)	12770.1[e] 8	81/2+
7483.8[&] 5	59/2+	8473.2[d] 10	(63/2+)	10008.2[i] 11	(69/2−)	12881.0[@] 12	(81/2+)
7511.9[j] 7	(59/2−)	8681.9[b] 9	(63/2+)	10298.1[&] 9	(71/2+)	13125.3[f] 10	(81/2−)
7635.2[d] 8	(59/2+)	8690.9[e] 7	65/2+	10420.9[j] 10	(71/2−)	13916.0[e] 9	(85/2+)
7747.4[b] 7	(59/2+)	8760.2[#] 11	(63/2+)	10615.0?[b] 11	(71/2+)	14018.0[@] 16	(85/2+)
7774.9[g] 8	(59/2−)	8787.4[@] 6	65/2+	10628.6[e] 7	73/2+	14253.3?[f] 15	(85/2−)
7798.5[e] 6	61/2+	8835.8[f] 7	(65/2−)	10736.3[@] 9	(73/2+)	15110.6[e] 11	(89/2+)
7860.2[#] 10	(59/2+)	8997.1[i] 10	(65/2−)	10914.5[f] 7	(73/2−)	15191.0?[@] 14	(89/2+)
7868.8[f] 7	61/2−	9290.6[&] 7	(67/2+)	11364.6[&] 10	(75/2+)	16354.5[e] 12	(93/2+)
7896.9[@] 5	61/2+	9411.0[j] 9	(67/2−)	11447.9?[j] 11	(75/2−)	17643.5[e] 13	(97/2+)
8026.4[i] 8	(61/2−)	9633.0[b] 10	(67/2+)	11673.9[e] 8	77/2+	18978.5?[e] 14	(101/2+)

† From least-squares fit to Eγ. Normalized χ^2=0.32.

‡ Band(A): 5/2[402], α=+1/2. Two crossings at higher spins: the first at ħω ≈ 0.27 MeV due to the alignment of two lowest $i_{13/2}$ neutrons (AB); the second crossing at ħω ≈ 0.42 MeV due to the alignment of two $h_{11/2}$ protons (E_pF_p).

Band(a): 5/2[402], α=−1/2. See comment on +1/2 signature partner concerning two band crossings.

@ Band(b): 7/2[404], α=+1/2. Two crossings at higher spins, the first at ħω ≈ 0.26 MeV due to the alignment of two lowest $i_{13/2}$ neutrons (AB); the second crossing at ħω ≈ 0.35 MeV due to the alignment of two bc neutrons.

& Band(B): 7/2[404], α=−1/2. See comment on +1/2 signature partner concerning two band crossings.

a Band(C): Band based on (49/2+). This band feeds into 7/2[404] band; possible continuation of 7/2[404] band after AB alignment.

b Band(D): Band based on 51/2+. This band feeds into 7/2[404] band; may be continuation of 7/2[404] band after AB alignment.

c Band(E): 1/2[411], α=+1/2. Two crossings at higher spins, the first at ħω ≈ 0.27 MeV due to the alignment of two lowest $i_{13/2}$ neutrons (AB); the second crossing at ħω ≈ 0.34 MeV due to the alignment of two bc neutrons. Band parameters: E0=81.3, A=16.5, B=−49.6, a=−0.65 (J=3/2, 5/2, 7/2, 9/2, 11/2 members).

d Band(e): 1/2[411], α=−1/2. See comment for +1/2 signature partner for two band crossings.

e Band(F): 1/2[660].

f Band(G): 1/2[541], α=+1/2. Two crossings at higher spins: the first at ħω ≈ 0.29 MeV due to the alignment of two lowest $i_{13/2}$ neutrons (AB), the second crossing at ħω ≈ 0.54 MeV due to the alignment of two $h_{11/2}$ protons (E_pF_p). Band parameters: E0=54.2, A=9.2, B=11.4, a=3.81 (J=5/2, 7/2, 9/2, 11/2, 13/2 members).

g Band(g): 1/2[541], α=−1/2. Crossings at higher spins, at ħω ≈ 0.27 MeV due to the alignment of the two lowest $i_{13/2}$ neutrons (AB).

h Band(H): Band based on 31/2$^{(-)}$. This band feeds into 1/2[541] band.

i Band(I): 9/2[514], α=+1/2. Crossings at higher spins, at ħω ≈ 0.26 MeV due to the alignment of two lowest $i_{13/2}$ neutrons (AB).

j Band(i): 9/2[514], α=−1/2. See comment on +1/2 signature partner concerning two band crossings.

γ(^{171}Ta)

Eγ‡	Ei(level)	Jiπ	Ef	Jfπ
53#a	235.2	9/2−	182.2	9/2+
69#a	182.2	9/2+	112.64	7/2+
84#a	335.75	11/2+	251.56	9/2+

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^{124}Sn(^{51}V,4nγ) 2005Ha71 (continued)

γ(^{171}Ta) (continued)

E_γ[‡]	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.[†]	Comments
95[#a]		509.11	13/2$^+$	414.27	11/2$^+$		
95.1 *2*	≈22[&]	126.3	9/2$^-$	31.3	5/2$^-$		Mult.: R_{ang}=0.62 *5* (2005Ha71); very low for ΔJ=2 transition required by level scheme.
103[#a]		699.74	15/2$^+$	596.41	13/2$^+$		
112.6 *2*	≈23[&]	112.64	7/2$^+$	0.0	5/2$^+$	D	Mult.: R_{ang}=0.63 *6* (2005Ha71).
128.3 *5*	≈1[&]	246.4	5/2$^+$	118.2	3/2$^+$		Mult.: R_{ang}=0.72 *8* (2005Ha71).
130.5 *2*	≈38[@]	365.8	11/2$^-$	235.2	9/2$^-$	D	Mult.: R_{ang}=0.71 *3* (2005Ha71).
130.7 *2*	≈37[&]	182.2	9/2$^+$	51.6	7/2$^+$	D	Mult.: R_{ang}=0.69 *4* (2005Ha71).
138.9 *2*	31[@] *1*	251.56	9/2$^+$	112.64	7/2$^+$	D	Iγ/298.1g=0.330 (1985Ba48 At E=230 MeV). Mult.: R_{ang}=0.65 *4* (2005Ha71). Iγ(30°)/Iγ(90°)=1.0 *6* (1985Ba48).
153.5 *2*	29[@] *1*	335.75	11/2$^+$	182.2	9/2$^+$	D+Q	Mult.: R_{ang}=0.73 *4* (2005Ha71). Iγ(30°)/Iγ(90°)=0.40 *3* (1985Ba48).
160.7 *2*	45 *2*	526.5	13/2$^-$	365.8	11/2$^-$	(D)	Mult.: R_{ang}=0.71 *3* (2005Ha71).
162.7 *2*	21 *1*	414.27	11/2$^+$	251.56	9/2$^+$	D	Mult.: R_{ang}=0.63 *4* (2005Ha71).
173.4 *2*	24 *1*	509.11	13/2$^+$	335.75	11/2$^+$		Mult.: R_{ang}=0.79 *4* (2005Ha71). Iγ(30°)/Iγ(90°)=0.56 *4* (1985Ba48).
173.9 *2*	13[@]	292.1	7/2$^+$	118.2	3/2$^+$		Mult.: R_{ang}=0.81 *6* (2005Ha71); low for ΔJ=2 transition required by level scheme.
181.9 *2*	39 *2*	708.4	15/2$^-$	526.5	13/2$^-$		Iγ/298.1g=0.623 (1985Ba48 At E=230 MeV). Mult.: R_{ang}=0.77 *2* for unresolved doublet (2005Ha71). Iγ(30°)/Iγ(90°)=0.64 *2* (1985Ba48).
182.1 *2*	19.7 *8*	596.41	13/2$^+$	414.27	11/2$^+$	D	Mult.: R_{ang}=0.63 *4* (2005Ha71).
183.6 *2*		235.2	9/2$^-$	51.6	7/2$^+$	D	Mult.: R_{ang}=0.67 *5* (2005Ha71).
190.5 *2*	17.6 *9*	699.74	15/2$^+$	509.11	13/2$^+$		Mult.: R_{ang}=0.83 *5* (2005Ha71). Iγ(30°)/Iγ(90°)=0.73 *2* (1985Ba48).
197.3 *2*	83 *4*	323.6	13/2$^-$	126.3	9/2$^-$		Iγ/298.1g=0.688 (1985Ba48 At E=230 MeV). Mult.: R_{ang}=0.76 *3* (2005Ha71). Iγ(30°)/Iγ(90°)=0.70 *2* (1985Ba48).
199.4 *2*	3.4 *2*	491.5	9/2$^+$	292.1	7/2$^+$	D	Mult.: R_{ang}=0.58 *4* (2005Ha71).
200.5 *5*	0.8 *1*	2492.4	29/2$^+$	2291.8	27/2$^+$		
201.6 *2*	17.0 *9*	798.29	15/2$^+$	596.41	13/2$^+$	D	Iγ/298.1g=0.366 (1985Ba48 At E=230 MeV). Mult.: R_{ang}=0.63 *5* (2005Ha71). Iγ(30°)/Iγ(90°)=0.40 *2* (1985Ba48).
205.4 *2*	13.9 *6*	905.2	17/2$^+$	699.74	15/2$^+$	D+Q	Mult.: R_{ang}=0.78 *4* (2005Ha71).
207.7 *2*	41 *2*	916.2	17/2$^-$	708.4	15/2$^-$	D+Q	Iγ/298.1g=0.410 (1985Ba48 At E=230 MeV). Mult.: R_{ang}=0.73 *3* (2005Ha71). Iγ(30°)/Iγ(90°)=0.64 *2* (1985Ba48).
213.8 *2*	14.6 *7*	1012.18	17/2$^+$	798.29	15/2$^+$	D	Iγ/298.1g=0.226 (1985Ba48 At E=230 MeV). Mult.: R_{ang}=0.65 *4* (2005Ha71). Iγ(30°)/Iγ(90°)=0.64 *7* (1985Ba48).
218.4 *2*	10.5 *7*	1123.6	19/2$^+$	905.2	17/2$^+$	D+Q	Mult.: R_{ang}=0.77 *6* (2005Ha71).
219.5 *2*	32 *1*	1135.7	19/2$^-$	916.2	17/2$^-$	D+Q	Mult.: R_{ang}=0.74 *3* (2005Ha71).
229.7 *2*	7.7 *5*	1353.4	21/2$^+$	1123.6	19/2$^+$	D+Q	Mult.: R_{ang}=0.81 *6* (2005Ha71).
231.3 *2*	12.5 *6*	1243.46	19/2$^+$	1012.18	17/2$^+$	D	Mult.: R_{ang}=0.65 *5* (2005Ha71).
235.0 *2*	2.8 *2*	2492.4	29/2$^+$	2257.4	27/2$^+$		Iγ/298.1g=0.222 (1985Ba48 At E=230 MeV) for 237.2γ+238.5γ doublet. Mult.: R_{ang}=0.76 *9* (2005Ha71). Iγ(30°)/Iγ(90°)=0.68 *2* for 237.2γ+238.5γ (1985Ba48).
236.4 *2*	10.7 *6*	1479.9	21/2$^+$	1243.46	19/2$^+$	D	Mult.: R_{ang}=0.69 *4* (2005Ha71).
240.9 *2*	7.1 *7*	1594.4	23/2$^+$	1353.4	21/2$^+$		Mult.: R_{ang}=0.77 *5* (2005Ha71).
242.3 *2*	29 *1*	1378.1	21/2$^-$	1135.7	19/2$^-$	D+Q	Mult.: R_{ang}=0.75 *3* (2005Ha71).
243.5 *2*	2.6 *3*	816.9	13/2$^+$	573.3	11/2$^+$	D	Mult.: R_{ang}=0.66 *5* (2005Ha71).

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^{124}Sn(^{51}V,4nγ) 2005Ha71 (continued)

γ(^{171}Ta) (continued)

E_γ[‡]	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.[†]	Comments
245.1 *2*	3.4 *3*	491.5	9/2$^+$	246.4	5/2$^+$		Mult.: R_{ang}=0.83 *5* (2005Ha71); low for ΔJ=2 transition required by level scheme.
245.8 *2*	25 *1*	1624.0	23/2$^-$	1378.1	21/2$^-$		Iγ/298.1g=0.356 (1985Ba48 At E=230 MeV). Mult.: R_{ang}=0.74 *4*. Iγ(30°)/Iγ(90°)=0.71 *6* (1985Ba48). Iγ/298.1g=0.328 (1985Ba48 At E=230 MeV).
246.4 *5*	<0.5	577.8	(11/2$^-$)	331.4	(7/2$^-$)		
249.8 *2*	6.9 *4*	1983.6	25/2$^+$	1733.7	23/2$^+$	D	Mult.: R_{ang}=0.60 *5* (2005Ha71).
251.1 *2*	6.1 *4*	1845.6	25/2$^+$	1594.4	23/2$^+$		Mult.: R_{ang}=0.78 *6* (2005Ha71).
251.6 *2*	13.8[@] *8*	251.56	9/2$^+$	0.0	5/2$^+$		Iγ/298.1g=0.088 (1985Ba48 At E=230 MeV). Mult.: Iγ(30°)/Iγ(90°)=0.55 *4* (1985Ba48).
253.7 *2*	6.6 *5*	1733.7	23/2$^+$	1479.9	21/2$^+$	D+Q	Mult.: R_{ang}=0.80 *8* (2005Ha71).
254.2 *5*	<0.5	577.8	(11/2$^-$)	323.6	13/2$^-$		
260.4 *2*	2.5 *2*	596.41	13/2$^+$	335.75	11/2$^+$		
260.4 *2*	1.4 *1*	2806.3	31/2$^+$	2545.8	29/2$^+$		
260.8 *2*	1.5[@]	292.1	7/2$^+$	31.3	5/2$^-$		
262.3 *2*	4.1 *4*	2108.0	27/2$^+$	1845.6	25/2$^+$	D+Q	Iγ/298.1g=0.083 (1985Ba48 At E=230 MeV). Mult.: R_{ang}=0.88 *7* (2005Ha71).
264.8 *2*	23 *1*	2154.5	27/2$^-$	1889.6	25/2$^-$		Iγ/298.1g=0.727 (1985Ba48 At E=230 MeV) for doublet. Mult.: R_{ang}=0.69 *3* for 264.8γ+265.4γ+265.5γ (2005Ha71). Iγ(30°)/Iγ(90°)=0.76 *4* for 264.6γ+265.8γ (1985Ba48).
265.4 *2*	8.1 *6*	3532.6	37/2$^-$	3267.2	35/2$^-$	D	Mult.: R_{ang}=0.69 *3* for 264.8γ+265.4γ+265.5γ (2005Ha71).
265.5 *2*	24 *1*	1889.6	25/2$^-$	1624.0	23/2$^-$		Iγ/298.1g=0.727 (1985Ba48 At E=230 MeV). Mult.: R_{ang}=0.69 *3* for 264.8γ+265.4γ+265.5γ (2005Ha71). Iγ(30°)/Iγ(90°)=0.76 *4* for 264.6γ+265.8γ (1985Ba48).
270.9 *2*	2.0 *1*	1201.8	17/2$^+$	930.9	15/2$^+$		
271.7 *2*	4.0 *3*	2379.7	29/2$^+$	2108.0	27/2$^+$	D	Mult.: R_{ang}=0.71 *6* (2005Ha71).
273.1 *2*	5.4 *3*	3805.7	39/2$^-$	3532.6	37/2$^-$		Mult.: R_{ang}=0.64 *3* for 273.1γ+273.6γ (2005Ha71).
273.6 *2*	12.7 *6*	3267.2	35/2$^-$	2993.6	33/2$^-$		Mult.: R_{ang}=0.64 *3* for 273.1γ+273.6γ (2005Ha71).
273.9 *2*	5.1 *4*	2257.4	27/2$^+$	1983.6	25/2$^+$	D	Mult.: R_{ang}=0.62 *7* (2005Ha71).
275.0 *2*	2.1 *2*	3081.5	(33/2$^+$)	2806.3	31/2$^+$		
277.2 *2*	17.5 *9*	2711.4	31/2$^-$	2434.1	29/2$^-$		Iγ/298.1g=0.234 (1985Ba48 At E=230 MeV). Mult.: R_{ang}=0.72 *7* (2005Ha71). Iγ(30°)/Iγ(90°)=0.63 *3* (1985Ba48).
279.6 *2*	21 *1*	2434.1	29/2$^-$	2154.5	27/2$^-$	D	Iγ/298.1g=0.275 (1985Ba48 At E=230 MeV). Mult.: R_{ang}=0.72 *7* (2005Ha71). Iγ(30°)/Iγ(90°)=0.58 *4* (1985Ba48).
281.1 *2*	10.5 *7*	573.3	11/2$^+$	292.1	7/2$^+$		Mult.: R_{ang}=0.81 *4* (2005Ha71).
282.2 *2*	16.2 *8*	2993.6	33/2$^-$	2711.4	31/2$^-$	D+Q	Iγ/298.1g=0.277 (1985Ba48 At E=230 MeV). Mult.: R_{ang}=0.76 *5* (2005Ha71). Iγ(30°)/Iγ(90°)=0.76 *10* (1985Ba48).
284.0 *2*	23.9[@] *9*	335.75	11/2$^+$	51.6	7/2$^+$		Iγ/298.1g=0.300 (1985Ba48 At E=230 MeV). Mult.: R_{ang}=0.86 *4* (2005Ha71); low for ΔJ=2 transition. Iγ(30°)/Iγ(90°)=0.75 *6* (1985Ba48).
284.3 *2*	3.7 *4*	2664.0	31/2$^+$	2379.7	29/2$^+$		
287.0 *5*	0.6 *1*	3368.5	35/2$^+$	3081.5	(33/2$^+$)		
287.3 *2*	3.4 *3*	4093.1	41/2$^-$	3805.7	39/2$^-$	D	Mult.: R_{ang}=0.67 *4* (2005Ha71).
288.3 *2*	3.6 *2*	2545.8	29/2$^+$	2257.4	27/2$^+$	D	Mult.: R_{ang}=0.71 *6* (2005Ha71).
289.1 *2*	3.5 *2*	2953.1	33/2$^+$	2664.0	31/2$^+$		
289.4 *2*	3.2 *2*	798.29	15/2$^+$	509.11	13/2$^+$	D	Mult.: R_{ang}=0.58 *9* (2005Ha71).
289.7 *2*	1.8 *1*	1630.4	21/2$^+$	1340.8	19/2$^+$		
291.3 *2*	3.7 *4*	526.5	13/2$^-$	235.2	9/2$^-$		Mult.: R_{ang}=0.75 *6* (2005Ha71); very low for ΔJ=2 transition required by level scheme.

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^{124}Sn(^{51}V,4nγ) 2005Ha71 (continued)

$\gamma(^{171}Ta)$ (continued)

E_γ[‡]	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.[†]	Comments
298.2 *2*	97 *4*	621.8	17/2$^-$	323.6	13/2$^-$		Mult.: R_{ang}=0.86 *3* (2005Ha71). Iγ(30°)/Iγ(90°)=0.82 *2* (1985Ba48).
300.1 *5*	<0.5[&]	331.4	(7/2$^-$)	31.3	5/2$^-$		
301.6 *2*	9.9 *7*	414.27	11/2$^+$	112.64	7/2$^+$		Iγ/298.1g=0.065 (1985Ba48 At E=230 MeV). Mult.: R_{ang}=0.60 *7* (2005Ha71); very low for ΔJ=2 transition required by level scheme. Iγ(30°)/Iγ(90°)=0.83 *6* (1985Ba48).
306.6 *2*	2.4 *2*	3259.7	35/2$^+$	2953.1	33/2$^+$		
306.6 *2*	2.6 *2*	4399.9	43/2$^-$	4093.1	41/2$^-$	D	Mult.: R_{ang}=0.59 *3* (2005Ha71).
308.2 *2*	1.1 *1*	3568.0	37/2$^+$	3259.7	35/2$^+$		
310.5 *2*	2.2 *2*	4197.6	41/2$^+$	3887.1	39/2$^+$		
312.4 *2*	4.4 *3*	1012.18	17/2$^+$	699.74	15/2$^+$	D+Q	Mult.: R_{ang}=0.36 *5* (2005Ha71).
319.2 *2*	1.1 *1*	3887.1	39/2$^+$	3568.0	37/2$^+$		
323.9 *2*	1.8 *1*	4866.8	45/2$^+$	4542.8	43/2$^+$		
325.4 *2*	7.7 *3*	816.9	13/2$^+$	491.5	9/2$^+$		Mult.: R_{ang}=0.77 *4* (2005Ha71); very low for ΔJ=2 transition required by level scheme.
327.0 *2*	40 *2*	509.11	13/2$^+$	182.2	9/2$^+$	Q	Iγ/298.1g=0.345 (1985Ba48 At E=230 MeV). Mult.: R_{ang}=0.75 *4* (2005Ha71). Iγ(30°)/Iγ(90°)=1.03 *7* (1985Ba48).
327.8 *2*	1.1 *1*	905.6	15/2$^-$	577.8	(11/2$^-$)		
330.9 *2*	2.8 *2*	4730.8	45/2$^-$	4399.9	43/2$^-$	D	Mult.: R_{ang}=0.67 *5* (2005Ha71).
338.2 *2*	2.3 *2*	1243.46	19/2$^+$	905.2	17/2$^+$	D	Mult.: R_{ang}=0.54 *7* (2005Ha71).
339.3 *2*	1.1 *1*	5584.8	49/2$^+$	5245.4	47/2$^+$		
342.6 *2*	18 *1*	708.4	15/2$^-$	365.8	11/2$^-$		Iγ/298.1g=0.077 (1985Ba48 At E=230 MeV). Mult.: R_{ang}=0.88 *4* (2005Ha71). Iγ(30°)/Iγ(90°)=1.11 *10* (1985Ba48).
342.6 *2*	1.3 *1*	5073.3	47/2$^-$	4730.8	45/2$^-$		
344.9 *2*	18.3 *8*	596.41	13/2$^+$	251.56	9/2$^+$		Iγ/298.1g=0.154 (1985Ba48 At E=230 MeV). Mult.: R_{ang}=0.74 *4* (2005Ha71). Iγ(30°)/Iγ(90°)=0.92 *8* (1985Ba48).
345.0 *2*	1.5 *1*	4542.8	43/2$^+$	4197.6	41/2$^+$		
345.5 *5*	<0.5	2079.2	25/2$^+$	1733.7	23/2$^+$		
349.9 *5*	0.7 *1*	6310.0	53/2$^+$	5959.8	51/2$^+$		
356.5 *2*	2.7 *2*	1479.9	21/2$^+$	1123.6	19/2$^+$	D	Mult.: R_{ang}=0.62 *9* (2005Ha71).
357.6 *2*	9.4 *5*	930.9	15/2$^+$	573.3	11/2$^+$		Mult.: R_{ang}=0.87 *4* (2005Ha71).
364.1 *2*	41 *2*	699.74	15/2$^+$	335.75	11/2$^+$		Iγ/298.1g=0.373 (1985Ba48 At E=230 MeV). Mult.: R_{ang}=0.84 *4* (2005Ha71). Iγ(30°)/Iγ(90°)=1.08 *6* (1985Ba48).
371.1 *5*	0.8 *1*	5821.8	(51/2$^-$)	5450.6	49/2$^-$		
374.8 *2*	1.0 *1*	5959.8	51/2$^+$	5584.8	49/2$^+$		
377.3 *5*	0.9 *1*	5450.6	49/2$^-$	5073.3	47/2$^-$		
378.6 *2*	1.4 *1*	5245.4	47/2$^+$	4866.8	45/2$^+$		
379.8 *5*	<0.5	6689.8	55/2$^+$	6310.0	53/2$^+$		
380.4 *2*	2.2 *2*	1733.7	23/2$^+$	1353.4	21/2$^+$	D	Mult.: R_{ang}=0.54 *5* (2005Ha71).
384.0 *2*	16.7 *9*	798.29	15/2$^+$	414.27	11/2$^+$		Iγ/298.1g=0.188 (1985Ba48 At E=230 MeV). Mult.: R_{ang}=0.71 *5* (2005Ha71); very low for ΔJ=2 transition required by level scheme. Iγ(30°)/Iγ(90°)=0.95 *6* (1985Ba48).
384.9 *2*	9.4 *5*	1201.8	17/2$^+$	816.9	13/2$^+$		Mult.: R_{ang}=0.79 *5* (2005HA71) suggests D+Q transition, however, ΔJ^π requires E2 multipolarity.
388.9 *2*	100 *4*	1010.8	21/2$^-$	621.8	17/2$^-$	Q	Iγ/298.1g=0.909 (1985Ba48 At E=230 MeV). Mult.: R_{ang}=0.92 *2* (2005Ha71). Iγ(30°)/Iγ(90°) normalized to 1.00.
389.2 *2*	2.1 *2*	1983.6	25/2$^+$	1594.4	23/2$^+$	D	Mult.: R_{ang}=0.64 *8* (2005Ha71).
389.7 *2*	21 *1*	916.2	17/2$^-$	526.5	13/2$^-$		Mult.: R_{ang}=0.87 *3* (2005Ha71).
396.1 *2*	42 *2*	905.2	17/2$^+$	509.11	13/2$^+$		Iγ/298.1g=0.455 (1985Ba48 At E=230 MeV).

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^{124}Sn(^{51}V,4nγ) 2005Ha71 (continued)

$\gamma(^{171}Ta)$ (continued)

E_γ[‡]	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.[†]	Comments
							Mult.: R_{ang}=0.88 *5* (2005Ha71). Iγ(30°)/Iγ(90°)=1.07 *9* (1985Ba48).
405.4 *2*	1.7 *2*	1311.0	19/2$^-$	905.6	15/2$^-$		
409.9 *2*	9.4 *5*	1340.8	19/2$^+$	930.9	15/2$^+$	(Q)	Mult.: R_{ang}=0.90 *4* (2005Ha71).
411.7 *2*	1.4 *1*	2257.4	27/2$^+$	1845.6	25/2$^+$		
413.0 *5*	<0.5	7483.8	59/2$^+$	7071.2	57/2$^+$		
413.1 *2*	4.1 *2*	2492.4	29/2$^+$	2079.2	25/2$^+$	Q	Mult.: R_{ang}=0.94 *5* (2005Ha71).
415.8 *2*	20 *1*	1012.18	17/2$^+$	596.41	13/2$^+$		Iγ/298.1g=0.265 (1985Ba48 At E=230 MeV). Mult.: R_{ang}=0.89 *5* (2005Ha71). Iγ(30°)/Iγ(90°)=1.38 *20* (1985Ba48).
423.9 *2*	43 *2*	1123.6	19/2$^+$	699.74	15/2$^+$	(Q)	Iγ/298.1g=0.363 (1985Ba48 At E=230 MeV). Mult.: R_{ang}=0.90 *4* (2005Ha71). Iγ(30°)/Iγ(90°)=0.95 *5* (1985Ba48).
424.0 *5*	<0.5	6245.6	(53/2$^-$)	5821.8	(51/2$^-$)		
425.6 *5*	<0.5	2806.3	31/2$^+$	2379.7	29/2$^+$		
427.3 *2*	21 *1*	1135.7	19/2$^-$	708.4	15/2$^-$	Q	Iγ/298.1g=0.261 (1985Ba48 At E=230 MeV). Mult.: R_{ang}=0.95 *3* (2005Ha71). Iγ(30°)/Iγ(90°)=1.19 *7* (1985Ba48).
428.6 *2*	11.6 *8*	1630.4	21/2$^+$	1201.8	17/2$^+$	Q	Mult.: R_{ang}=1.06 *5* (2005Ha71).
437.7 *5*	0.9 *1*	2545.8	29/2$^+$	2108.0	27/2$^+$		
442.4 *2*	3.3 *2*	2988.3	33/2$^+$	2545.8	29/2$^+$		
445.2 *2*	17.2 *9*	1243.46	19/2$^+$	798.29	15/2$^+$	Q	Iγ/298.1g=0.275 (1985Ba48 At E=230 MeV). Mult.: R_{ang}=0.88 *6* (2005Ha71). Iγ(30°)/Iγ(90°)=0.98 *21* (1985Ba48).
447.1 *2*	1.5 *1*	573.3	11/2$^+$	126.3	9/2$^-$	D	Mult.: R_{ang}=0.7 *1* (2005Ha71).
448.3 *2*	42 *2*	1353.4	21/2$^+$	905.2	17/2$^+$	Q	Iγ/298.1g=0.580 (1985Ba48 At E=230 MeV). Mult.: R_{ang}=0.95 *4* (2005Ha71). Iγ(30°)/Iγ(90°)=1.02 *4* (1985Ba48).
448.8 *2*	8.4 *5*	2079.2	25/2$^+$	1630.4	21/2$^+$	Q	Mult.: R_{ang}=0.95 *4* (2005Ha71).
451.7 *5*	0.8 *1*	577.8	(11/2$^-$)	126.3	9/2$^-$		
452.9 *2*	9.2 *5*	1793.7	23/2$^+$	1340.8	19/2$^+$		Mult.: R_{ang}=0.83 *5* (2005Ha71).
462.0 *2*	26 *1*	1378.1	21/2$^-$	916.2	17/2$^-$	Q	Iγ/298.1g=0.418 (1985Ba48 At E=230 MeV). Mult.: R_{ang}=0.91 *4* (2005Ha71). Iγ(30°)/Iγ(90°)=0.96 *19* (1985Ba48).
464.9 *2*	97 *4*	1475.6	25/2$^-$	1010.8	21/2$^-$	Q	Iγ/298.1g=0.800 (1985Ba48 At E=230 MeV). Mult.: R_{ang}=0.99 *2* (2005Ha71). Iγ(30°)/Iγ(90°)=1.03 *6* (1985Ba48).
466.6 *2*	1.9 *2*	2545.8	29/2$^+$	2079.2	25/2$^+$	Q	Mult.: R_{ang}=1.1 *1* (2005Ha71).
467.6 *2*	21 *1*	1479.9	21/2$^+$	1012.18	17/2$^+$		Iγ/298.1g=0.310 (1985Ba48 At E=230 MeV). Mult.: R_{ang}=0.85 *5* (2005Ha71). Iγ(30°)/Iγ(90°)=1.2 *3* (1985Ba48).
470.8 *2*	44 *2*	1594.4	23/2$^+$	1123.6	19/2$^+$	Q	Iγ/298.1g=0.413 (1985Ba48 At E=230 MeV). Mult.: R_{ang}=0.97 *4* (2005Ha71). Iγ(30°)/Iγ(90°)=0.92 *5* (1985Ba48).
471.8 *2*	2.5 *3*	1782.7	23/2$^-$	1311.0	19/2$^-$	Q	Mult.: R_{ang}=1.0 *1* (2005Ha71).
488.4 *2*	27 *1*	1624.0	23/2$^-$	1135.7	19/2$^-$	Q	Mult.: R_{ang}=0.91 *4* (2005Ha71). Iγ(30°)/Iγ(90°)=0.99 *4* (1985Ba48).
490.1 *2*	3.5 *3*	2120.5	25/2$^+$	1630.4	21/2$^+$		Mult.: R_{ang}=0.77 *6* (2005Ha71).
490.3 *2*	16.0 *9*	1733.7	23/2$^+$	1243.46	19/2$^+$	Q	Iγ/298.1g=0.398 (1985Ba48 At E=230 MeV). Mult.: R_{ang}=1.06 *7* (2005Ha71). Iγ(30°)/Iγ(90°)=1.04 *4* (1985Ba48).
492.3 *2*	42 *2*	1845.6	25/2$^+$	1353.4	21/2$^+$	Q	Iγ/298.1g=0.382 (1985Ba48 At E=230 MeV). Mult.: R_{ang}=0.96 *4* (2005Ha71). Iγ(30°)/Iγ(90°)=1.27 *8* (1985Ba48).
496.0 *2*	34 *5*	2988.3	33/2$^+$	2492.4	29/2$^+$	(Q)	Iγ/298.1g=0.102 (1985Ba48 At E=230 MeV).

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^{124}Sn(^{51}V,4nγ) 2005Ha71 (continued)

$\gamma(^{171}Ta)$ (continued)

E_γ[‡]	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.[†]	Comments
							Mult.: R_{ang}=0.88 *4* (2005Ha71). Iγ(30°)/Iγ(90°)=1.20 *7* (1985Ba48).
498.1 *2*	9.7 *6*	2291.8	27/2$^+$	1793.7	23/2$^+$	Q	Mult.: R_{ang}=0.91 *5* (2005Ha71).
503.7 *2*	26 *1*	1983.6	25/2$^+$	1479.9	21/2$^+$		Mult.: R_{ang}=0.88 *4* (2005Ha71).
508.9 *2*	25 *1*	2492.4	29/2$^+$	1983.6	25/2$^+$		Iγ/298.1g=0.480 (1985Ba48 At E=230 MeV). Mult.: R_{ang}=0.88 *3* (2005Ha71). Iγ(30°)/Iγ(90°)=0.89 *6* (1985Ba48).
511.5 *2*	31 *1*	1889.6	25/2$^-$	1378.1	21/2$^-$		Iγ/298.1g=0.429 (1985Ba48 At E=230 MeV). Mult.: R_{ang}=0.86 *6* (2005Ha71). Iγ(30°)/Iγ(90°)=0.50 *2* (1985Ba48).
513.7 *2*	43 *2*	2108.0	27/2$^+$	1594.4	23/2$^+$	Q	Iγ/298.1g=0.461 (1985Ba48 At E=230 MeV). Mult.: R_{ang}=0.91 *4* (2005Ha71). Iγ(30°)/Iγ(90°)=0.96 *5* (1985Ba48).
522.1 *2*	3.4 *4*	2304.8	27/2$^-$	1782.7	23/2$^-$	(Q)	Mult.: R_{ang}=1.5 *2*.
523.6 *2*	13.1 *8*	2257.4	27/2$^+$	1733.7	23/2$^+$	Q	Mult.: R_{ang}=1.1 *1* (2005Ha71).
524.7 *2*	85 *4*	2000.5	29/2$^-$	1475.6	25/2$^-$	Q	Mult.: R_{ang}=1.03 *2* (2005Ha71).
526.3 *2*	3.0 *2*	2646.8	29/2$^+$	2120.5	25/2$^+$		Mult.: R_{ang}=0.8 *1* (2005Ha71).
530.5 *2*	28 *1*	2154.5	27/2$^-$	1624.0	23/2$^-$		Mult.: R_{ang}=0.89 *6* (2005Ha71).
530.5 *2*	34 *1*	3518.9	37/2$^+$	2988.3	33/2$^+$	Q	Mult.: R_{ang}=0.97 *3* (2005Ha71).
534.2 *2*	43 *2*	2379.7	29/2$^+$	1845.6	25/2$^+$	Q	Iγ/298.1g=0.390 (1985Ba48 At E=230 MeV). Mult.: R_{ang}=1.02 *4* (2005Ha71). Iγ(30°)/Iγ(90°)=1.15 *5* (1985Ba48).
535.8 *2*	6.1 *4*	3081.5	(33/2$^+$)	2545.8	29/2$^+$		
538.5 *2*	6.5 *4*	3805.7	39/2$^-$	3267.2	35/2$^-$		Iγ/298.1g=0.126 (1985Ba48 At E=230 MeV). Mult.: R_{ang}=1.05 *4* for 538.5γ+538.9γ (2005Ha71). Iγ(30°)/Iγ(90°)=0.89 *10* (1985Ba48).
538.9 *2*	15 *1*	3532.6	37/2$^-$	2993.6	33/2$^-$	Q	Mult.: R_{ang}=1.05 *4* for 538.5γ+538.9γ (2005Ha71).
543.9 *2*	2.8 *2*	3190.7	(33/2$^+$)	2646.8	29/2$^+$		
544.2 *2*	9.2 *6*	2836.0	31/2$^+$	2291.8	27/2$^+$	Q	Mult.: R_{ang}=1.14 *7* (2005Ha71).
544.5 *2*	26 *1*	2434.1	29/2$^-$	1889.6	25/2$^-$	Q	Iγ/298.1g=0.281 (1985Ba48 At E=230 MeV). Mult.: R_{ang}=1.11 *7* (2005Ha71). Iγ(30°)/Iγ(90°)=0.98 *9* (1985Ba48).
549.0 *2*	9.7 *7*	2806.3	31/2$^+$	2257.4	27/2$^+$	Q	Iγ/298.1g=0.207 (1985Ba48 At E=230 MeV). Mult.: R_{ang}=1.13 *8* (2005Ha71).
554.6 *2*	4.7 *4*	2859.4	31/2$^-$	2304.8	27/2$^-$		
555.7 *2*	16 *1*	3267.2	35/2$^-$	2711.4	31/2$^-$		Mult.: R_{ang}=0.86 *4* for 555.7γ+557.1γ (2005Ha71).
556.0 *2*	41 *2*	2664.0	31/2$^+$	2108.0	27/2$^+$	Q	Mult.: R_{ang}=1.03 *4* (2005Ha71).
557.1 *2*	26 *1*	2711.4	31/2$^-$	2154.5	27/2$^-$		Mult.: R_{ang}=0.86 *4* for 555.7+557.1 (2005Ha71).
559.5 *2*	25 *1*	2993.6	33/2$^-$	2434.1	29/2$^-$		Mult.: R_{ang}=1.04 *5* for 559.5γ+560.5γ (2005Ha71).
559.6 *2*	4.9 *5*	3641.2	(37/2$^+$)	3081.5	(33/2$^+$)		
560.5 *2*	6.1 *6*	4093.1	41/2$^-$	3532.6	37/2$^-$	Q	Mult.: R_{ang}=1.04 *5* for 559.5γ+560.5γ (2005Ha71).
562.0 *2*	1.4 *1*	3610.4	35/2$^{(-)}$	3048.5	31/2$^{(-)}$		Mult.: R_{ang}=0.86 *7* (2005Ha71).
562.1 *2*	8.8 *7*	2545.8	29/2$^+$	1983.6	25/2$^+$	Q	Mult.: R_{ang}=1.12 *8* (2005Ha71).
562.2 *2*	5.1 *4*	3368.5	35/2$^+$	2806.3	31/2$^+$	Q	Mult.: R_{ang}=1.12 *8* (2005Ha71).
565.8 *2*	10.5 *7*	3518.9	37/2$^+$	2953.1	33/2$^+$	Q	Mult.: R_{ang}=0.94 *6* (2005Ha71).
567.6 *2*	1.8 *2*	2646.8	29/2$^+$	2079.2	25/2$^+$		
570.1 *2*	75 *3*	2570.5	33/2$^-$	2000.5	29/2$^-$	Q	Iγ/298.1g=0.288 (1985Ba48 At E=230 MeV). Mult.: R_{ang}=1.01 *2* (2005Ha71). Iγ(30°)/Iγ(90°)=1.05 *4* (1985Ba48).
572.0 *2*	4.1 *4*	3431.4	35/2$^-$	2859.4	31/2$^-$		
573.5 *2*	33 *2*	2953.1	33/2$^+$	2379.7	29/2$^+$	Q	Iγ/298.1g=0.229 (1985Ba48 At E=230 MeV). Mult.: R_{ang}=1.00 *4* (2005Ha71). Iγ(30°)/Iγ(90°)=1.06 *6* (1985Ba48).
578.0 *2*	1.8 *1*	3768.7	(37/2$^+$)	3190.7	(33/2$^+$)		
579.7 *2*	4.1 *4*	3568.0	37/2$^+$	2988.3	33/2$^+$		Mult.: R_{ang}=0.8 *1* (2005Ha71).
581.9 *5*	0.8 *1*	905.6	15/2$^-$	323.6	13/2$^-$	D+Q	Mult.: R_{ang}=0.48 *7* (2005Ha71).

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^{124}Sn(^{51}V,4nγ) 2005Ha71 (continued)

$\gamma(^{171}Ta)$ (continued)

E_γ ‡	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult. †	Comments
585.7 *2*	3.1 *3*	4017.0	39/2$^-$	3431.4	35/2$^-$	Q	Mult.: R_{ang}=1.2 *1* (2005Ha71).
586.0 *2*	7.9 *5*	3422.0	35/2$^+$	2836.0	31/2$^+$	Q	Mult.: R_{ang}=1.08 *5* (2005Ha71).
586.3 *2*	35 *1*	4105.2	41/2$^+$	3518.9	37/2$^+$	Q	Iγ/298.1g=0.561 (1985Ba48 At E=230 MeV). Mult.: R_{ang}=1.02 *3* (2005Ha71). Iγ(30°)/Iγ(90°)=1.47 *10* (1985Ba48).
592.0 *2*	3.9 *3*	3960.6	(39/2$^+$)	3368.5	35/2$^+$		
594.3 *2*	6.1 *4*	4399.9	43/2$^-$	3805.7	39/2$^-$		Mult.: R_{ang}=0.87 *4* (2005Ha71).
595.8 *2*	31 *2*	3259.7	35/2$^+$	2664.0	31/2$^+$	Q	Iγ/298.1g=0.372 (1985Ba48 At E=230 MeV). Mult.: R_{ang}=0.92 *4* (2005Ha71).
597.7 *2*	2.8 *3*	4208.1	39/2$^{(-)}$	3610.4	35/2$^{(-)}$	Q	Mult.: R_{ang}=1.1 *1* (2005Ha71).
607.2 *2*	2.1 *2*	930.9	15/2$^+$	323.6	13/2$^-$	D	Mult.: R_{ang}=0.72 *5* (2005Ha71).
608.5 *2*	59 *3*	3179.1	37/2$^-$	2570.5	33/2$^-$	Q	Iγ/298.1g=0.213 (1985Ba48 At E=230 MeV). Mult.: R_{ang}=1.01 *2* (2005Ha71). Iγ(30°)/Iγ(90°)=1.00 *5* (1985Ba48).
608.8 *2*	6.9 *5*	2988.3	33/2$^+$	2379.7	29/2$^+$	Q	R_{ang}=1.07 *8* (2005Ha71).
614.8 *2*	22 *1*	3568.0	37/2$^+$	2953.1	33/2$^+$	Q	Iγ/298.1g=0.091 (1985Ba48 At E=230 MeV). Mult.: R_{ang}=1.09 *6* (2005Ha71).
620.5 *2*	1.6 *1*	4389.2	(41/2$^+$)	3768.7	(37/2$^+$)		
623.4 *2*	2.9 *3*	4640.4	43/2$^-$	4017.0	39/2$^-$	Q	Mult.: R_{ang}=1.3 *1* (2005Ha71).
627.0 *2*	3.3 *2*	4268.2	(41/2$^+$)	3641.2	(37/2$^+$)		
627.4 *2*	20 *1*	3887.1	39/2$^+$	3259.7	35/2$^+$		Iγ/298.1g=0.154 (1985Ba48 At E=230 MeV); for doublet. Mult.: Iγ(30°)/Iγ(90°)=0.53 *9* for 627.2γ+628.8γ (1985Ba48).
629.6 *2*	14 *1*	4197.6	41/2$^+$	3568.0	37/2$^+$		Iγ/298.1g=0.154 (1985Ba48 At E=230 MeV); for doublet. Mult.: Iγ(30°)/Iγ(90°)=0.53 *9* for 627.2γ+628.8γ (1985Ba48).
632.7 *2*	5.5 *4*	4054.7	39/2$^+$	3422.0	35/2$^+$	Q	Mult.: R_{ang}=1.24 *7* (2005Ha71).
636.1 *2*	29 *1*	4741.3	45/2$^+$	4105.2	41/2$^+$	Q	Iγ/298.1g=0.405 (1985Ba48 At E=230 MeV). Mult.: R_{ang}=1.02 *3* (2005Ha71). Iγ(30°)/Iγ(90°)=1.06 *7* (1985Ba48).
637.1 *2*	3.0 *3*	4845.3	43/2$^{(-)}$	4208.1	39/2$^{(-)}$		Mult.: R_{ang}=0.78 *8* (2005Ha71); very low for ΔJ=2 transition required by level scheme.
637.8 *2*	5.6 *4*	4730.8	45/2$^-$	4093.1	41/2$^-$	Q	Mult.: R_{ang}=1.12 *7* (2005Ha71).
650.1 *2*	43 *2*	3829.2	41/2$^-$	3179.1	37/2$^-$	Q	Iγ/298.1g=0.342 (1985Ba48 At E=230 MeV). Mult.: R_{ang}=1.05 *3* (2005Ha71). Iγ(30°)/Iγ(90°)=1.04 *10* (1985Ba48).
655.7 *2*	12 *1*	4542.8	43/2$^+$	3887.1	39/2$^+$	Q	Iγ/298.1g=0.118 (1985Ba48 At E=230 MeV). Mult.: R_{ang}=1.01 *7* (2005Ha71). Iγ(30°)/Iγ(90°)=1.40 *15*.
662.8 *2*	2.1 *2*	4623.4	(43/2$^+$)	3960.6	(39/2$^+$)		
669.3 *2*	10.0 *7*	4866.8	45/2$^+$	4197.6	41/2$^+$	Q	Mult.: R_{ang}=1.03 *8* (2005Ha71).
673.4 *2*	4.1 *3*	5073.3	47/2$^-$	4399.9	43/2$^-$	Q	Mult.: R_{ang}=0.91 *5* (2005Ha71).
673.5 *2*	4.3 *4*	4728.2	43/2$^+$	4054.7	39/2$^+$	Q	Mult.: R_{ang}=1.01 *7* (2005Ha71).
674.5 *2*	0.8 *1*	5063.7	(45/2$^+$)	4389.2	(41/2$^+$)		
675.1 *5*	<0.5	5738.8	(49/2$^+$)	5063.7	(45/2$^+$)		
682.1 *2*	4.3 *5*	5322.5	(47/2$^-$)	4640.4	43/2$^-$		
687.2 *2*	25 *1*	5428.5	49/2$^+$	4741.3	45/2$^+$	Q	Iγ/298.1g=0.337 (1985Ba48 At E=230 MeV). Mult.: R_{ang}=1.07 *4* (2005Ha71). Iγ(30°)/Iγ(90°)=1.20 *10* (1985Ba48).
688.3 *5*	0.8 *1*	3641.2	(37/2$^+$)	2953.1	33/2$^+$		
689.4 *2*	1.1 *1*	1311.0	19/2$^-$	621.8	17/2$^-$	D	Mult.: R_{ang}=0.41 *6* (2005Ha71).
690.5 *2*	2.4 *3*	5535.8	47/2$^{(-)}$	4845.3	43/2$^{(-)}$	Q	Mult.: R_{ang}=1.2 *1* (2005Ha71).
690.7 *2*	2.6 *2*	5418.9	47/2$^+$	4728.2	43/2$^+$	Q	Mult.: R_{ang}=0.94 *9* (2005Ha71).
693.4 *2*	1.9 *2*	4961.6	(45/2$^+$)	4268.2	(41/2$^+$)		
694.0 *5*	<0.5	6432.8	(53/2$^+$)	5738.8	(49/2$^+$)		
695.8 *2*	1.8 *2*	6114.7	(51/2$^+$)	5418.9	47/2$^+$		
699.2 *2*	29 *1*	4528.4	45/2$^-$	3829.2	41/2$^-$	Q	Iγ/298.1g=0.230 (1985Ba48 At E=230 MeV).

Continued on next page (footnotes at end of table)

^{124}Sn(^{51}V,4nγ) 2005Ha71 (continued)

$\gamma(^{171}Ta)$ (continued)

E_γ ‡	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult. †	Comments
							Mult.: R_{ang}=1.04 *3* (2005Ha71). Iγ(30°)/Iγ(90°)=0.94 *6* (1985Ba48).
700.6 *5*	0.8 *1*	4268.2	(41/2$^+$)	3568.0	37/2$^+$		
700.9 *5*	0.8 *1*	3960.6	(39/2$^+$)	3259.7	35/2$^+$		
702.6 *2*	6.2 *5*	5245.4	47/2$^+$	4542.8	43/2$^+$	Q	Mult.: R_{ang}=1.05 *9* (2005Ha71).
714.4 *2*	4.1 *3*	5959.8	51/2$^+$	5245.4	47/2$^+$	Q	Mult.: R_{ang}=1.05 *8* (2005Ha71).
718.1 *2*	6.4 *5*	5584.8	49/2$^+$	4866.8	45/2$^+$	Q	Mult.: R_{ang}=1.12 *9* (2005Ha71).
719.0 *2*	2.3 *2*	1340.8	19/2$^+$	621.8	17/2$^-$	D	Mult.: R_{ang}=0.64 *5* (2005Ha71).
719.8 *2*	3.6 *2*	5450.6	49/2$^-$	4730.8	45/2$^-$	Q	Mult.: R_{ang}=1.1 *1* (2005Ha71).
725.3 *2*	5.1 *4*	6310.0	53/2$^+$	5584.8	49/2$^+$	Q	Mult.: R_{ang}=1.19 *9* (2005Ha71).
730.0 *2*	2.5 *2*	6689.8	55/2$^+$	5959.8	51/2$^+$	Q	Mult.: R_{ang}=1.3 *1* (2005Ha71).
733.2 *2*	1.2 *1*	6847.9	(55/2$^+$)	6114.7	(51/2$^+$)		
734.5 *2*	1.4 *1*	5357.9	(47/2$^+$)	4623.4	(43/2$^+$)		
736.4 *5*	0.7 *1*	4623.4	(43/2$^+$)	3887.1	39/2$^+$		
738.5 *2*	19 *1*	6167.0	53/2$^+$	5428.5	49/2$^+$	Q	Iγ/298.1g=0.256 (1985Ba48 At E=230 MeV). Mult.: R_{ang}=1.08 *4* (2005Ha71). Iγ(30°)/Iγ(90°)=1.08 *7* (1985Ba48).
748.5 *2*	2.9 *4*	5821.8	(51/2$^-$)	5073.3	47/2$^-$		
749.6 *2*	3.8 *4*	6072.3	(51/2$^-$)	5322.5	(47/2$^-$)		
753.5 *2*	19.2 *8*	5281.7	49/2$^-$	4528.4	45/2$^-$	Q	Iγ/298.1g=0.184 (1985Ba48 At E=230 MeV). Mult.: R_{ang}=1.08 *4* (2005Ha71). Iγ(30°)/Iγ(90°)=1.3 *4* (1985Ba48).
757.1 *2*	1.2 *1*	6292.9	(51/2$^-$)	5535.8	47/2$^{(-)}$		
761.3 *2*	3.4 *2*	7071.2	57/2$^+$	6310.0	53/2$^+$	Q	Mult.: R_{ang}=0.95 *8* (2005Ha71).
764.2 *5*	0.6 *1*	5630.9	(49/2$^+$)	4866.8	45/2$^+$		
770.1 *2*	1.2 *1*	5731.7	(49/2$^+$)	4961.6	(45/2$^+$)		
771.8 *2*	2.3 *3*	1782.7	23/2$^-$	1010.8	21/2$^-$		
782.5 *5*	<0.5	6413.4	(53/2$^+$)	5630.9	(49/2$^+$)		
783.0 *2*	3.3 *2*	1793.7	23/2$^+$	1010.8	21/2$^-$	D	Mult.: R_{ang}=0.59 *6* (2005Ha71).
787.3 *5*	0.8 *1*	7635.2	(59/2$^+$)	6847.9	(55/2$^+$)		
788.5 *2*	1.2 *1*	6033.9	51/2$^+$	5245.4	47/2$^+$	Q	Mult.: R_{ang}=1.2 *1* (2005Ha71).
790.1 *2*	14.4 *7*	6957.1	57/2$^+$	6167.0	53/2$^+$	Q	Iγ/298.1g=0.152 (1985Ba48 At E=230 MeV). Mult.: R_{ang}=1.18 *4* (2005Ha71). Iγ(30°)/Iγ(90°)=0.92 *7* (1985Ba48).
790.7 *2*	1.3 *2*	6072.3	(51/2$^-$)	5281.7	49/2$^-$		
793.9 *2*	2.4 *2*	7483.8	59/2$^+$	6689.8	55/2$^+$	Q	Mult.: R_{ang}=1.1 *1* (2005Ha71).
794.1 *2*	1.6 *2*	5322.5	(47/2$^-$)	4528.4	45/2$^-$		
795.0 *2*	2.7 *2*	6245.6	(53/2$^-$)	5450.6	49/2$^-$		
795.5 *5*	0.9 *1*	6153.4	(51/2$^+$)	5357.9	(47/2$^+$)		
798.2 *5*	0.6 *1*	6888.9	(55/2$^-$)	6090.5	53/2$^-$		
808.8 *2*	12.2 *5*	6090.5	53/2$^-$	5281.7	49/2$^-$	Q	Iγ/298.1g=0.161 (1985Ba48 At E=230 MeV). Mult.: R_{ang}=1.11 *5* (2005Ha71). Iγ(30°)/Iγ(90°)=0.90 *12* (1985Ba48).
810.4 *5*	0.7 *1*	6542.1	(53/2$^+$)	5731.7	(49/2$^+$)		
811.2 *2*	1.7 *2*	4640.4	43/2$^-$	3829.2	41/2$^-$		
815.3 *2*	1.9 *2*	6637.1	(55/2$^-$)	5821.8	(51/2$^-$)		
816.2 *2*	2.7 *2*	2291.8	27/2$^+$	1475.6	25/2$^-$	D	Mult.: R_{ang}=0.66 *8* (2005Ha71).
816.6 *2*	1.7 *2*	6888.9	(55/2$^-$)	6072.3	(51/2$^-$)		
825.7 *2*	2.0 *1*	7896.9	61/2$^+$	7071.2	57/2$^+$	Q	Mult.: R_{ang}=1.0 *1* (2005Ha71).
827.9 *2*	1.0 *1*	6861.8	(55/2$^+$)	6033.9	51/2$^+$		
828.0 *5*	<0.5	7370.1	(57/2$^+$)	6542.1	(53/2$^+$)		
828.6 *2*	1.3 *1*	6413.4	(53/2$^+$)	5584.8	49/2$^+$		
829.3 *2*	2.3 *3*	2304.8	27/2$^-$	1475.6	25/2$^-$	D+Q	Mult.: R_{ang}=0.27 *6* (2005Ha71).
832.8 *5*	0.6 *1*	6986.2	(55/2$^+$)	6153.4	(51/2$^+$)		
835.5 *2*	1.6 *1*	2836.0	31/2$^+$	2000.5	29/2$^-$		
837.8 *2*	2.9 *3*	4017.0	39/2$^-$	3179.1	37/2$^-$	D	Mult.: R_{ang}=0.68 *8* (2005Ha71).

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^{124}Sn(^{51}V,4nγ) 2005Ha71 (continued)

$\gamma(^{171}Ta)$ (continued)

E_γ[‡]	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.[†]	Comments
838.0 *5*	<0.5	8473.2	(63/2$^+$)	7635.2	(59/2$^+$)		
841.4 *2*	11.8 *6*	7798.5	61/2$^+$	6957.1	57/2$^+$	Q	Iγ/298.1g=0.147 (1985Ba48 At E=230 MeV). Mult.: R_{ang}=0.95 *4* (2005Ha71). Iγ(30°)/Iγ(90°)=1.22 *24* (1985Ba48).
844.0[a] *5*	<0.5	8214.1?	(61/2$^+$)	7370.1	(57/2$^+$)		
850.4 *5*	0.8 *1*	7263.8	(57/2$^+$)	6413.4	(53/2$^+$)		
851.5 *2*	1.4 *1*	3422.0	35/2$^+$	2570.5	33/2$^-$		
858.8 *2*	2.2 *3*	2859.4	31/2$^-$	2000.5	29/2$^-$		Mult.: R_{ang}=0.39 *7* for 858.8γ+860.9γ (2005Ha71).
860.9 *2*	2.4 *3*	3431.4	35/2$^-$	2570.5	33/2$^-$		Mult.: R_{ang}=0.39 *7* for 858.8γ+860.9γ (2005Ha71).
861.3 *2*	1.5 *1*	7106.9	(57/2$^-$)	6245.6	(53/2$^-$)		
862.8 *2*	9.0 *4*	6953.3	57/2$^-$	6090.5	53/2$^-$	Q	Iγ/298.1g=0.138 (1985Ba48 At E=230 MeV). Mult.: R_{ang}=1.18 *7* (2005Ha71). Iγ(30°)/Iγ(90°)=0.82 *13* (1985Ba48).
867.1 *2*	1.6 *1*	8350.9	(63/2$^+$)	7483.8	59/2$^+$		
874.0 *5*	<0.5	7860.2	(59/2$^+$)	6986.2	(55/2$^+$)		
874.8 *2*	1.5 *1*	7511.9	(59/2$^-$)	6637.1	(55/2$^-$)		
885.6 *5*	0.8 *1*	7747.4	(59/2$^+$)	6861.8	(55/2$^+$)		
886.0 *5*	<0.5	7774.9	(59/2$^-$)	6888.9	(55/2$^-$)		
889.0 *5*	<0.5	8152.8	(61/2$^+$)	7263.8	(57/2$^+$)		
890.5 *2*	1.3 *1*	8787.4	65/2$^+$	7896.9	61/2$^+$		Mult.: R_{ang}=1.1 *1* (2005Ha71).
892.4 *2*	8.0 *5*	8690.9	65/2$^+$	7798.5	61/2$^+$	Q	Iγ/298.1g=0.117 (1985Ba48 At E=230 MeV). Mult.: R_{ang}=1.08 *4* (2005Ha71). Iγ(30°)/Iγ(90°)=1.00 *20* (1985Ba48).
900.0 *5*	<0.5	8760.2	(63/2$^+$)	7860.2	(59/2$^+$)		
910.0[a] *5*	<0.5	9670.2?	(67/2$^+$)	8760.2	(63/2$^+$)		
915.5 *2*	5.4 *3*	7868.8	61/2$^-$	6953.3	57/2$^-$	Q	Iγ/298.1g=0.079 (1985Ba48 At E=230 MeV). Mult.: R_{ang}=1.00 *9* (2005Ha71).
919.5 *5*	0.9 *1*	8026.4	(61/2$^-$)	7106.9	(57/2$^-$)		
926.9 *2*	1.2 *1*	8438.8	(63/2$^-$)	7511.9	(59/2$^-$)		
934.5 *5*	0.6 *1*	8681.9	(63/2$^+$)	7747.4	(59/2$^+$)		
939.7 *5*	0.9 *1*	9290.6	(67/2$^+$)	8350.9	(63/2$^+$)		
943.4 *2*	6.1 *4*	9634.3	69/2$^+$	8690.9	65/2$^+$	Q	Iγ/398g=0.097 9.7 (1985Ba48 At E=230 MeV). Mult.: R_{ang}=1.08 *5* (2005Ha71). Iγ(30°)/Iγ(90°)=1.0 *6* (1985Ba48).
948.6 *5*	0.7 *1*	9736.0	(69/2$^+$)	8787.4	65/2$^+$		
951.1 *5*	<0.5	9633.0	(67/2$^+$)	8681.9	(63/2$^+$)		
966.9 *2*	3.4 *2*	8835.8	(65/2$^-$)	7868.8	61/2$^-$	Q	Mult.: R_{ang}=0.9 *1* (2005Ha71).
970.7 *5*	0.6 *1*	8997.1	(65/2$^-$)	8026.4	(61/2$^-$)		
972.2 *5*	0.7 *1*	9411.0	(67/2$^-$)	8438.8	(63/2$^-$)		
982.0[a] *5*	<0.5	10615.0?	(71/2$^+$)	9633.0	(67/2$^+$)		
994.3 *2*	3.4 *3*	10628.6	73/2$^+$	9634.3	69/2$^+$	Q	Mult.: R_{ang}=1.04 *7* (2005Ha71).
1000.3 *5*	<0.5	10736.3	(73/2$^+$)	9736.0	(69/2$^+$)		
1007.5 *5*	0.5 *1*	10298.1	(71/2$^+$)	9290.6	(67/2$^+$)		
1009.9 *5*	<0.5	10420.9	(71/2$^-$)	9411.0	(67/2$^-$)		
1011.0 *5*	<0.5	10008.2	(69/2$^-$)	8997.1	(65/2$^-$)		
1016.0 *2*	2.1 *1*	9851.8	(69/2$^-$)	8835.8	(65/2$^-$)		
1016.1 *2*	1.5 *2*	4845.3	43/2$^{(-)}$	3829.2	41/2$^-$		
1027.0[a] *5*	<0.5	11447.9?	(75/2$^-$)	10420.9	(71/2$^-$)		
1029.0 *2*	1.9 *2*	4208.1	39/2$^{(-)}$	3179.1	37/2$^-$		
1039.9 *2*	2.4 *2*	3610.4	35/2$^{(-)}$	2570.5	33/2$^-$		
1045.3 *2*	2.2 *2*	11673.9	77/2$^+$	10628.6	73/2$^+$	Q	Mult.: R_{ang}=1.2 *1* (2005Ha71).
1048.0 *2*	2.5 *2*	3048.5	31/2$^{(-)}$	2000.5	29/2$^-$	D+Q	Mult.: R_{ang}=0.37 *4* (2005Ha71).
1049.4 *5*	<0.5	11785.7	(77/2$^+$)	10736.3	(73/2$^+$)		
1062.7 *2*	1.4 *1*	10914.5	(73/2$^-$)	9851.8	(69/2$^-$)		
1066.5 *5*	<0.5	11364.6	(75/2$^+$)	10298.1	(71/2$^+$)		

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^{124}Sn(^{51}V,4nγ) 2005Ha71 (continued)

$\gamma(^{171}Ta)$ (continued)

E_γ[‡]	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.[†]	Comments
1095.2 *5*	<0.5	12881.0	(81/2$^+$)	11785.7	(77/2$^+$)		
1096.2 *2*	1.2 *1*	12770.1	81/2$^+$	11673.9	77/2$^+$	Q	Mult.: R_{ang}=0.9 *1* (2005Ha71).
1101.9 *5*	0.6 *1*	12016.4	(77/2$^-$)	10914.5	(73/2$^-$)		
1108.9 *5*	<0.5	13125.3	(81/2$^-$)	12016.4	(77/2$^-$)		
1115.2 *5*	<0.5	12479.8	(79/2$^+$)	11364.6	(75/2$^+$)		
1128.0[a] *5*	<0.5	14253.3?	(85/2$^-$)	13125.3	(81/2$^-$)		
1137.0 *5*	<0.5	14018.0	(85/2$^+$)	12881.0	(81/2$^+$)		
1145.9 *5*	0.7 *1*	13916.0	(85/2$^+$)	12770.1	81/2$^+$		
1173.0[a] *5*	<0.5	15191.0?	(89/2$^+$)	14018.0	(85/2$^+$)		
1194.6 *5*	<0.5	15110.6	(89/2$^+$)	13916.0	(85/2$^+$)		
1243.9 *5*	<0.5	16354.5	(93/2$^+$)	15110.6	(89/2$^+$)		
1289.0 *5*	<0.5	17643.5	(97/2$^+$)	16354.5	(93/2$^+$)		
1335.0[a] *5*	<0.5	18978.5?	(101/2$^+$)	17643.5	(97/2$^+$)		

† Based on 2005Ha71 measurement of $R_{ang}=W(\theta_f,\phi)/W(\theta_{90^\circ},\phi)$, where $W(\theta_f,\phi)$ is the intensity observed in forward detectors (θ=122°, 130°, 143°, 148° and 163°) and $W(\theta_{90^\circ},\phi)$ is the intensity observed in Gammasphere rings near 90° (θ=79°, 81°, 90°, 99° and 101°); Normalized ratios of approximately 0.6 and 1.0 were observed for known stretched E1 and E2 transitions, respectively.

‡ $\Delta E\gamma$=0.2 keV assigned to most transitions, except 0.5 keV for I$\gamma\leq$1; based on authors′ general comment In 2005Ha71.

From level scheme in Figure 1 of 2005Ha71; not listed in authors′ Table I.

@ Estimate from 2005Ha71, based on intensity balance and branching ratio.

& Estimate based on intensity balance (2005Ha71).

a Placement of transition in the level scheme is uncertain.

^{124}Sn(^{51}V,4nγ) 2005Ha71

Level Scheme

Intensities: Relative I_γ

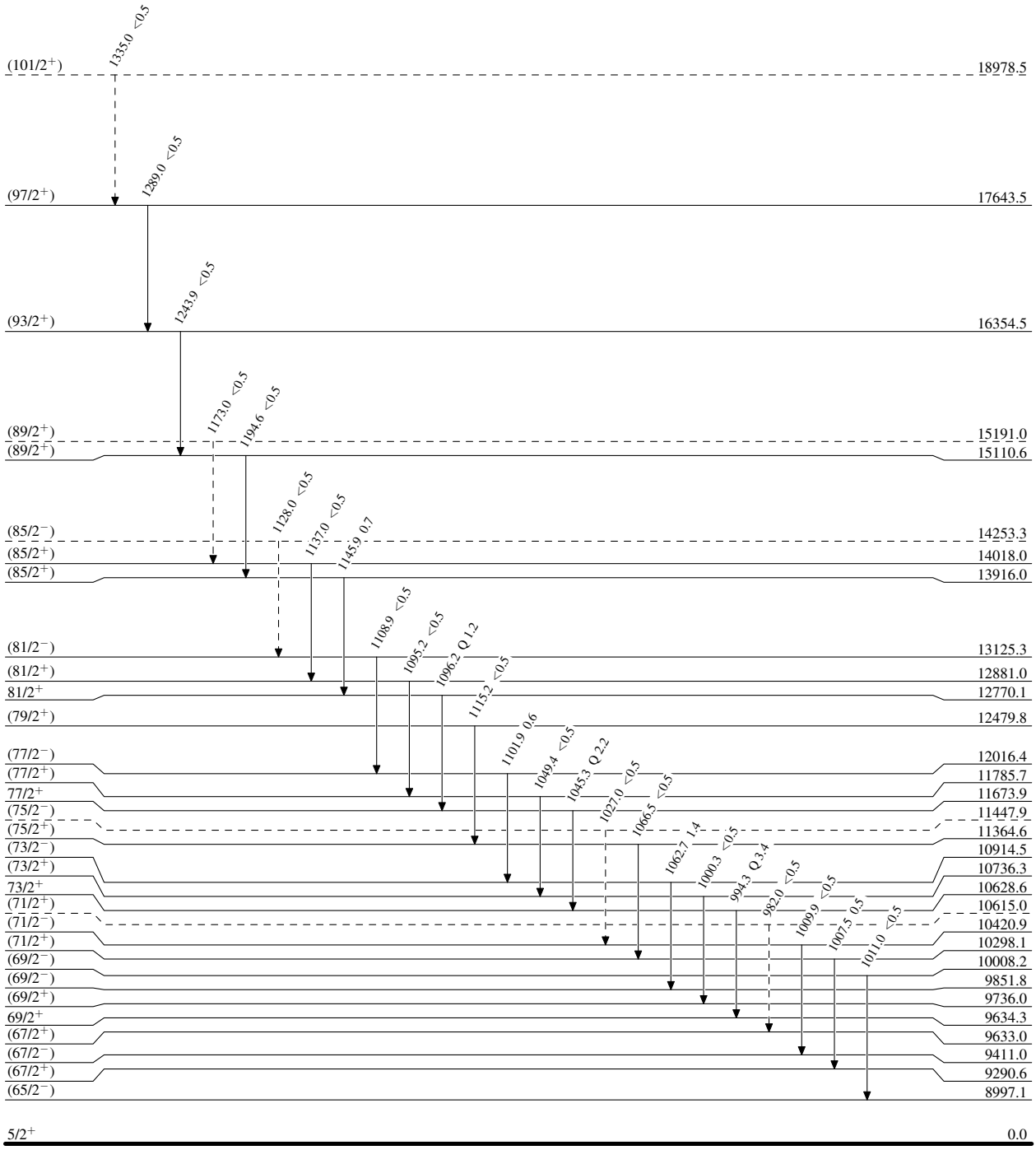
Legend

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

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

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

γ Decay (Uncertain)



$^{171}_{73}Ta_{98}$

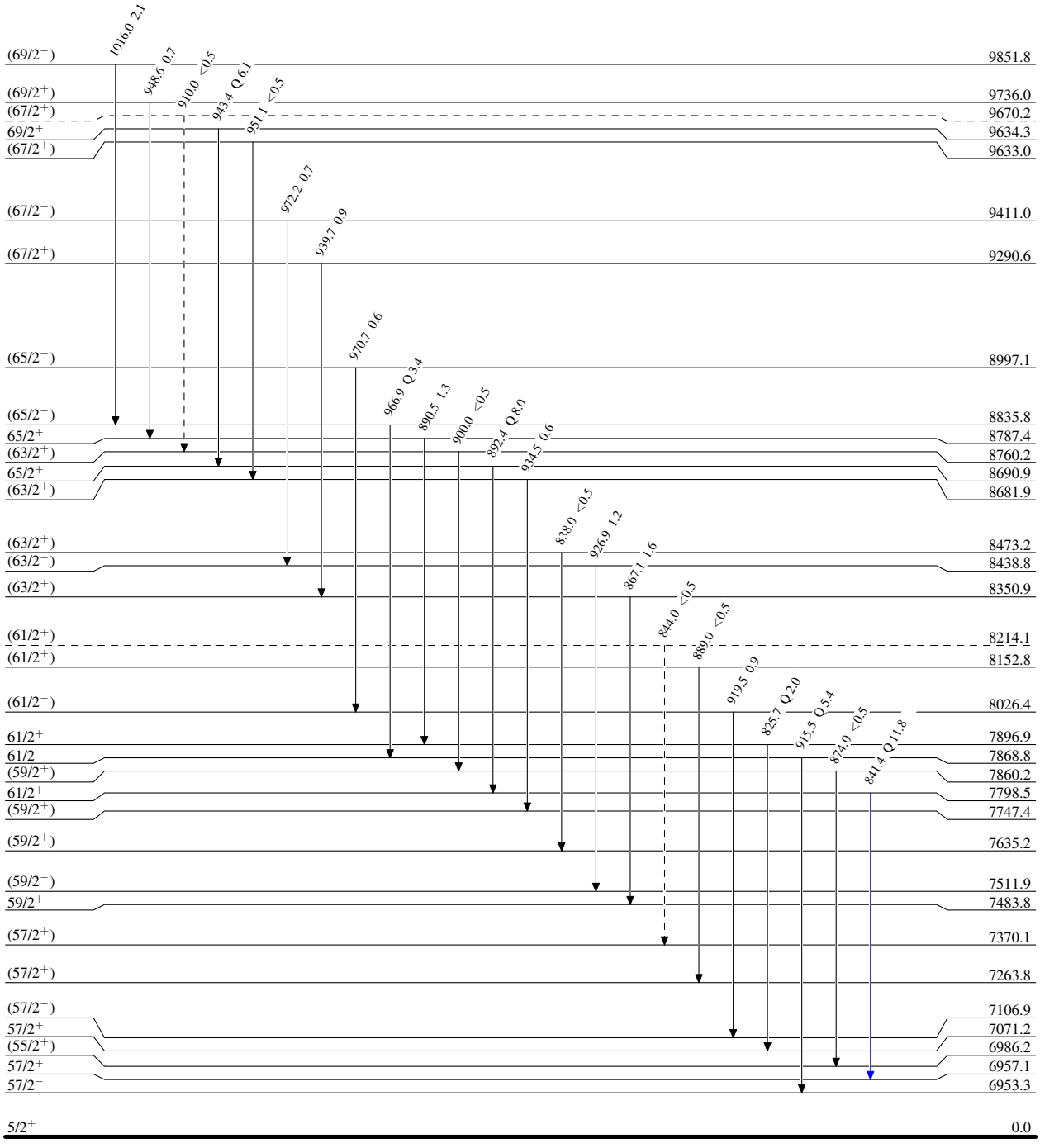
^{124}Sn(^{51}V,4nγ) 2005Ha71

Level Scheme (continued)

Intensities: Relative I_γ

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)

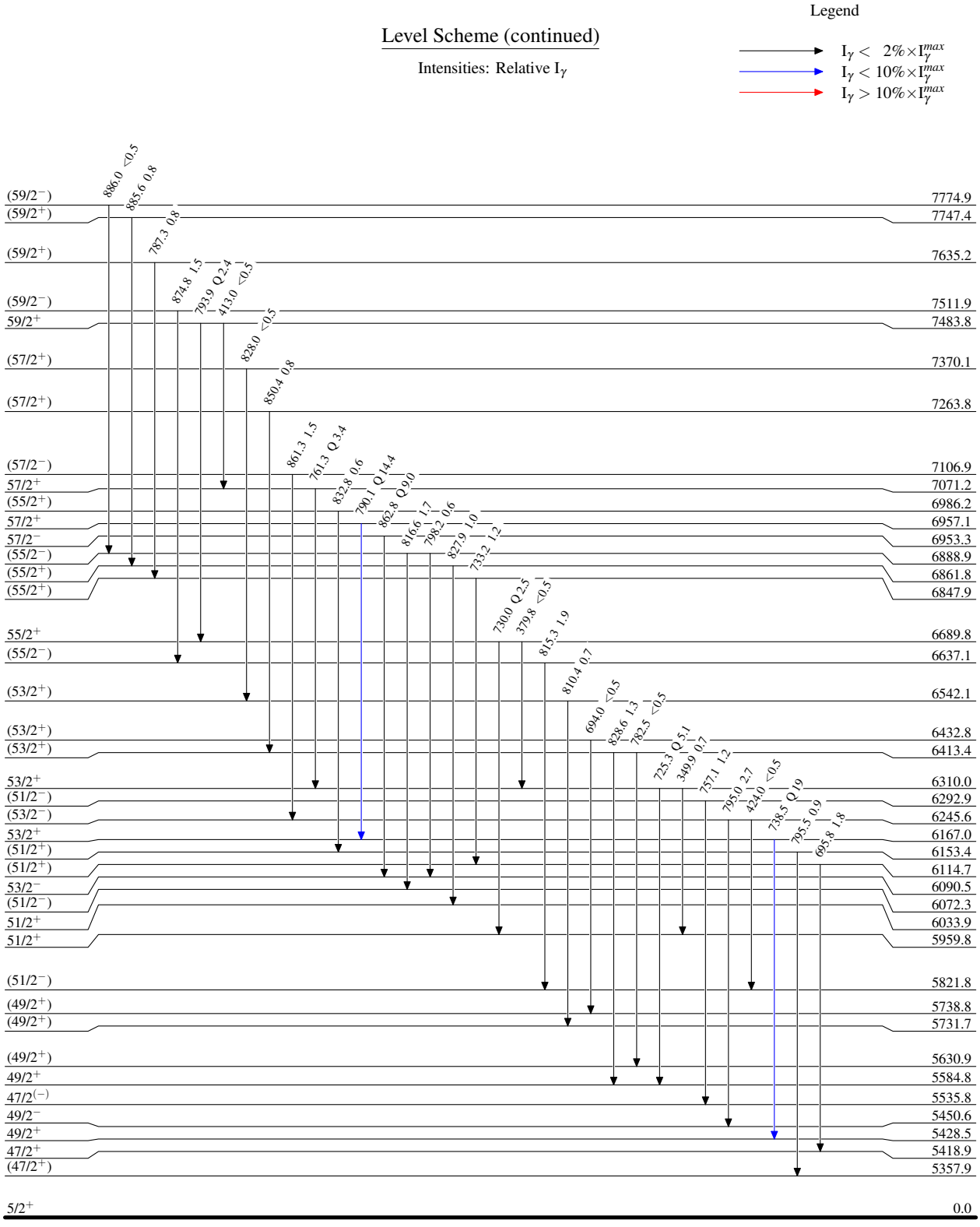


$^{171}_{73}Ta_{98}$

^{124}Sn(^{51}V,4nγ) 2005Ha71

Level Scheme (continued)

Intensities: Relative I_γ

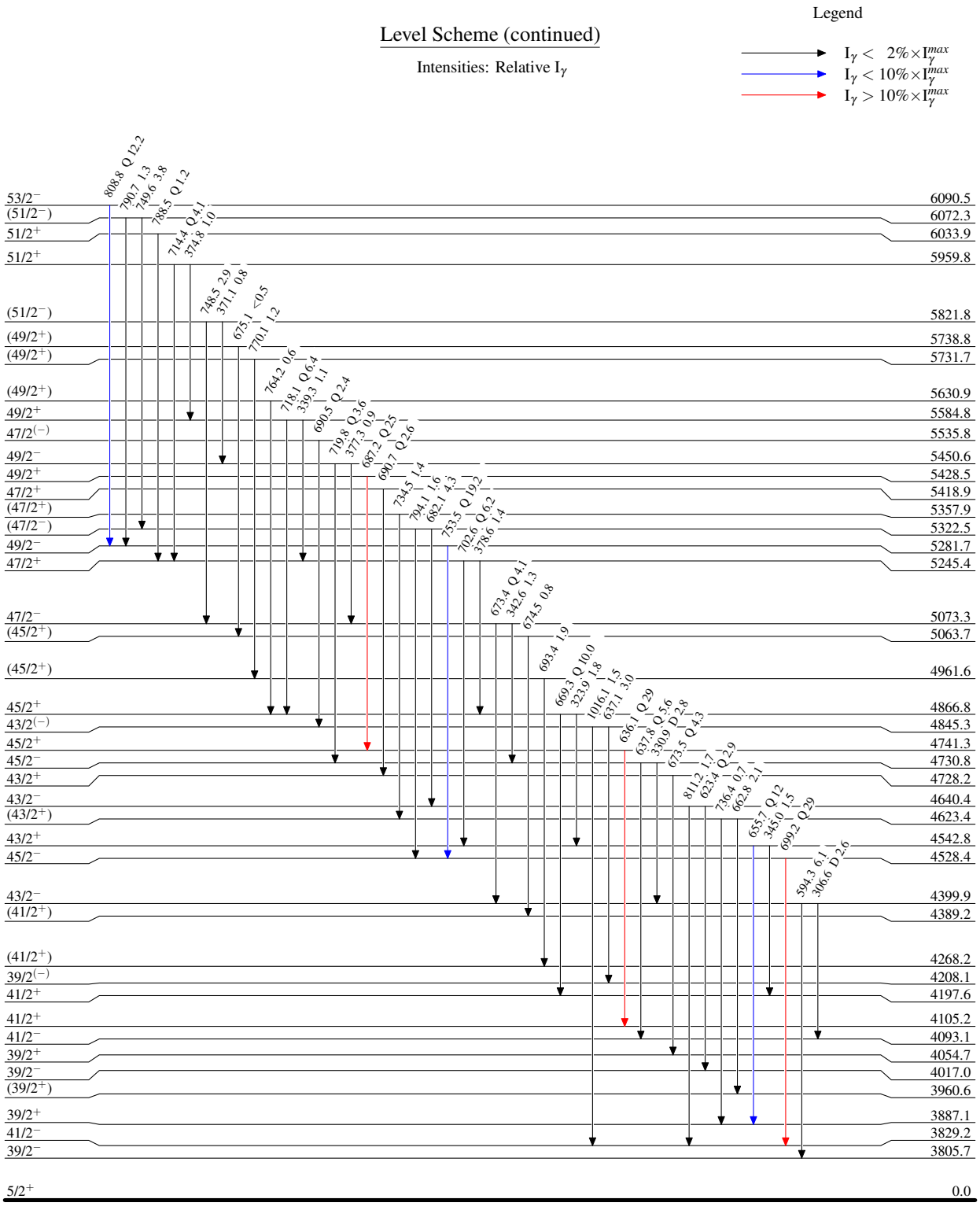


$^{171}_{73}Ta_{98}$

^{124}Sn(^{51}V,4nγ) 2005Ha71

Level Scheme (continued)

Intensities: Relative I_γ



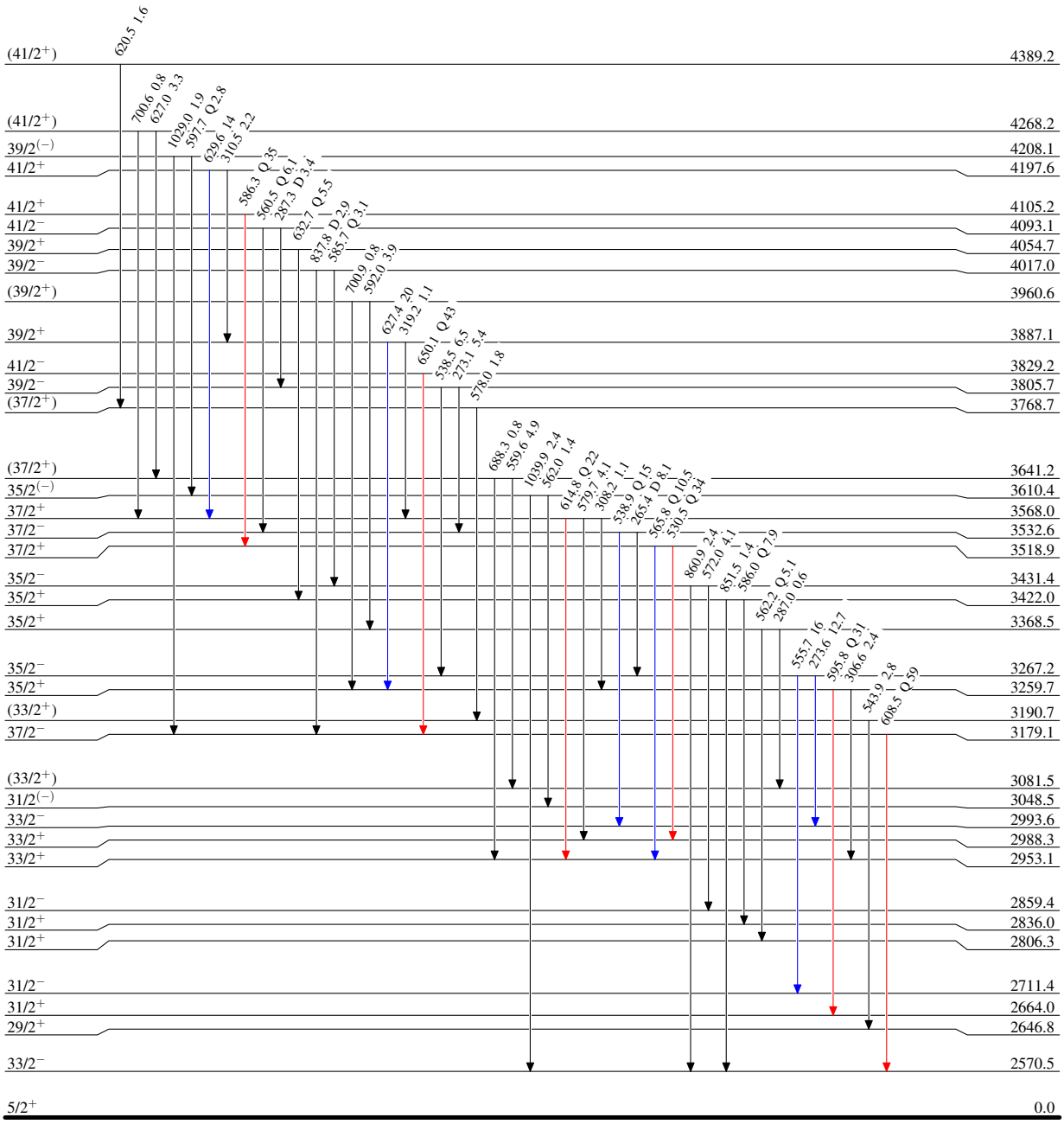
$^{171}_{73}Ta_{98}$

^{124}Sn(^{51}V,4nγ) 2005Ha71

Level Scheme (continued)

Intensities: Relative I_γ

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

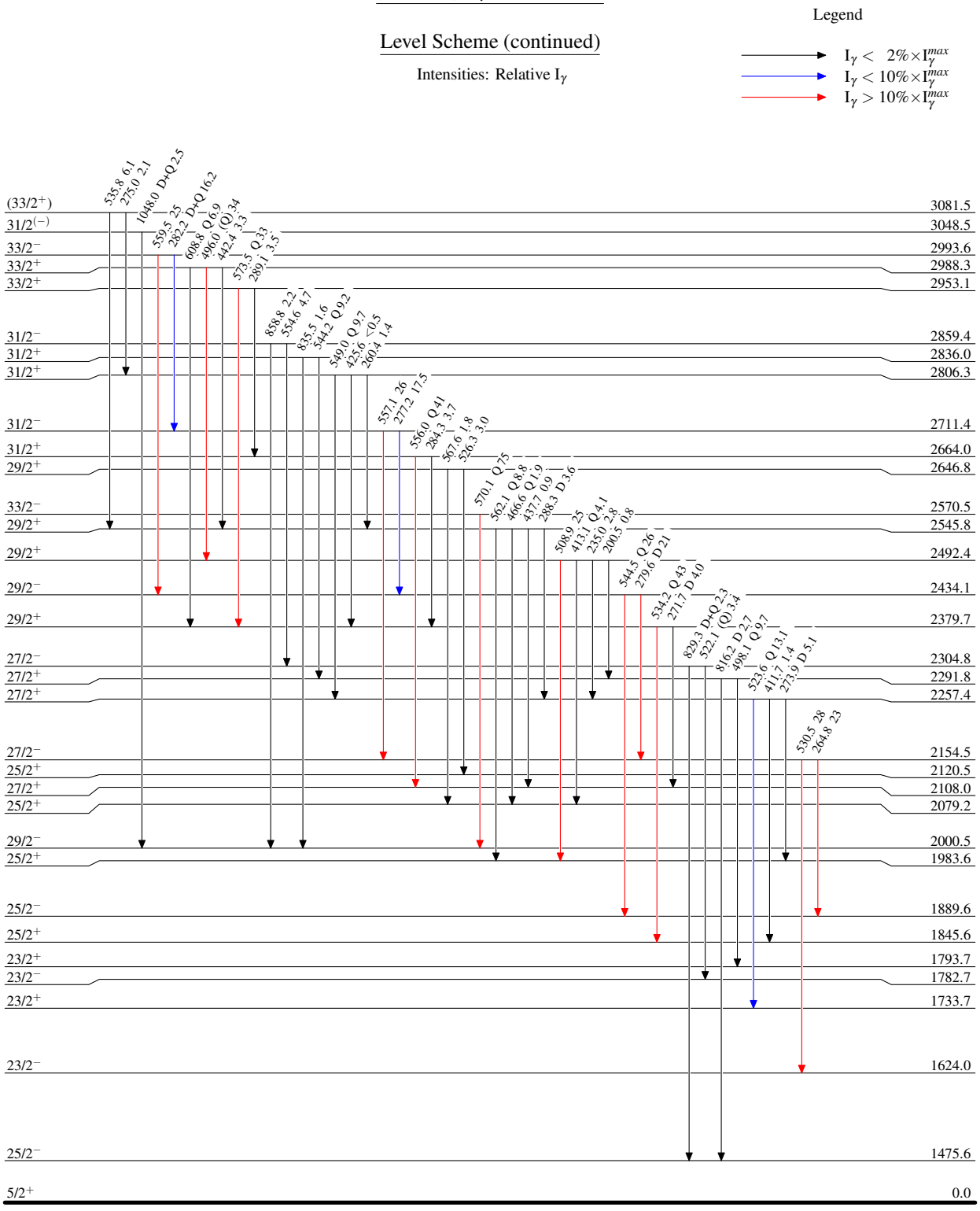


$^{171}_{73}Ta_{98}$

^{124}Sn(^{51}V,4nγ) 2005Ha71

Level Scheme (continued)

Intensities: Relative I_γ

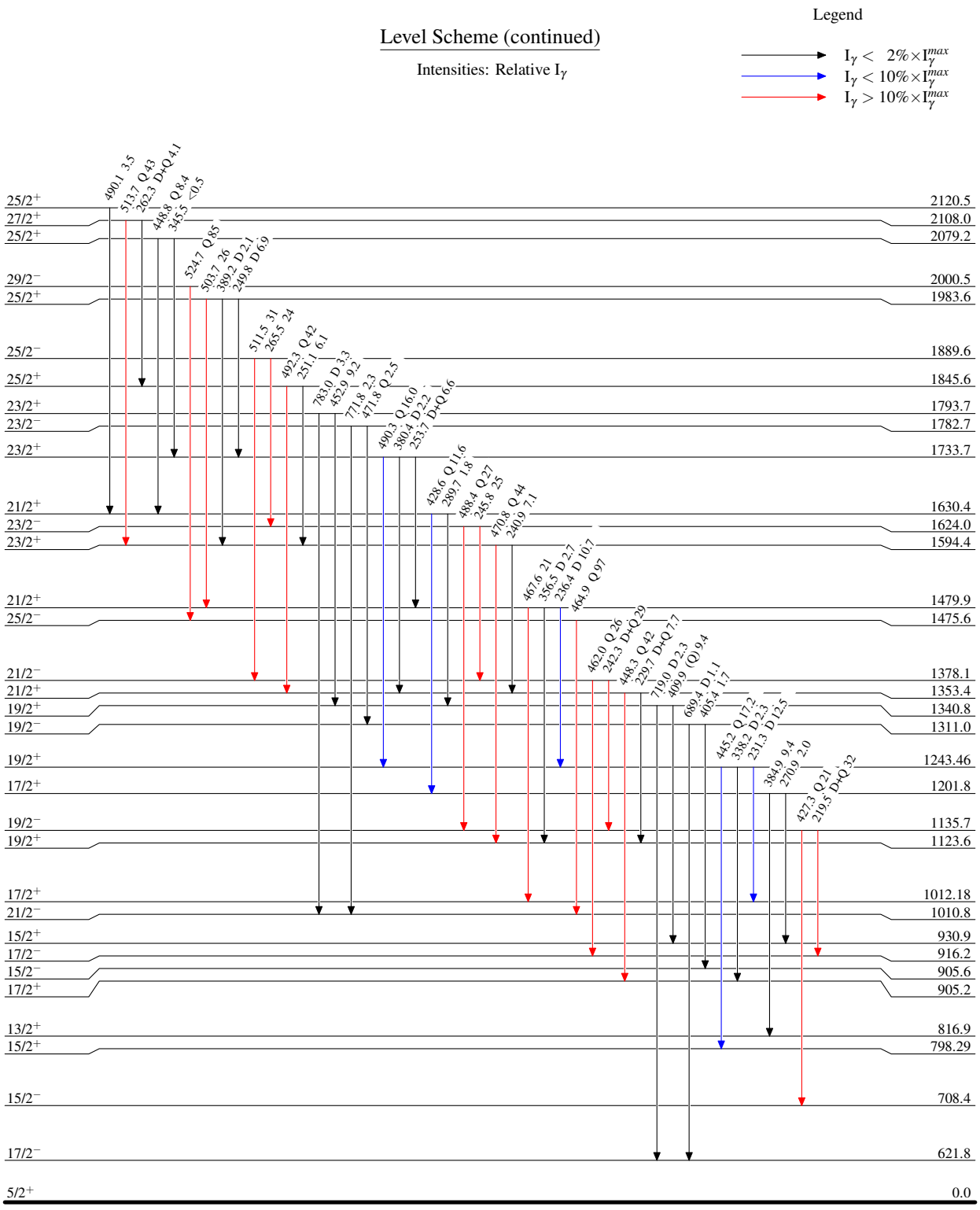


$^{171}_{73}Ta_{98}$

^{124}Sn(^{51}V,4nγ) 2005Ha71

Level Scheme (continued)

Intensities: Relative I_γ



$^{171}_{73}Ta_{98}$

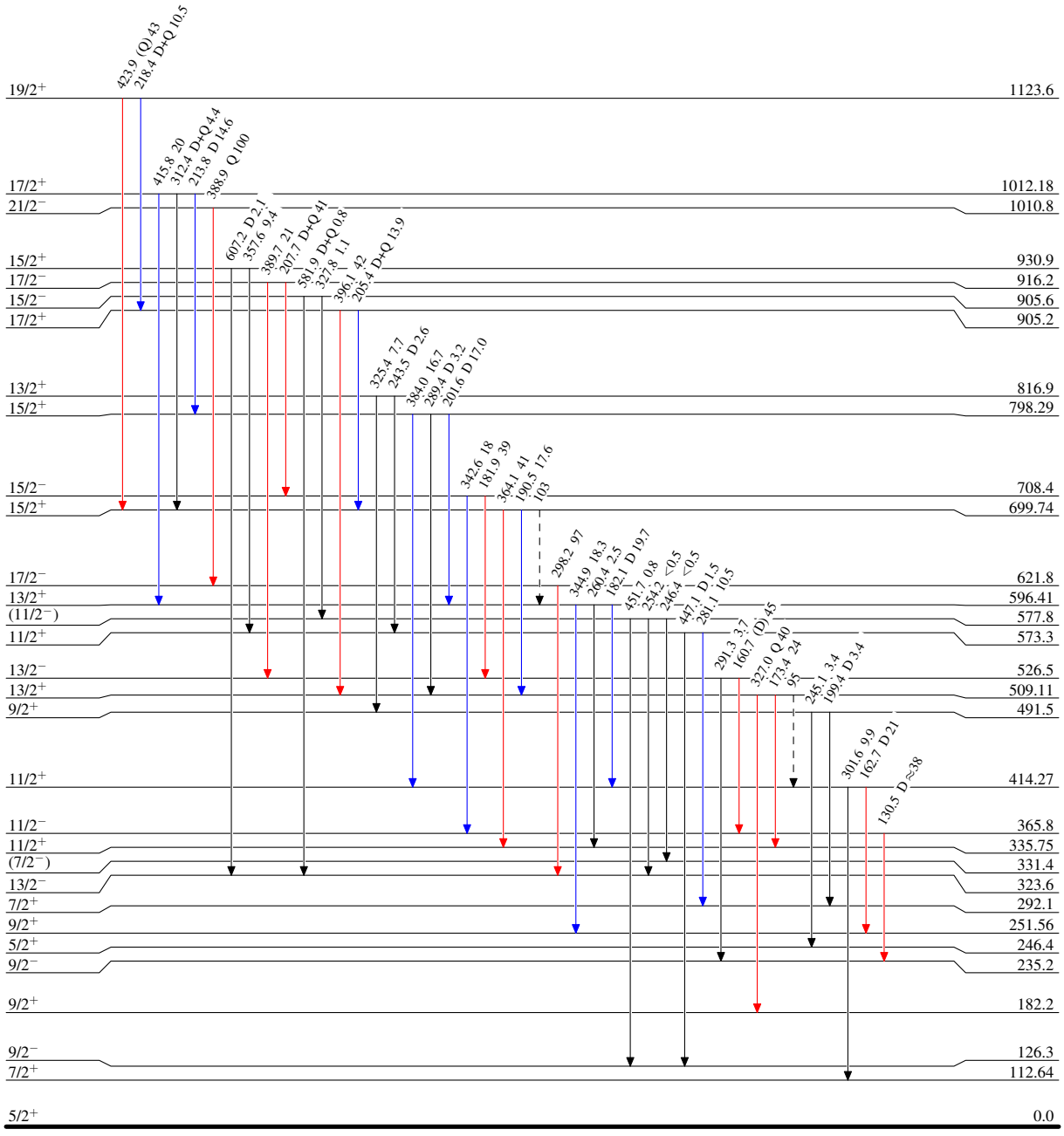
^{124}Sn(^{51}V,4nγ) 2005Ha71

Level Scheme (continued)

Intensities: Relative I_γ

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)

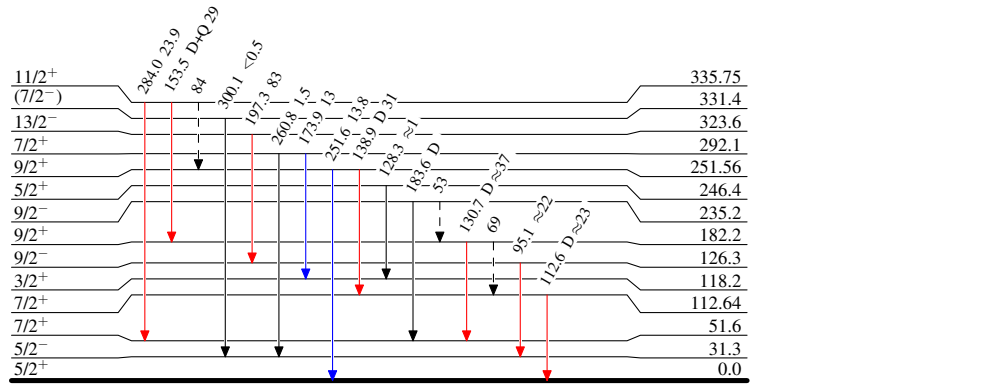


$^{171}_{73}Ta_{98}$

^{124}Sn(^{51}V,4nγ) 2005Ha71

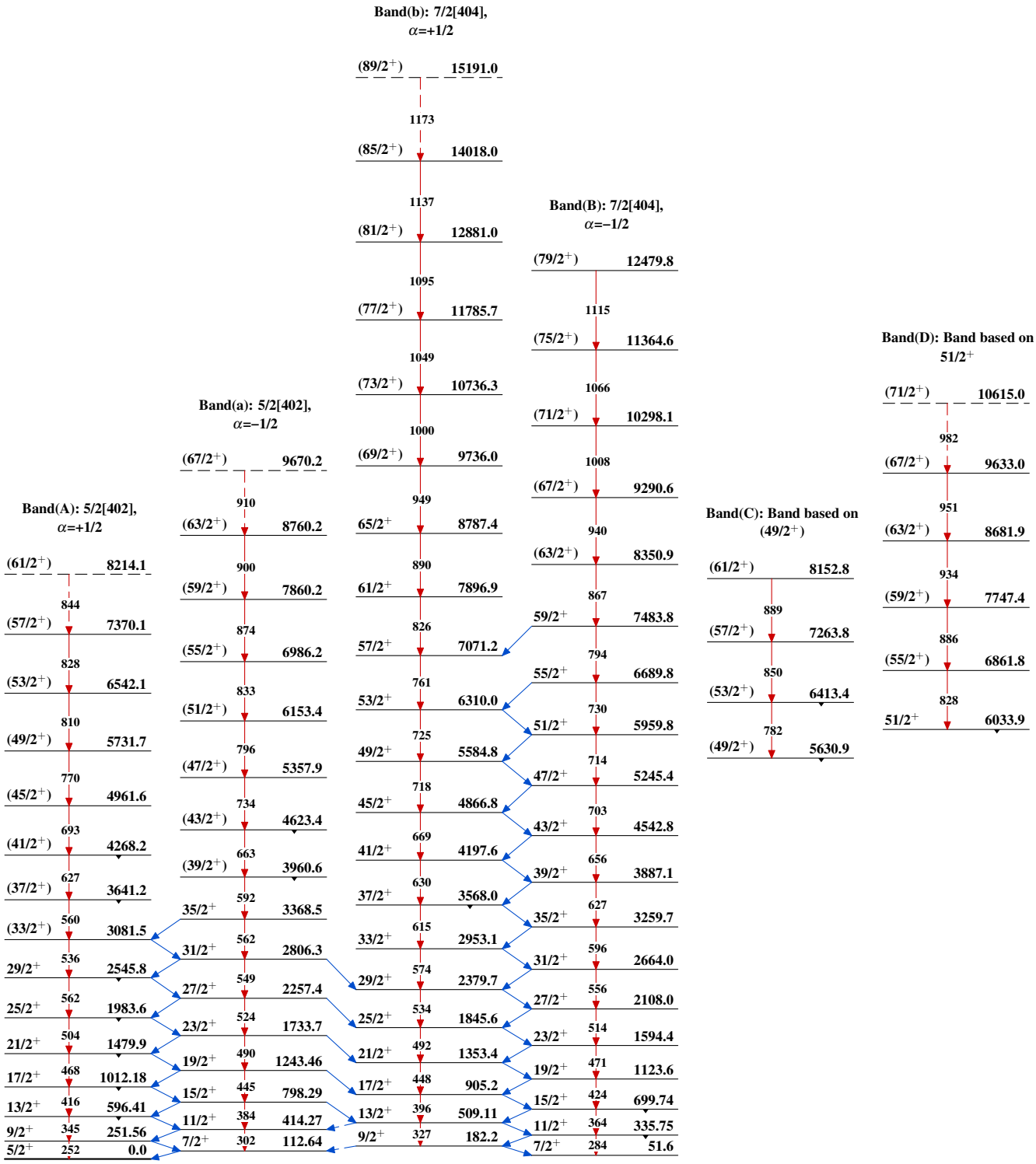
Level Scheme (continued)

Intensities: Relative I_γ

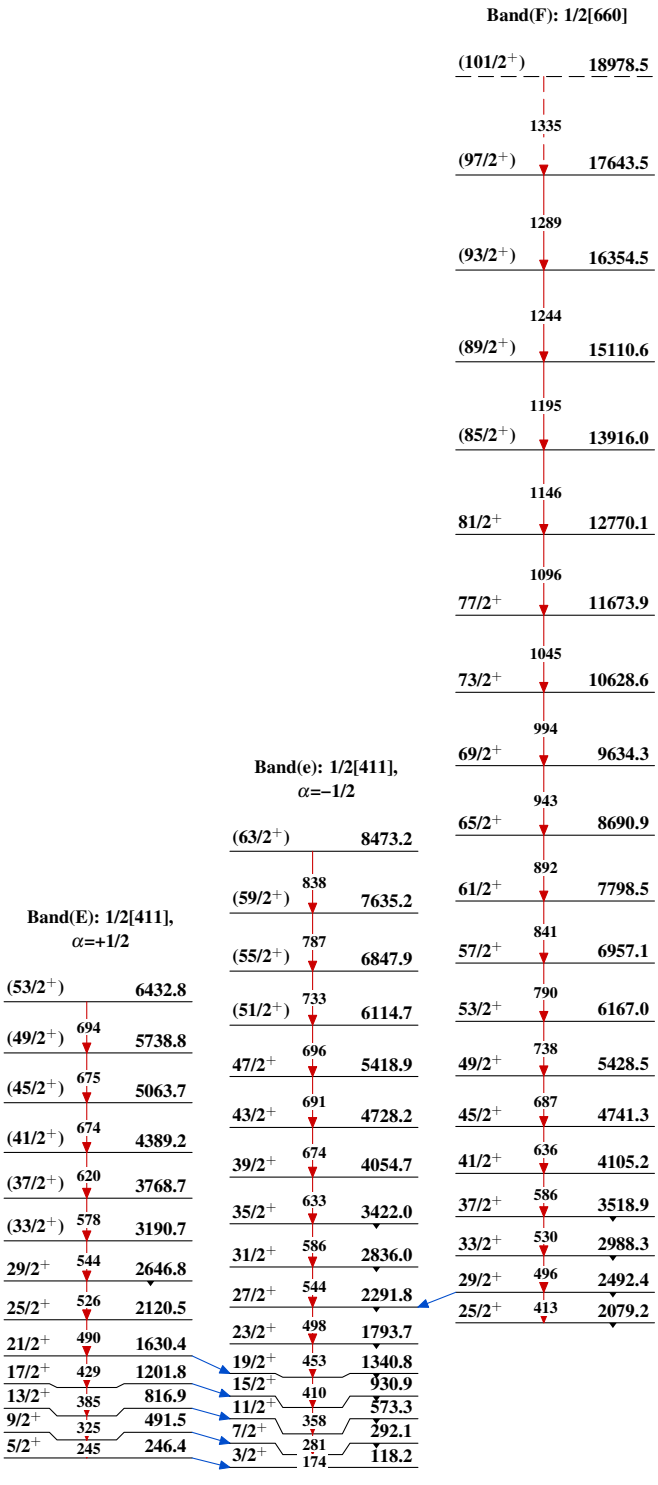


$^{171}_{73}Ta_{98}$

$^{124}Sn(^{51}V,4n\gamma)$ 2005Ha71

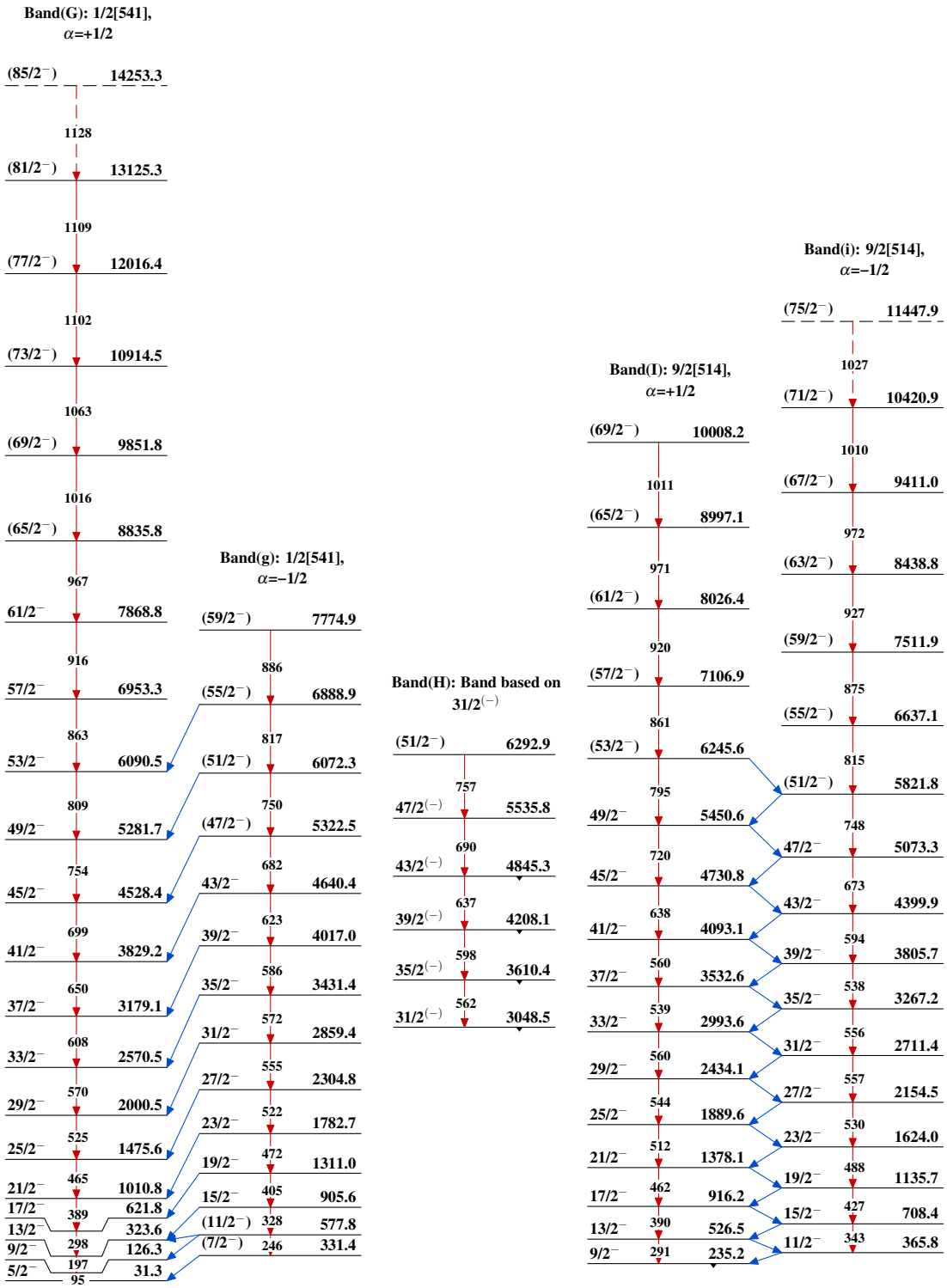


$^{124}Sn(^{51}V,4n\gamma)$ 2005Ha71 (continued)



$^{171}_{73}Ta_{98}$

^{124}Sn(^{51}V,4nγ) 2005Ha71 (continued)



$^{171}_{73}Ta_{98}$