^{118}Sn(^{162}Dy,^{162}Dy′γ) 2001Wu05

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	N. Nica	NDS 195,1 (2024)	19-Sep-2023

Additional information 1.

^{118}Sn(^{162}Dy,^{162}Dy′), E(^{162}Dy)=780 MeV. Enriched (99.975% ^{118}Sn) target, ≈250 μg/cm^2 thick, evaporated onto an ≈20 μg/cm^2 carbon foil and covered by an ≈6 μg/cm^2 Al coating. Scattered nuclei were detected using a highly segmented parallel-plate avalanche detector array. γ radiation in coincidence with the reaction products was detected using the GAMMASPHERE array with 100 Ge detectors. Measured Eγ, Iγ, γγ. Deduced intraband and interband E2 matrix elements for the g.s., S and γ-vibrational bands.

^{162}Dy Levels

E(level)†	Jπ	E(level)†	Jπ	E(level)†	Jπ	E(level)†	Jπ
0.0‡	0+	1530.2&	6−	2262.3@	10+	3269a	14+
80.7‡	2+	1535.9a	4+	2292.4b	5+	3374.3@	16+
265.7‡	4+	1634.6a	5+	2337.5#	11+	3433.0#	15+
548.5‡	6+	1670.2#	8+	2398a	10+	3732.8#	16+
888.2#	2+	1752.1a	6+	2421b	6+	3830.7‡	18+
921.0‡	8+	1845.8&	8−	2491.7‡	14+	3835a	16+
963.0#	3+	1878.0#	9+	2534.8@	12+	3878.8@	18+
1061.0#	4+	1887.8a	7+	2602a	11+	4037#	17+
1148.2&	2−	1901.4‡	12+	2622.5#	12+	4340.8#	18+
1182.8#	5+	1985.9@	8+	2670.9&	12−	4434.8@	20+
1210.1&	3−	2041a	8+	2817a	12+	4577.1‡	20+
1297.0&	4−	2087.5#	10+	2858.6#	13+	5351.5‡	22+
1324.2#	6+	2181.0b	4+	2934.8@	14+	6153.5‡	24+
1374.9‡	10+	2212a	9+	3138.5‡	16+		
1490.3#	7+	2234.6&	10−	3144.8#	14+		

† Values as shown on the level scheme of 2001Wu05.
‡ Band(A): $K^\pi=0^+$ g.s. band. 2001Wu05 report that this band crosses the S band at $J^\pi=18^+$.
# Band(B): $K^\pi=2^+$, γ band.
@ Band(C): S band. 2001Wu05 report that this band crosses the g.s. band at $J^\pi=18^+$. They also report that the quadrupole deformation of this band is ≈20% larger than those of the near-lying bands.
& Band(D): $K^\pi=2^-$ octupole-vibrational band.
a Band(E): $K^\pi=4^+$ band. 2001Wu05 estimate that this band contains ≈11% of the two-phonon γ-vibration.
b Band(F): Proposed second excited $K^\pi=4^+$ band. 2001Wu05 estimate that this band contains ≈25% of the two-phonon γ-vibration.

γ(^{162}Dy)

2001Wu05 extracted electromagnetic matrix elements for a number of γ′s from their measured γ-ray yields using a Coulomb-excitation code. In particular, E2 matrix elements were deduced for a number of transitions connecting the S band and the γ-vibrational band.

Unless noted otherwise, the listed B(E2) values were derived by the evaluator from the E2 matrix elements reported by 2001Wu05 using the relation $B(E2; J_i \rightarrow J_f)=[M(E2; J_i \rightarrow J_f)]^2/(2J_i+1)$ (from a private communication from C. Y. Wu).

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^{118}Sn(^{162}Dy,^{162}Dy′γ) 2001Wu05 (continued)

γ(^{162}Dy) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.	Comments
80.7	2^+	80.7		0.0	0^+		
265.7	4^+	185.0		80.7	2^+		
548.5	6^+	282.8		265.7	4^+		
888.2	2^+	807.5	100	80.7	2^+		
		888.2	87 *6*	0.0	0^+		
921.0	8^+	372.5		548.5	6^+		
963.0	3^+	697.3	100	265.7	4^+		
		882.3	6.8×10^2 *5*	80.7	2^+		
1061.0	4^+	795.3	100	265.7	4^+		
		980.3	62 *4*	80.7	2^+		
1182.8	5^+	634.3	100	548.5	6^+		
		917.1	6.6×10^2 *5*	265.7	4^+		
1297.0	4^-	236.0		1061.0	4^+		
		408.8		888.2	2^+		
1324.2	6^+	263.2	13.7 *13*	1061.0	4^+		
		775.7	100	548.5	6^+		
		1058.5	60 *4*	265.7	4^+		
1374.9	10^+	453.9		921.0	8^+		
1490.3	7^+	307.5	162 *16*	1182.8	5^+		
		569.3	100	921.0	8^+		
		941.8	5.4×10^2 *4*	548.5	6^+		
1530.2	6^-	233.2		1297.0	4^-		
		347.4		1182.8	5^+		
1535.9	4^+	572.9	68 *15*	963.0	3^+		
		647.7	100	888.2	2^+		B(E2)↓=0.0060 *18* B(E2) value computed by the evaluator from B(E2)(W.u.)=1.15 *35*, as reported by 2001Wu05.
1634.6	5^+	573.6	8×10^1 *5*	1061.0	4^+		E_γ: 572.9 in table III of 2001Wu05 seems a misprint.
		671.6	100	963.0	3^+		E_γ: 647.7 in table III of 2001Wu05 seems a misprint.
1670.2	8^+	346.0	62 *4*	1324.2	6^+		
		749.2	100	921.0	8^+		
		1121.7	91 *13*	548.5	6^+		
1752.1	6^+	427.9	100	1324.2	6^+		
		569.3	3.2×10^2 *10*	1182.8	5^+		
		691.1	2.0×10^2 *6*	1061.0	4^+		E_γ: 2006Ap01 (n,γ) do not report a γ of this energy deexciting this level.
1845.8	8^-	315.6		1530.2	6^-		
		355.5		1490.3	7^+		
1878.0	9^+	387.7	49 *5*	1490.3	7^+		
		957.0	100	921.0	8^+		
1887.8	7^+	253.2		1634.6	5^+		
		705.0		1182.8	5^+		
1901.4	12^+	526.5		1374.9	10^+		
1985.9	8^+	1064.9		921.0	8^+	[M1]	B(M1)=0.010. Value computed by the evaluator from B(M1)(W.u.)=0.0058, as reported by 2001Wu05. Mult.: 2001Wu05 state that the M1 component dominates the ΔJ=0 transitions connecting the g.s. and S bands. A small E2 component, of course, is not ruled out.
2041	8^+	288.9		1752.1	6^+		
2087.5	10^+	417.3	181 *13*	1670.2	8^+		
		712.6	100	1374.9	10^+		
		1166.5	97 *12*	921.0	8^+		
2181.0	4^+	1218.0	113 *24*	963.0	3^+		
		1292.8	100	888.2	2^+		B(E2)↓=0.015 *4*

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^{118}Sn(^{162}Dy,^{162}Dy′γ) 2001Wu05 (continued)

γ(^{162}Dy) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.	Comments
							B(E2) value computed by the evaluator from B(E2)(W.u.)=2.78 *83*, as reported by 2001Wu05.
2212	9^+	324.2		1887.8	7^+		
2234.6	10^-	356.6		1878.0	9^+		
		388.8		1845.8	8^-		
2262.3	10^+	276.4	100	1985.9	8^+		
		887.4	2.7×10^2 *13*	1374.9	10^+		
2292.4	5^+	1231.4	2.2×10^2 *7*	1061.0	4^+		
		1329.4	100	963.0	3^+		
2337.5	11^+	459.5		1878.0	9^+		
2398	10^+	357		2041	8^+		
2421	6^+	1238.2		1182.8	5^+		
2491.7	14^+	590.3		1901.4	12^+		
2534.8	12^+	272.3	12.2 *17*	2262.3	10^+	[E2]	B(E2)=1.25 *+14−21*. Value computed by the evaluator from the E2 matrix element=5.60 eb *+40−51*.
		447.3	196 *22*	2087.5	10^+	[E2]	B(E2)=1.70 *+6−57*. Value computed by the evaluator from the E2 matrix element=6.52 eb *+12−120*.
		633.4	100	1901.4	12^+		
		1159.9	136 *16*	1374.9	10^+		
2602	11^+	390		2212	9^+		
2622.5	12^+	360.2	8×10^1 *4*	2262.3	10^+	[E2]	B(E2)=0.45 *+17−37*. Value computed by the evaluator from the E2 matrix element=−3.36 eb *+191−58*.
		535.0	6.6×10^2 *9*	2087.5	10^+	[E2]	B(E2)=0.50 *+4−15*. Value computed by the evaluator from the E2 matrix element=3.52 eb *+13−56*.
		721.1	100	1901.4	12^+		
		1247.6	3.4×10^2 *5*	1374.9	10^+		
2670.9	12^-	436.3		2234.6	10^-		
2817	12^+	419		2398	10^+		
2858.6	13^+	521.1		2337.5	11^+		
2934.8	14^+	312.3	5.1 *8*	2622.5	12^+	[E2]	B(E2)=0.28 *+34−10*. Value computed by the evaluator from the E2 matrix element=−2.85 eb *+55−139*.
		400.0	100	2534.8	12^+	[E2]	B(E2)=1.6 *+4−6*. Value computed by the evaluator from the E2 matrix element=6.80 eb *+70−142*.
		443.1	22 *3*	2491.7	14^+		
		1033.4	21 *6*	1901.4	12^+		
3138.5	16^+	646.8		2491.7	14^+		
3144.8	14^+	522.3	100	2622.5	12^+	[E2]	B(E2)=1.7 *3*. Value computed by the evaluator from the E2 matrix element=6.94 eb *+56−76*.
		610.0	<86	2534.8	12^+	[E2]	B(E2)=0.33 *11*. Value computed by the evaluator from the E2 matrix element=3.10 eb *+47−59*. I_γ: from the relative B(E2) values of the 522.3 and 610.0 γ′s as reported by 2001Wu05, the evaluator computes Iγ(610.0γ)=43 *16*.
		1243.4	26 *11*	1901.4	12^+		
3269	14^+	452		2817	12^+		
3374.3	16^+	439.5		2934.8	14^+		
3433.0	15^+	574.4		2858.6	13^+		
3732.8	16^+	588.0		3144.8	14^+		
3830.7	18^+	692.2		3138.5	16^+		
3835	16^+	566		3269	14^+		
3878.8	18^+	504.5		3374.3	16^+		
		740.3		3138.5	16^+		
4037	17^+	604		3433.0	15^+		
4340.8	18^+	608.0		3732.8	16^+		
4434.8	20^+	556.0		3878.8	18^+		

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^{118}Sn(^{162}Dy,^{162}Dy′γ) 2001Wu05 (continued)

γ(^{162}Dy) (continued)

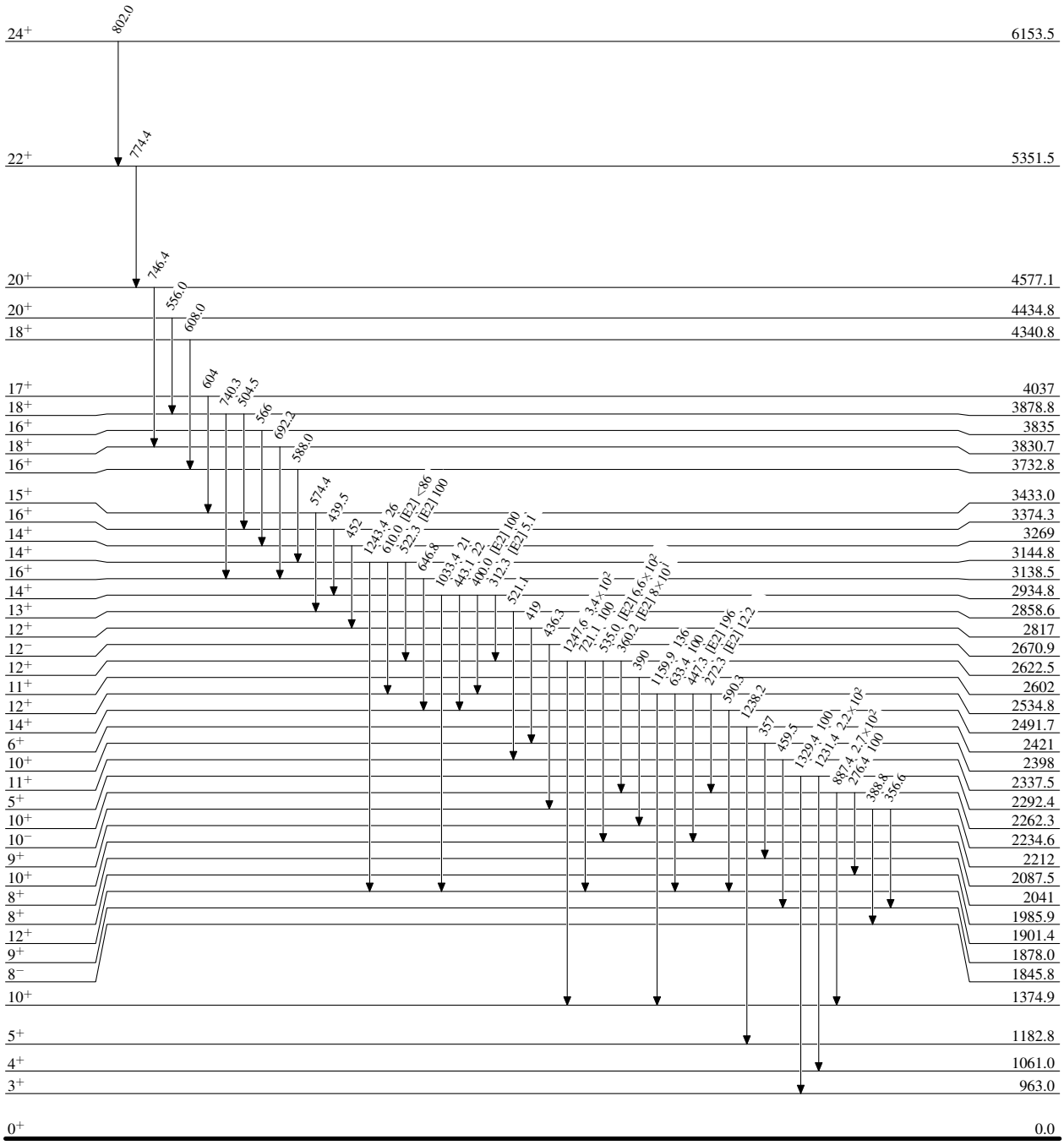
E_i(level)	J_i^π	E_γ †	E_f	J_f^π
4577.1	20^+	746.4	3830.7	18^+
5351.5	22^+	774.4	4577.1	20^+
6153.5	24^+	802.0	5351.5	22^+

† The energies of those γ′s for which no Iγ values are listed were deduced from the respective level energies. The others are given in the data tables of 2001Wu05.
‡ Relative γ branching from each level (2001Wu05).

^{118}Sn(^{162}Dy,^{162}Dy′γ) 2001Wu05

Level Scheme

Intensities: Relative photon branching from each level

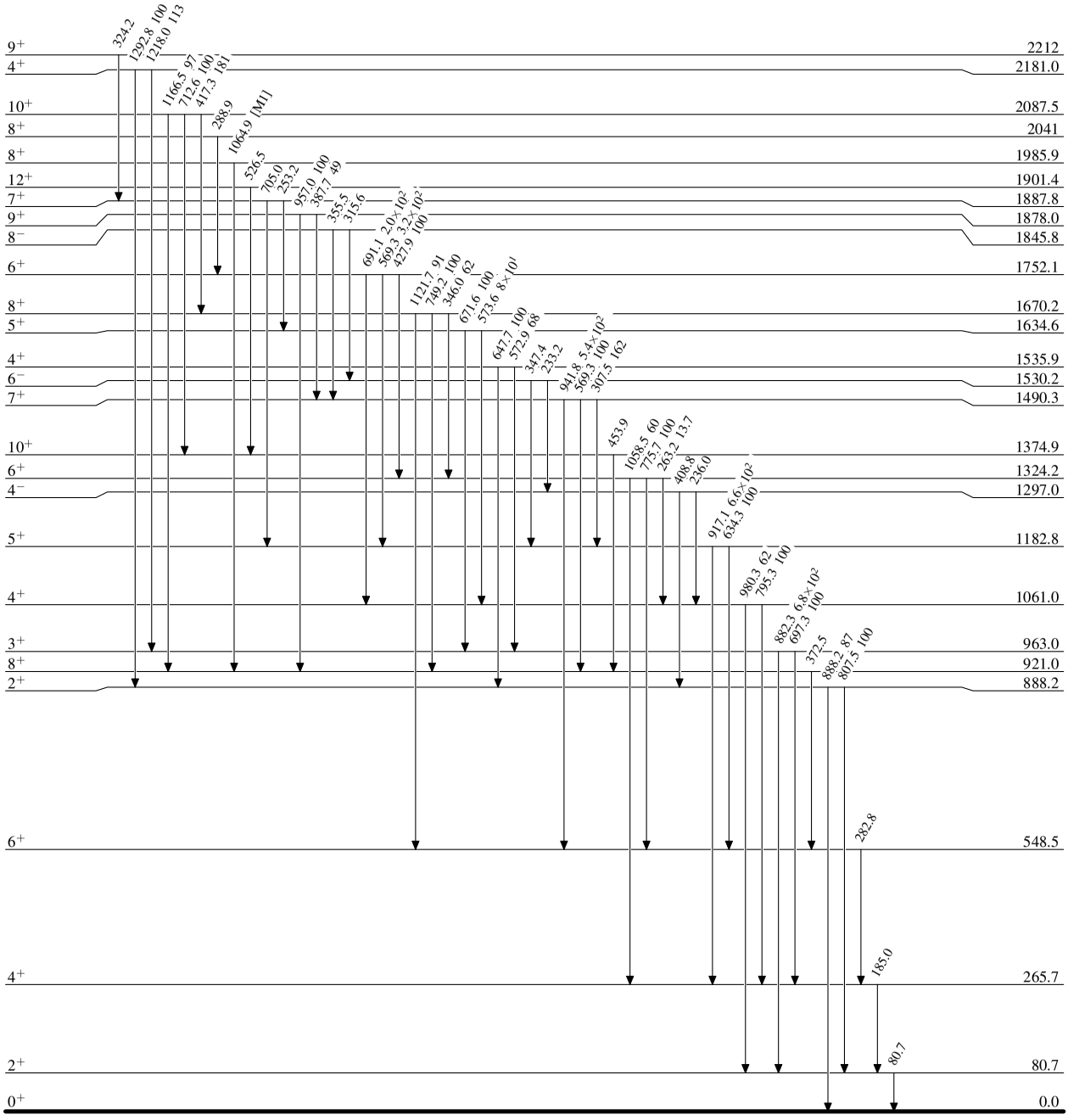
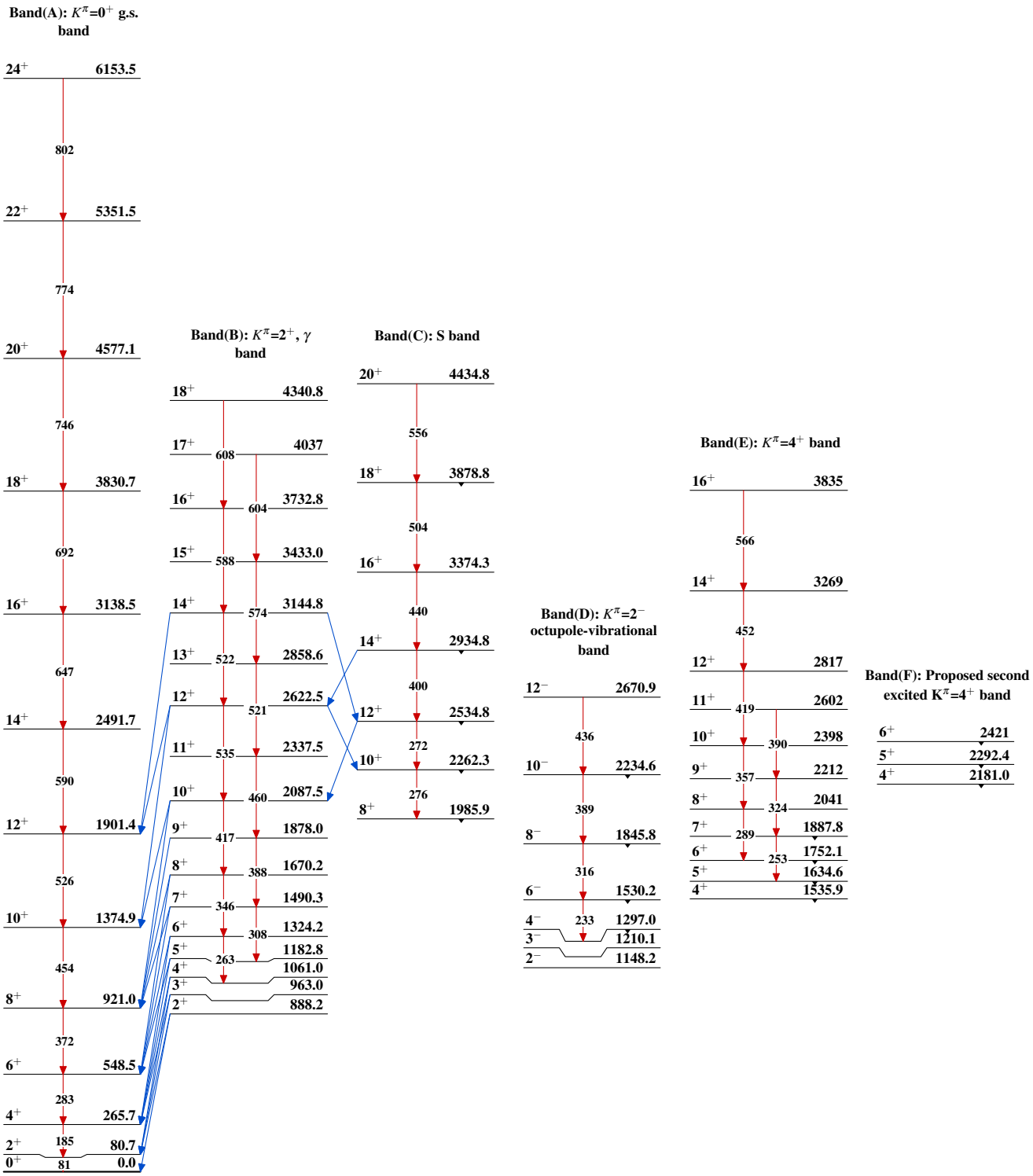


$^{162}_{66}Dy_{96}$

$^{118}Sn(^{162}Dy,^{162}Dy'\gamma)$ **2001Wu05**

Level Scheme (continued)

Intensities: Relative photon branching from each level



$^{118}Sn(^{162}Dy,^{162}Dy'\gamma)$ 2001Wu05