^{155}Gd(^{19}F,5nγ), ^{122}Sn(^{51}V,4nγ) 1993Li15,2003So08

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Coral M. Baglin	NDS 109, 2033 (2008)	15-Jun-2008

1993Li15 supersedes 1988Yu02 and 1989Yu03.

1993Li15: ^{155}Gd(^{19}F,5nγ): E(^{19}F)=85.5-100 MeV; Gd targets enriched to 91% in ^{155}Gd; 4 intrinsic Ge detectors; measured Eγ, Iγ, γγ coin, γ(θ) (θ=15°, 35°, 55°, 70°, 90°) At E(^{19}F)=95 MeV; measured excitation functions (E(^{19}F)=85.5-100 MeV).

1993Li15: ^{122}Sn(^{51}V,4nγ): E(^{51}V)=223 MeV; ESSA30 detector array (29 escape-suppressed Ge detectors); measured Eγ, Iγ, γ(θ), γγ coin, (mass-separated recoil)-γ coin used to verify assignments to ^{169}Ta; used cranked shell model to interpret level structure.

2003So08: ^{155}Gd(^{19}F,5nγ): E(^{19}F)=97 MeV; 61.61% ^{155}Gd target; 11 HPGE-BGO Compton suppressed detectors and a planar HPGE detector; measured Eγ, γγ coin.

^{169}Ta Levels

E(level)[†]	J$^{\pi}$[#]	Comments
0.0[b]	5/2$^+$	
0.0+x[@]	5/2$^-$	E(level): x=191.9 *3* from Adopted Levels.
0.0+y[e]	(3/2$^+$)	E(level): Y=27.5 *3* from Adopted Levels.
0.0+z[f]		
107.0+x[@] *10*	9/2$^-$	
136.2[c] *8*	7/2$^+$	adopted assignment for this level is to 7/2[404] band, not to the 5/2[402] band (As suggested In 1993Li15 and shown here).
147.9+z[f] *10*		
152.1+y[d] *9*	5/2$^+$	
205.4+y[e] *9*	(7/2$^+$)	
220.2[&] *3*	9/2$^-$	Additional information 1. E(level): from Adopted Levels.
284.8[b] *8*	9/2$^+$	
301.2+z[f] *15*		
329.7+x[@] *10*	13/2$^-$	
337.9[a] *8*	11/2$^-$	
438.0+y[d] *10*	9/2$^+$	
460.3[c] *10*	11/2$^+$	
508.0[&] *8*	13/2$^-$	
514.1+z[f] *18*		
540.5+y[e] *12*	(11/2$^+$)	
657.2[b] *11*	13/2$^+$	
666.4+x[@] *15*	17/2$^-$	
693.5[a] *10*	15/2$^-$	
744.6+z[f] *20*		
820.8+y[d] *12*	13/2$^+$	
876.5[c] *12*	15/2$^+$	
926.7[&] *11*	17/2$^-$	
971.9+y[e] *14*	(15/2$^+$)	
1081.0+z[f] *23*		
1104.7+x[@] *18*	21/2$^-$	
1110.0[b] *13*	17/2$^+$	
1152.0[a] *12*	19/2$^-$	
1276.7+y[d] *14*	17/2$^+$	

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^{155}Gd(^{19}F,5nγ), ^{122}Sn(^{51}V,4nγ) 1993Li15,2003So08 (continued)

^{169}Ta Levels (continued)

E(level)[†]	J$^\pi$[#]	E(level)[†]	J$^\pi$[#]	E(level)[†]	J$^\pi$[#]
1362.1[c] *13*	19/2$^+$	2886.8[c] *17*	31/2$^+$	4793.6[b] *21*	45/2$^+$
1432.3[&] *13*	21/2$^-$	2959.1+y[e] *25*	(31/2$^+$)	4950.3[a] *21*	47/2$^-$
1465.9+y[e] *17*	(19/2$^+$)	3005.9[&] *17*	33/2$^-$	5153.6[c] *22*	47/2$^+$
1622.1[b] *14*	21/2$^+$	3095.7[b] *18*	33/2$^+$	5310.4[&] *21*	49/2$^-$
1628.6+x[@] *20*	25/2$^-$	3209.3+y?[‡] *25*		5369+x[@] *4*	49/2$^-$
1684.7[a] *13*	23/2$^-$	3213.2[a] *17*	35/2$^-$	5492.2[b] *22*	(49/2$^+$)
1761.8+y[d] *17*	21/2$^+$	3339.1[c] *18*	35/2$^+$	5682.6[a] *22*	(51/2$^-$)
1896.4[c] *15*	23/2$^+$	3434+y[e] *3*	(35/2$^+$)	5877.1[c] *22*	(51/2$^+$)
1989.7+y[e] *20*	(23/2$^+$)	3443.4[&] *18*	37/2$^-$	6078.6?[&] *25*	(53/2$^-$)
1996.7[&] *14*	25/2$^-$	3473+x[@] *3*	37/2$^-$	6111+x[@] *4*	(53/2$^-$)
2171.4[b] *15*	25/2$^+$	3583.0[b] *19*	37/2$^+$	6236.9[b] *23*	(53/2$^+$)
2177.8+y *20*		3701.2[a] *18*	39/2$^-$	6470.6?[a] *24*	(55/2$^-$)
2221.3+x[@] *23*	29/2$^-$	3871.9[c] *20*	39/2$^+$	6642.1?[c] *23*	(55/2$^+$)
2263.9[a] *15*	27/2$^-$	3977.6[&] *19*	41/2$^-$	6870+x[@] *4*	(57/2$^-$)
2447.1[c] *16*	27/2$^+$	3992+y[e] *3*	(39/2$^+$)	6905.6?[&] *25*	(57/2$^-$)
2503.0+y[e] *22*	(27/2$^+$)	4041+x[@] *3*	41/2$^-$	7020.4?[b] *24*	(57/2$^+$)
2573.2[&] *15*	29/2$^-$	4152.4[b] *20*	41/2$^+$	7312.6?[a] *25*	(59/2$^-$)
2639.3+y *22*		4284.8[a] *20*	43/2$^-$	7610+x[@] *4*	(61/2$^-$)
2676.8[b] *17*	29/2$^+$	4481.2[c] *21*	43/2$^+$	8424+x?[@] *4*	(65/2$^-$)
2797.6[a] *16*	31/2$^-$	4604.5[&] *20*	45/2$^-$	9289+x?[@] *4*	(69/2$^-$)
2863.5+x[@] *25*	33/2$^-$	4672+x[@] *3*	45/2$^-$	10210+x?[@] *4*	(73/2$^-$)

[†] From least-squares fit to Eγ, allowing 1 keV uncertainty in all data.

[‡] Level not adopted; deexciting γ not confirmed In subsequent detailed study using the ^{124}Sn(^{51}V,^{6}nγ) reaction.

[#] From 1993Li15, except As noted; based on γ multipolarities deduced from measured γ(θ), on observed band structure and on systematics of band structures in neighboring odd-A, odd-Z nuclides. The 9/2[514] and 5/2[402] configuration assignments are supported by measured B(M1)(ΔJ=1 transition)/B(E2)(ΔJ=2 transition) for intraband transitions deexciting individual band members. Band parameters for the 1/2[541] band are close to those for known 1/2[541] bands in this mass region. These J$^\pi$ values are consistent with adopted ones (apart from use of parentheses) except for 1/2[541] band members with J>49/2 where the In-band cascade sequence In this reaction differs from the adopted one.

[@] Band(A): 1/2[541], α=+1/2 band (1993Li15). Energies are given relative to the energy x of the level fed by the 107γ; from Adopted Levels, x=191.9 keV.

[&] Band(B): 9/2[514], α=+1/2 band (1993Li15).

[a] Band(b): 9/2[514], α=−1/2 band (1993Li15).

[b] Band(C): 5/2[402], α=+1/2 band (1993Li15). Level energies are 40 keV higher than those In Adopted Levels because 1993Li15 assigned the 137 level As the J=7/2 member of this configuration instead of the 97 level.

[c] Band(c): 5/2[402], α=−1/2 band (1993Li15). See comment on signature partner band.

[d] Band(D): 1/2[411], α=+1/2 band (2003So08).

[e] Band(d): 1/2[411], α=−1/2 band (2003So08). Apparent K=1/2 decoupled band; 1/2[411] is only low-energy K=1/2 orbital available (1/2[541] is already assigned to a different band).

[f] Band(E): band fragment. 1993Li15 make no configuration assignment for this band and subsequent (HI,xnγ) studies do not observe it; possibly it does not belong to ^{169}Ta.

^{155}Gd(^{19}F,5nγ), ^{122}Sn(^{51}V,4nγ) 1993Li15,2003So08 (continued)

γ(^{169}Ta)

Eγ[†]	Iγ[‡]	Ei(level)	J_i^π	Ef	J_f^π	Mult.[#]	Comments
107.0	27[@] 5	107.0+x	9/2⁻	0.0+x	5/2⁻		
117.8	37[&] 5	337.9	11/2⁻	220.2	9/2⁻	D	Mult.: A_2=−0.5 *3*; A_4=+0.1 *4*.
136.3	35 7	136.2	7/2⁺	0.0	5/2⁺	(D)	Mult.: A_2=−0.3 *5*; A_4=+0.1 *7*.
147.9	83[b] 11	147.9+z		0.0+z			
148.7	19 4	284.8	9/2⁺	136.2	7/2⁺	D+Q	Mult.: A_2=−0.05 *15*; A_4=+0.18 *20*. A_2'=−0.40 *9*.
152.2[c]		152.1+y	5/2⁺	0.0+y	(3/2⁺)		
153.3		301.2+z		147.9+z			
170.0	100[&] 3	508.0	13/2⁻	337.9	11/2⁻	D+Q	Mult.: A_2=+0.07 *3*; A_4=+0.09 *4*. A_2'=−0.07 *3*.
175.3	34 3	460.3	11/2⁺	284.8	9/2⁺	D	Mult.: A_2=−0.1 *4*; A_4=+0.1 *5*. A_2'=−0.38 *8*.
185.3	58[&] 3	693.5	15/2⁻	508.0	13/2⁻	D	Mult.: A_2=+0.09 *9*; A_4=+0.06 *12*. A_2'=−0.10 *8*.
196.7	32.0 25	657.2	13/2⁺	460.3	11/2⁺	D	Mult.: A_2=−0.06 *25*; A_4=+0.2 *3*. A_2'=−0.15 *10*.
205.3	23[a] 3	205.4+y	(7/2⁺)	0.0+y	(3/2⁺)		
206.9	32[&] 3	3213.2	35/2⁻	3005.9	33/2⁻	D	Mult.: A_2=+0.16 *3*; A_4=+0.23 *4*. A_2'=−0.14 *5* for 206.9γ+207.9γ doublet.
207.9	33[&] 5	3005.9	33/2⁻	2797.6	31/2⁻		Mult.: A_2=−0.18 *8*; A_4=0.00 *10* for doublet. A_2'=−0.14 *5* for 206.9γ+207.9γ.
208.7	33 5	3095.7	33/2⁺	2886.8	31/2⁺		Mult.: A_2=−0.18 *8*; A_4=0.00 *10* for doublet. A_2'=−0.22 *13* for multiplet.
209.8	55 5	2886.8	31/2⁺	2676.8	29/2⁺	(D)	Mult.: A_2=−0.05 *13*; A_4=+0.01 *17*. A_2'=−0.22 *13* for multiplet.
212.9	95[b] 5	514.1+z		301.2+z			
219.0	67.4 24	876.5	15/2⁺	657.2	13/2⁺	D	Mult.: A_2=+0.11 *16*; A_4=+0.23 *21*. A_2'=−0.07 *9*.
222.7	97.9[@] 20	329.7+x	13/2⁻	107.0+x	9/2⁻	Q	Mult.: A_2=+0.24 *6*; A_4=−0.03 *9*. A_2'=+0.18 *10* for doublet.
224.6	36[&] 3	2797.6	31/2⁻	2573.2	29/2⁻	D	Mult.: A_2=0.00 *8*; A_4=+0.05 *11* for doublet. A_2'=−0.03 *5*.
225.4	62.3[&] 20	1152.0	19/2⁻	926.7	17/2⁻	D	Mult.: A_2=0.00 *8*; A_4=+0.09 *11*. A_2'=−0.03 *5*.
229.8	28 3	2676.8	29/2⁺	2447.1	27/2⁺		Mult.: A_2=−0.08 *10*; A_4=+0.04 *14* for doublet.
230.0	27[&] 3	3443.4	37/2⁻	3213.2	35/2⁻	D	Mult.: A_2=−0.08 *10*; A_4=+0.04 *14* for doublet. A_2'=−0.06 *6*.
230.5	100[b] 4	744.6+z		514.1+z			
232.5[c]		438.0+y	9/2⁺	205.4+y	(7/2⁺)		
233.4	27.5 20	1110.0	17/2⁺	876.5	15/2⁺		Mult.: A_2=+0.01 *6*; A_4=+0.15 *8* for doublet. A_2'=+0.23 *9*.
233.5	69.4[&] 20	926.7	17/2⁻	693.5	15/2⁻	D	Mult.: A_2=+0.01 *6*; A_4=+0.15 *8*. A_2'=+0.09 *8*.
243.4	34.4 21	3339.1	35/2⁺	3095.7	33/2⁺	D	Mult.: A_2=−0.19 *20*; A_4=+0.1 *3*. A_2'=−0.29 *7* for 243.4γ+244.0 doublet.
244.0	31 3	3583.0	37/2⁺	3339.1	35/2⁺		Mult.: A_2=+0.07 *14*; A_4=+0.13 *18*. A_2'=−0.29 *7* for 243.4γ+244.0γ doublet.
252.0	14.6 24	1362.1	19/2⁺	1110.0	17/2⁺		Mult.: A_2=−0.03 *6*; A_4=+0.04 *8* for doublet. A_2'=+0.08 *12*.
252.2	36.3[&] 24	1684.7	23/2⁻	1432.3	21/2⁻	(D)	Mult.: A_2=−0.03 *6*; A_4=+0.04 *8* for doublet. A_2'=−0.03 *5*.
258.1	25.5[&] 18	3701.2	39/2⁻	3443.4	37/2⁻	D	Mult.: A_2=−0.11 *11*; A_4=+0.12 *15*. A_2'=−0.32 *6*.
260.0	42.0 18	1622.1	21/2⁺	1362.1	19/2⁺		Mult.: A_2=+0.12 *10*; A_4=+0.01 *14*. A_2'=+0.01 *6*.
267.1	47.3[&] 19	2263.9	27/2⁻	1996.7	25/2⁻		Mult.: A_2=+0.12 *19*; A_4=+0.10 *26*. A_2'=+0.19 *10*.
274.3	30.0 20	1896.4	23/2⁺	1622.1	21/2⁺	D	Mult.: A_2=+0.16 *17*; A_4=+0.01 *24*. A_2'=−0.12 *9* for multiplet.
275.3	27.3 20	2171.4	25/2⁺	1896.4	23/2⁺		Mult.: A_2=−0.12 *10*; A_4=0.00 *13* for triplet. A_2'=−0.12 *9* for multiplet.
276.3	25.0 25	2447.1	27/2⁺	2171.4	25/2⁺		Mult.: A_2=−0.12 *10*; A_4=0.00 *13* for triplet. A_2'=−0.12 *9* for multiplet.
276.4	46.5[&] 26	3977.6	41/2⁻	3701.2	39/2⁻	D	Mult.: A_2=−0.12 *10*; A_4=0.00 *13* for triplet. A_2'=−0.14 *9*.

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^{155}Gd(^{19}F,5nγ), ^{122}Sn(^{51}V,4nγ) 1993Li15,2003So08 (continued)

γ(^{169}Ta) (continued)

E_γ[†]	I_γ[‡]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[#]	Comments
280.2[c]		820.8+y	13/2+	540.5+y	(11/2+)		
280.3	57[&] 3	1432.3	21/2−	1152.0	19/2−	D	Mult.: A_2=−0.03 3; A_4=+0.06 4 for doublet. A_2'=−0.19 9.
280.4	21 3	4152.4	41/2+	3871.9	39/2+	(D)	Mult.: A_2=−0.03 5; A_4=+0.06 6 for doublet. A_2'=−0.07 10.
284.7	21.3 20	284.8	9/2+	0.0	5/2+		Mult.: A_2=+0.04 13; A_4=−0.08 22. E_γ: γ omitted from Adopted Gammas. IT is reported by 1993Li15 only and evaluator considers it likely that γ does not belong to ^{169}Ta.
286.1[c]		438.0+y	9/2+	152.1+y	5/2+		
287.7	29.5[&] 18	508.0	13/2−	220.2	9/2−		Mult.: A_2=+0.26 5; A_4=+0.01 7 for doublet.
288.9	29.5 18	3871.9	39/2+	3583.0	37/2+	D	Mult.: A_2=+0.07 5; A_4=+0.01 7 for doublet. A_2'=−0.21 12.
304.9[c]		1276.7+y	17/2+	971.9+y	(15/2+)		
306.5	42[&] 3	4284.8	43/2−	3977.6	41/2−	D	Mult.: A_2=−0.21 15; A_4=0.00 20. A_2'=−0.15 10.
309.5	35.8[&] 20	2573.2	29/2−	2263.9	27/2−	D	Mult.: A_2=+0.14 12; A_4=+0.01 16. A_2'=−0.13 7.
311.6	46.2[&] 21	1996.7	25/2−	1684.7	23/2−	D	Mult.: A_2=+0.07 22; A_4=0.0 3 for doublet. A_2'=−0.13 7.
312.4	16 5	4793.6	45/2+	4481.2	43/2+		Mult.: A_2=+0.07 22; A_4=0.0 4 for doublet.
319.3	43[&] 5	4604.5	45/2−	4284.8	43/2−		Mult.: A_2=+0.30 16; A_4=+0.02 22. A_2'=−0.40 7 for doublet.
324.2	39.2 19	460.3	11/2+	136.2	7/2+	Q	Mult.: A_2=+0.48 23; A_4=−0.04 23.
328.8	16 3	4481.2	43/2+	4152.4	41/2+	D	Mult.: A_2=+0.6 3; A_4=+0.1 3 for doublet. A_2'=−0.23 9.
335.0	16[a] 3	540.5+y	(11/2+)	205.4+y	(7/2+)		
336.4	84[b] 3	1081.0+z		744.6+z			
336.7	100[@] 6	666.4+x	17/2−	329.7+x	13/2−		Mult.: A_2=+0.22 13; A_4=−0.12 19. A_2'=+0.08 2 for doublet.
338.6	15.0 20	5492.2	(49/2+)	5153.6	47/2+		Mult.: A_2=+0.18 14; A_4=+0.01 19.
345.8	27[&] 5	4950.3	47/2−	4604.5	45/2−	D	Mult.: A_2=0.00 8; A_4=0.00 11. A_2'=−0.40 14 for doublet.
356.0	39.4[&] 17	693.5	15/2−	337.9	11/2−		Mult.: A_2=+0.33 10; A_4=+0.20 9. Level scheme implies E2, but A_4 is not consistent with a Q transition.
359.8	16.0 20	5153.6	47/2+	4793.6	45/2+		Mult.: A_2=+0.09 23; A_4=0.0 3 for triplet.
360.0	19.0[&] 23	5310.4	49/2−	4950.3	47/2−		Mult.: A_2=+0.09 23; A_4=+0.01 13 for triplet.
360.0	15.0 20	6236.9	(53/2+)	5877.1	(51/2+)		Mult.: A_2=+0.09 23; A_4=0.0 3 for triplet.
372.3	11[&] 3	5682.6	(51/2−)	5310.4	49/2−		Mult.: A_2=+0.20 6; A_4=+0.01 8 for doublet.
372.4	42.0 17	657.2	13/2+	284.8	9/2+		Mult.: A_2=+0.20 6; A_4=−0.28 8 for doublet. A_2'=−0.24 5 for doublet.
378.0[e]	13.3 20	7020.4?	(57/2+)	6642.1?	(55/2+)		
382.8[c]		820.8+y	13/2+	438.0+y	9/2+		
385.0	17.0 20	5877.1	(51/2+)	5492.2	(49/2+)		Mult.: A_2=+0.33 11; A_4=+0.03 15 for doublet.
392.0[e]	6[&] 3	6470.6?	(55/2−)	6078.6?	(53/2−)		
396[e]	26.4[&] 18	6078.6?	(53/2−)	5682.6	(51/2−)		Mult.: A_2=+0.33 11; A_4=+0.03 15 for multiplet.
405.2[e]	15.4 17	6642.1?	(55/2+)	6236.9	(53/2+)		
407[e]	[&]	7312.6?	(59/2−)	6905.6?	(57/2−)		
415.8	42[&] 4	3213.2	35/2−	2797.6	31/2−		Mult.: A_2=+0.34 8; A_4=−0.10 11 for doublet. A_2'=+0.15 7.

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^{155}Gd(^{19}F,5nγ), ^{122}Sn(^{51}V,4nγ) 1993Li15,2003So08 (continued)

γ(^{169}Ta) (continued)

E_γ [†]	I_γ [‡]	E_i(level)	J^π_i	E_f	J^π_f	Mult. [#]	Comments
416.0[c]		2177.8+y		1761.8+y	21/2+		
416.4	58 *4*	876.5	15/2+	460.3	11/2+		Mult.: A_2=+0.34 *8*; A_4=−0.10 *11* for doublet.
418.5	62[&] *3*	926.7	17/2−	508.0	13/2−		Mult.: A_2=+0.60 *5*; A_4=+0.13 *7* for doublet. A_2'=+0.13 *7*.
418.8	50 *3*	3095.7	33/2+	2676.8	29/2+		Mult.: A_2=+0.60 *5*; A_4=+0.13 *7*.
431.4	19[a] *3*	971.9+y	(15/2+)	540.5+y	(11/2+)		
432.9	54[&] *3*	3005.9	33/2−	2573.2	29/2−	Q	Mult.: A_2=+0.26 *13*; A_4=−0.15 *17*. A_2'=+0.51 *10*.
435[e]	6[&] *3*	6905.6?	(57/2−)	6470.6?	(55/2−)		
437.7	35.0[&] *22*	3443.4	37/2−	3005.9	33/2−		Mult.: A_2=+0.31 *7*; A_4=−0.15 *9* for triplet. A_2'=+0.03 *8* for doublet.
438.3	95.1[@] *22*	1104.7+x	21/2−	666.4+x	17/2−		Mult.: A_2=+0.31 *7*; A_4=−0.14 *9* for triplet. A_2'=+0.16 *4* for doublet.
439.9	49.9 *22*	2886.8	31/2+	2447.1	27/2+	(Q)	Mult.: A_2=+0.32 *7*; A_4=−0.15 *8* for triplet. A_2'=+0.24 *8*.
452.6	30 *4*	3339.1	35/2+	2886.8	31/2+	(Q)	Mult.: A_2=+0.48 *10*; A_4=−0.10 *13* for triplet. A_2'=+0.27 *6*.
452.9	61 *4*	1110.0	17/2+	657.2	13/2+	Q	Mult.: A_2=+0.48 *10*; A_4=−0.10 *13* for doublet to which this transition contributes 67% of the total intensity. A_2'=+0.27 *6*.
455.9[c]		1276.7+y	17/2+	820.8+y	13/2+		
456.1[c]		2959.1+y	(31/2+)	2503.0+y	(27/2+)		
458.3	97.0[&] *19*	1152.0	19/2−	693.5	15/2−	Q	Mult.: A_2=+0.41 *10*; A_4=−0.17 *14*. A_2'=+0.20 *12*.
461.5[c]		2639.3+y		2177.8+y			
475.4[c]		3434+y	(35/2+)	2959.1+y	(31/2+)		
485.1[c]		1761.8+y	21/2+	1276.7+y	17/2+		
485.7	84.1 *25*	1362.1	19/2+	876.5	15/2+	(Q)	Mult.: A_2=+0.1 *3*; A_4=+0.01 *5*. A_2'=+0.20 *9*.
487.0	25 *3*	3583.0	37/2+	3095.7	33/2+	(Q)	Mult.: A_2=+0.6 *5*; A_4=0.0 *6* for doublet. A_2'=+0.26 *8*.
487.9	20.1[&] *23*	3701.2	39/2−	3213.2	35/2−	Q	Mult.: A_2=+0.6 *5*; A_4=+0.05 *6* for doublet. A_2'=+0.41 *18*.
494.0[d]	11[a] *4*	1465.9+y	(19/2+)	971.9+y	(15/2+)		
505.0	55 *3*	2676.8	29/2+	2171.4	25/2+		Mult.: A_2=+0.2 *3*; A_4=0.0 *5* for doublet. A_2'=−0.01 *10* for doublet.
505.8	99[&] *4*	1432.3	21/2−	926.7	17/2−		Mult.: A_2=+0.2 *3*; A_4=+0.12 *7* for doublet. A_2'=+0.16 *4* for doublet.
512.1	82 *4*	1622.1	21/2+	1110.0	17/2+		Mult.: A_2=−0.2 *6*; A_4=−0.7 *8*. A_2'=−0.01 *9* for doublet.
513.3[c]	12[a] *4*	2503.0+y	(27/2+)	1989.7+y	(23/2+)		order of 513γ and 524γ taken from 2003So08; 1993Li15 give the reverse order for these transitions.
523.8[d]	12[a] *4*	1989.7+y	(23/2+)	1465.9+y	(19/2+)		see comment on 513.3γ.
523.9	94[@] *4*	1628.6+x	25/2−	1104.7+x	21/2−	Q	Mult.: A_2=+0.36 *3*; A_4=−0.19 *4*. A_2'=+0.26 *6*.
532.5	77[&] *3*	1684.7	23/2−	1152.0	19/2−	Q	Mult.: A_2=+0.23 *5*; A_4=−0.05 *7*. A_2'=+0.20 *12*.
533.0	22 *3*	3871.9	39/2+	3339.1	35/2+	(Q)	Mult.: A_2=+0.23 *5*; A_4=−0.05 *7* for triplet. A_2'=+0.28 *7*.
533.4	55[&] *3*	2797.6	31/2−	2263.9	27/2−	(Q)	Mult.: A_2=+0.23 *5*; A_4=−0.05 *7* for multiplet. A_2'=+0.20 *4*.
534.0	26[&] *3*	3977.6	41/2−	3443.4	37/2−	(Q)	Mult.: A_2=+0.23 *5*; A_4=−0.37 *7* for multiplet. A_2'=+0.20 *4*.
534.3	62 *3*	1896.4	23/2+	1362.1	19/2+		E_γ: from figs. 1 (gated spectra) and 2 (level scheme) of 1993Li15; Eγ=543.3 in table 1 (measured transition properties) is presumed to be

Continued on next page (footnotes at end of table)

$^{155}Gd(^{19}F,5n\gamma)$, $^{122}Sn(^{51}V,4n\gamma)$ 1993Li15,2003So08 (continued)

$\gamma(^{169}Ta)$ (continued)

E_γ[†]	I_γ[‡]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[#]	Comments
							a typographical error. Mult.: A_2=+0.23 *5*; A_4=−0.05 *7* for multiplet. A_2'=+0.28 *7* for doublet.
549.2	65 *3*	2171.4	25/2+	1622.1	21/2+		Mult.: A_2=+0.38 *6*; A_4=−0.12 *8* for doublet. A_2'=+0.16 *10*.
550.6	60 *3*	2447.1	27/2+	1896.4	23/2+		Mult.: A_2=+0.38 *6*; A_4=−0.13 *8* for doublet. A_2'=+0.16 *10*.
558[c]		3992+y	(39/2+)	3434+y	(35/2+)		
564.7	67[&] *3*	1996.7	25/2−	1432.3	21/2−	(Q)	Mult.: A_2=+0.19 *16*; A_4=−0.15 *21*. A_2'=+0.15 *10* for doublet.
568.0	55[@] *3*	4041+x	41/2−	3473+x	37/2−	(Q)	Mult.: A_2=+0.15 *15*; A_4=−0.13 *26* for doublet to which this γ contributes 67% of total Iγ. A_2'=+0.17 *8*.
569.3	26 *3*	4152.4	41/2+	3583.0	37/2+	(Q)	Mult.: A_2=+0.15 *15*; A_4=−0.13 *20* for doublet. A_2'=+0.12 *9*.
570[ce]		3209.3+y?		2639.3+y			
576.5	57.6[&] *23*	2573.2	29/2−	1996.7	25/2−	(Q)	Mult.: A_2=+0.10 *9*; A_4=0.00 *12*. A_2'=+0.13 *9*.
579.3	68[&] *5*	2263.9	27/2−	1684.7	23/2−		Mult.: A_2=+0.38 *21*; A_4=−0.06 *25* for doublet. A_2'=+0.15 *5*.
583.7	24[&] *3*	4284.8	43/2−	3701.2	39/2−	Q	Mult.: A_2=+0.29 *15*; A_4=−0.21 *20*. A_2'=+0.15 *5*.
592.7	92[@] *3*	2221.3+x	29/2−	1628.6+x	25/2−	Q	Mult.: A_2=+0.28 *12*; A_4=−0.10 *17*. A_2'=+0.29 *6*.
609.4	24 *3*	4481.2	43/2+	3871.9	39/2+		Mult.: A_2=+0.12 *7*; A_4=−0.18 *4* for doublet.
609.9	64[@] *3*	3473+x	37/2−	2863.5+x	33/2−	Q	Mult.: A_2=+0.12 *3*; A_4=−0.19 *5* for doublet dominated by this G. A_2'=+0.23 *9*.
627.6	28[&] *5*	4604.5	45/2−	3977.6	41/2−	Q	Mult.: A_2=+0.24 *15*; A_4=−0.27 *21*. A_2'=+0.06 *14*.
630.4	36[@] *3*	4672+x	45/2−	4041+x	41/2−	Q	Mult.: A_2=+0.45 *18*; A_4=+0.04 *24*. A_2'=+0.36 *12*.
641.1	24 *3*	4793.6	45/2+	4152.4	41/2+		Mult.: A_2=+0.17 *13*; A_4=−0.03 *18* for doublet.
642.2	67[@] *3*	2863.5+x	33/2−	2221.3+x	29/2−	Q	Mult.: A_2=+0.19 *13*; A_4=−0.03 *18* for doublet. A_2'=+0.25 *8*.
665.3	26[&] *3*	4950.3	47/2−	4284.8	43/2−		Mult.: A_2=+0.1 *3*; A_4=0.0 *4*.
672.4	23 *4*	5153.6	47/2+	4481.2	43/2+	Q	Mult.: A_2=+0.36 *16*; A_4=−0.07 *21*.
697.5	27[@] *4*	5369+x	49/2−	4672+x	45/2−		Mult.: A_2=+0.08 *6*; A_4=−0.17 *8* for doublet.
698.8	25 *3*	5492.2	(49/2+)	4793.6	45/2+		Mult.: A_2=+0.06 *6*; A_4=−0.16 *8* for doublet.
705.9	26[&] *3*	5310.4	49/2−	4604.5	45/2−	(Q)	Mult.: A_2=+0.06 *16*; A_4=−0.17 *21*.
723.4	21 *3*	5877.1	(51/2+)	5153.6	47/2+	Q	Mult.: A_2=+0.34 *8*; A_4=+0.07 *11*.
732.3	15[&] *4*	5682.6	(51/2−)	4950.3	47/2−		
740	13[@] *4*	7610+x	(61/2−)	6870+x	(57/2−)		unconfirmed In $(^{51}V,^6n\gamma)$ study by 2006Ha46; not included In Adopted Gammas. Mult.: A_2=+0.08 *6* for doublet.
742	17[@] *4*	6111+x	(53/2−)	5369+x	49/2−		unconfirmed In $(^{51}V,^6n\gamma)$ study by 2006Ha46; not included In Adopted Gammas. Mult.: A_2=+0.08 *6*; A_4=−0.17 *8* for doublet.
744.7	21 *3*	6236.9	(53/2+)	5492.2	(49/2+)		
758.5	9[@] *3*	6870+x	(57/2−)	6111+x	(53/2−)		placed from J=53/2 band member In Adopted Levels, Gammas.
764.7[e]	7 *3*	6642.1?	(55/2+)	5877.1	(51/2+)		
768[e]	19[&] *4*	6078.6?	(53/2−)	5310.4	49/2−		
783.9[e]	7 *3*	7020.4?	(57/2+)	6236.9	(53/2+)		
788[e]	7[&] *3*	6470.6?	(55/2−)	5682.6	(51/2−)		
814[e]	<6[@]	8424+x?	(65/2−)	7610+x	(61/2−)		placed from J=57/2 band member In Adopted Levels, Gammas.

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^{155}Gd(^{19}F,5nγ), ^{122}Sn(^{51}V,4nγ) 1993Li15,2003So08 (continued)

γ(^{169}Ta) (continued)

E_γ [†]	I_γ [‡]	E_i(level)	J_i^π	E_f	J_f^π	Comments
827[e]	8[&] *4*	6905.6?	(57/2$^-$)	6078.6?	(53/2$^-$)	
842[e]	7[&] *3*	7312.6?	(59/2$^-$)	6470.6?	(55/2$^-$)	
865[e]	<5[@]	9289+x?	(69/2$^-$)	8424+x?	(65/2$^-$)	
921.2[e]	<5[@]	10210+x?	(73/2$^-$)	9289+x?	(69/2$^-$)	E_γ: placed from J=65/2 band member In Adopted Levels, Gammas (a 1030γ deexcites the 73/2$^-$ 1/2[541] band member there).

† From 1993Li15; uncertainties unstated by authors. 1988Yu02 and 1989Yu03 give Eγ for only the lower half of the 1/2[541] band; their data agree with those from 1993Li15 to better than 0.6 keV.

‡ 1993Li15 report Iγ relative to that for the strongest γ within each band. Iγ data tabulated here without comment are for the 5/2[402] g.s. band and are normalized so I(485.7γ)=84.1 *25*. Iγ data for transitions within other bands are footnoted to indicate their relevant intensity normalizations.

\# Assigned by evaluator based on γ(θ). Values of A_2 and A_4 deduced by authors from (^{19}F,5nγ) data are given in comments along with values of A_2 (denoted A_2') deduced by 1993Li15 from (^{51}V,4nγ) assuming A_4=0.0.

@ Relative to I(336.7γ)=100 *6*.

& Relative to I(170.0γ)=100 *3*.

a Relative to I(205.3γ)=23 *3*.

b Relative to I(230.5γ)=100 *4*.

c From 2003So08; uncertainty unstated by authors.

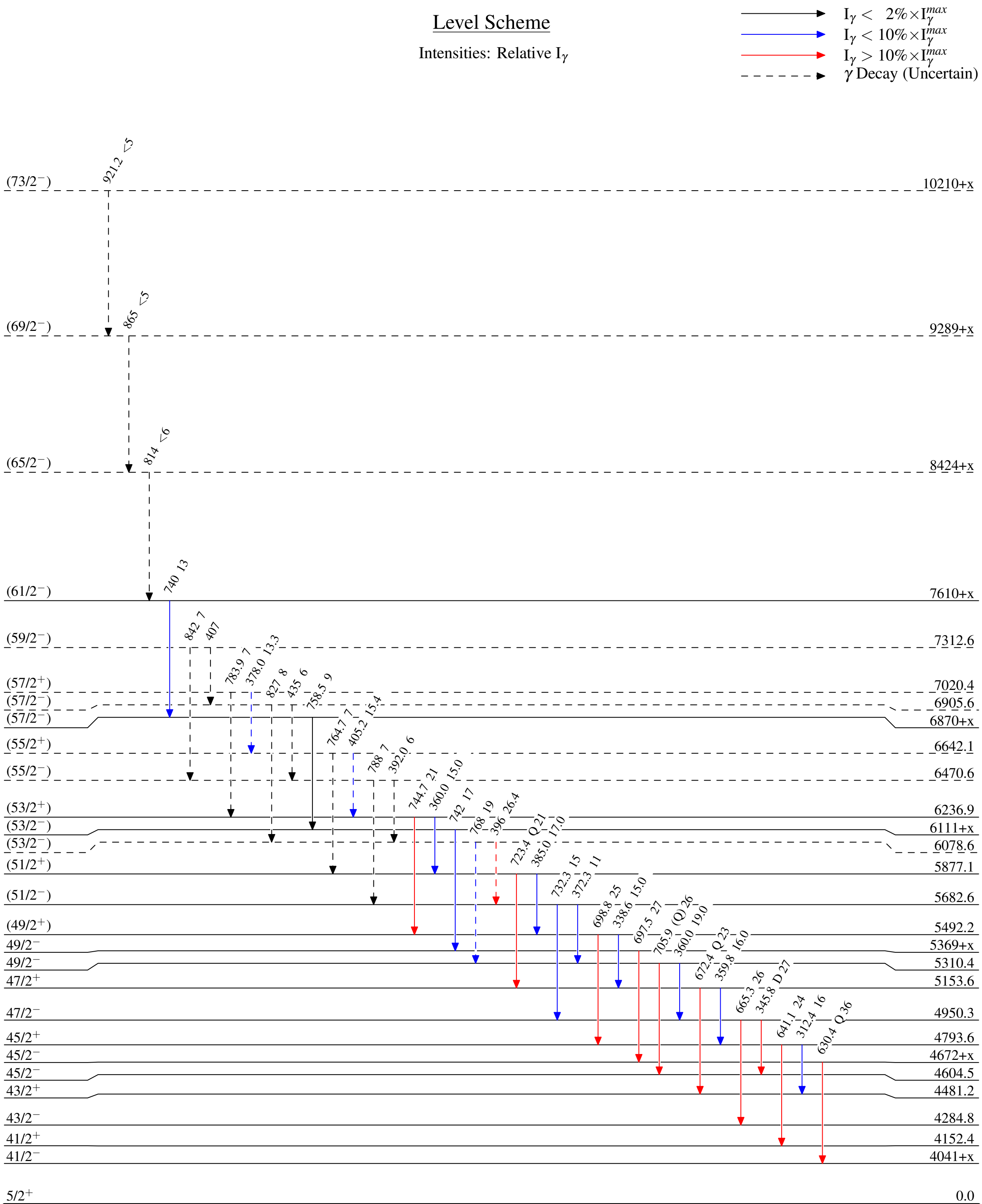
d In table 1 (observed transition properties) of 1993Li15, the intraband 494.0γ and 523.8γ are placed deexciting 27/2$^+$ and 19/2$^+$ band members, respectively; in fig. 2 (level scheme), the reverse is the case. The evaluator adopts the latter because it leads to the more plausible sequence of Eγ values for the band's ΔJ=2 γ cascade.

e Placement of transition in the level scheme is uncertain.

^{155}Gd(^{19}F,5nγ), ^{122}Sn(^{51}V,4nγ) 1993Li15,2003So08

Level Scheme

Intensities: Relative I_γ

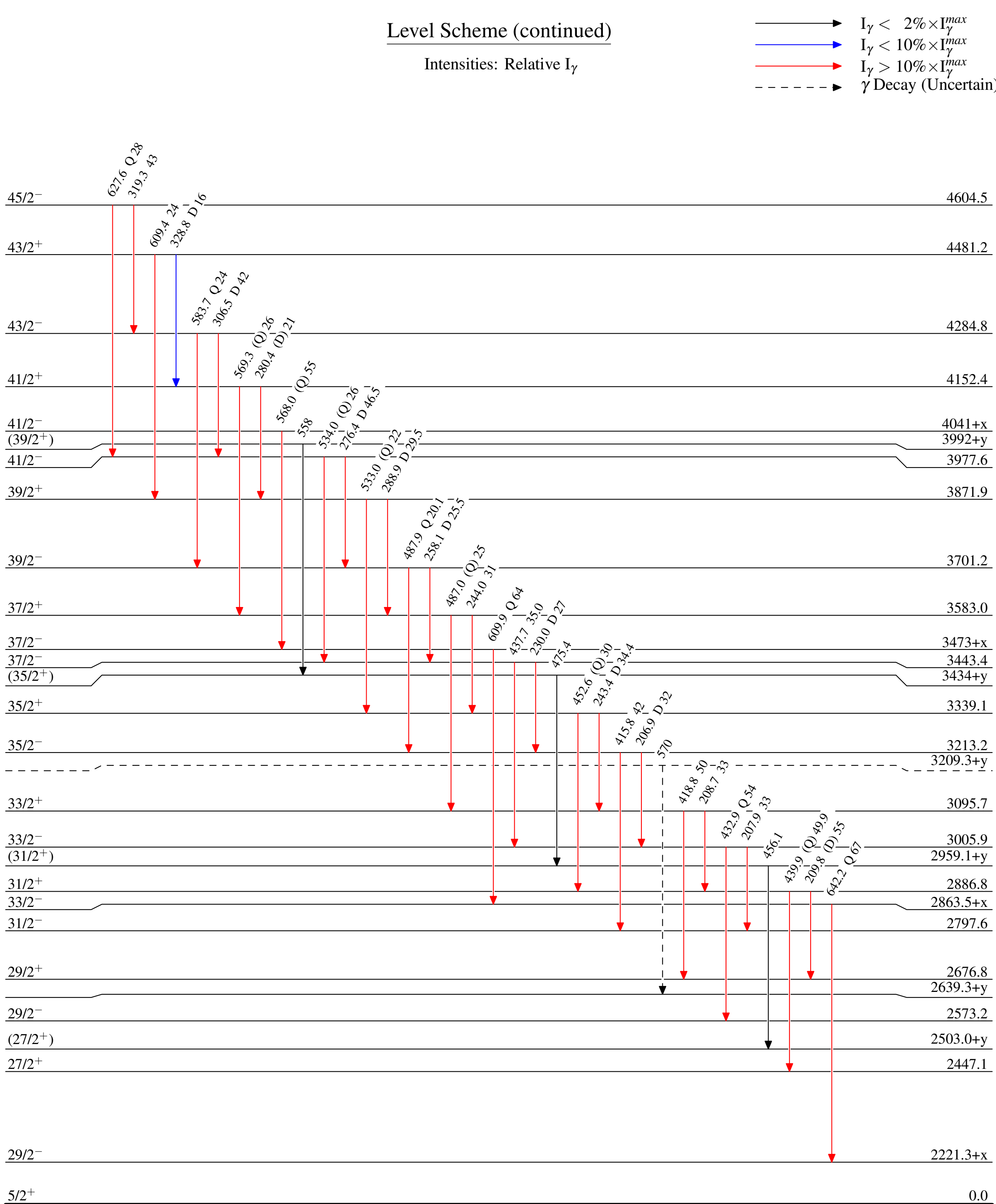


$^{169}_{73}Ta_{96}$

$^{155}Gd(^{19}F,5n\gamma)$, $^{122}Sn(^{51}V,4n\gamma)$ 1993Li15,2003So08

Level Scheme (continued)

Intensities: Relative I_γ

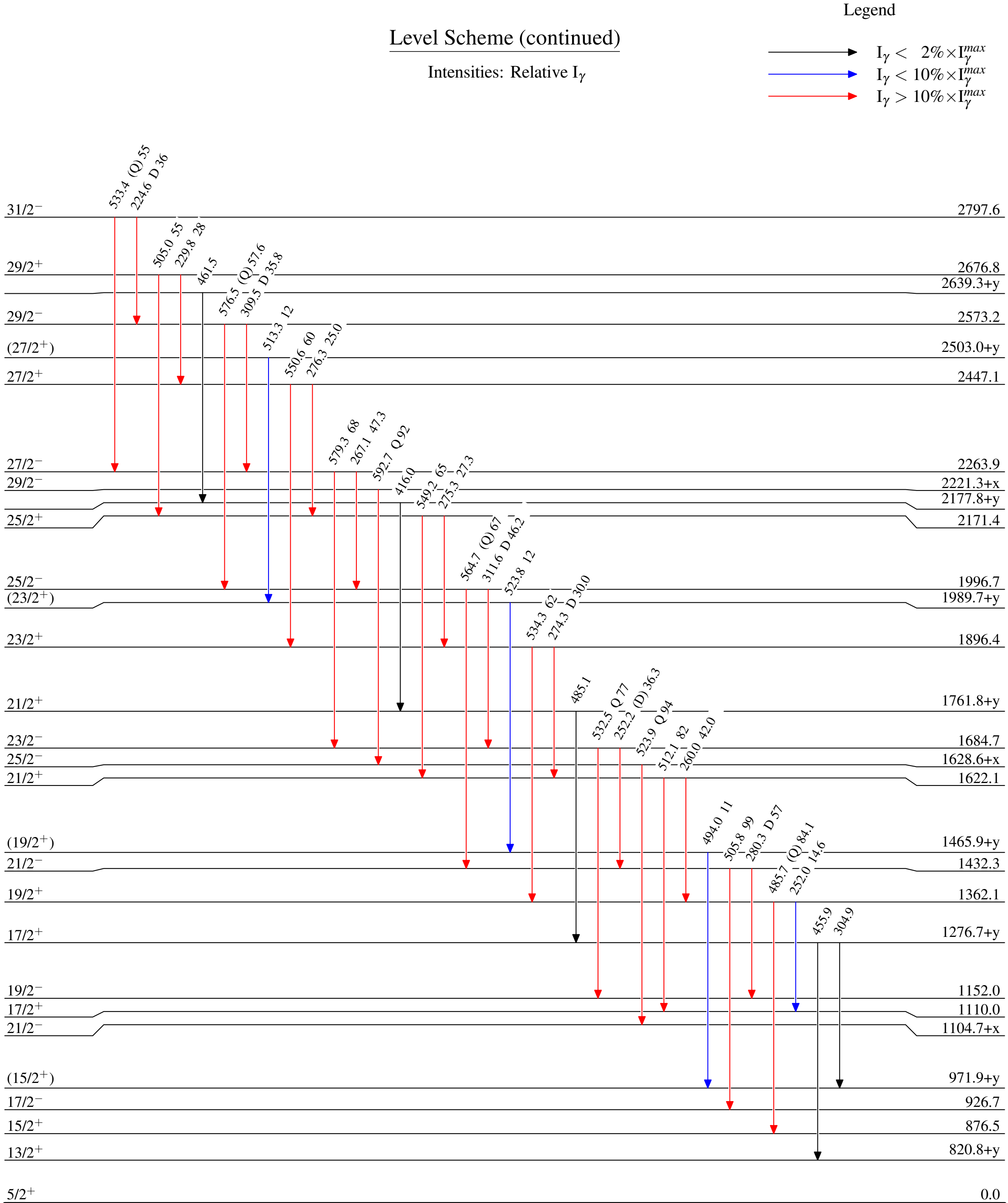


$^{169}_{73}Ta_{96}$

^{155}Gd(^{19}F,5nγ), ^{122}Sn(^{51}V,4nγ) 1993Li15,2003So08

Level Scheme (continued)

Intensities: Relative I_γ

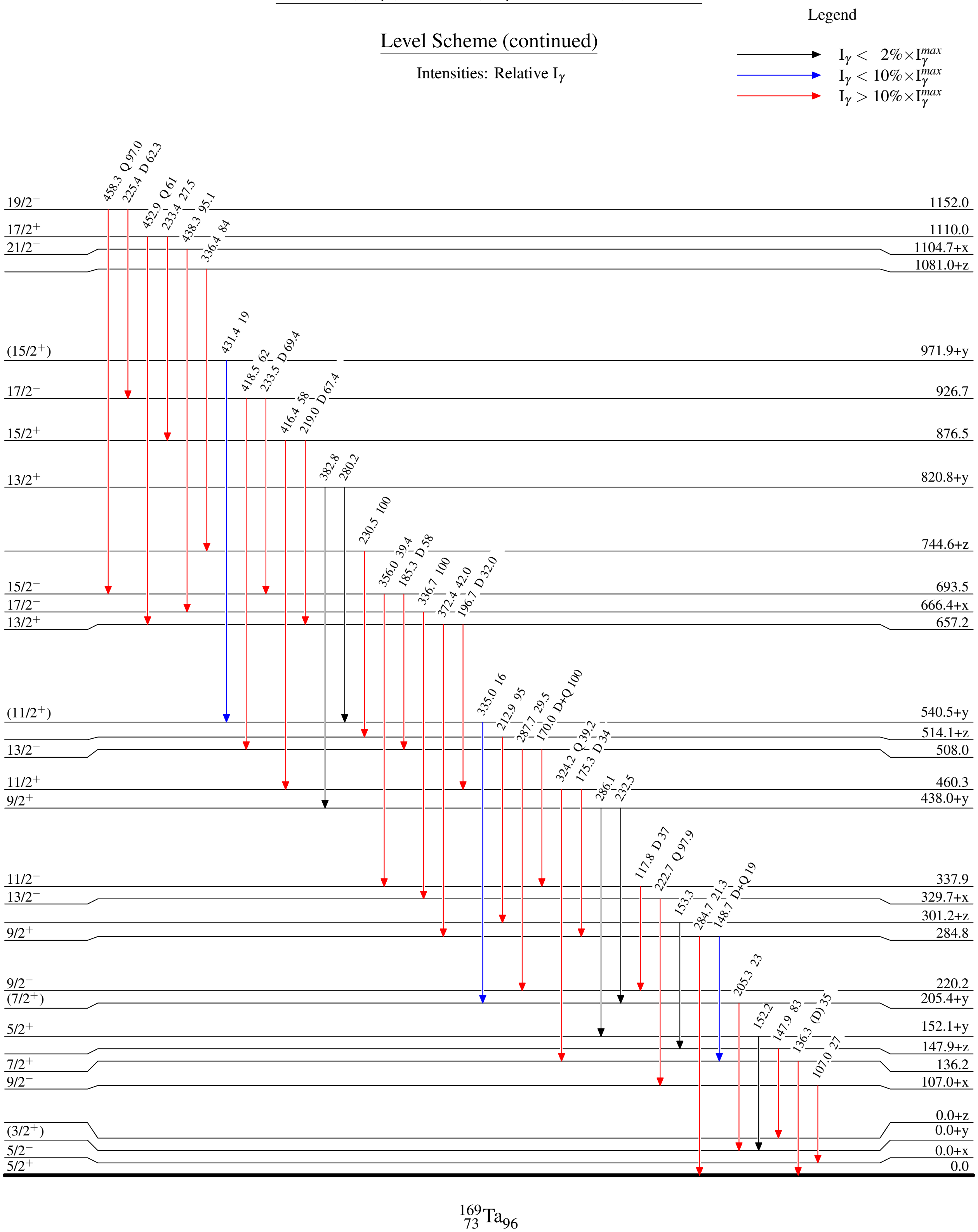


$^{169}_{73}$Ta$_{96}$

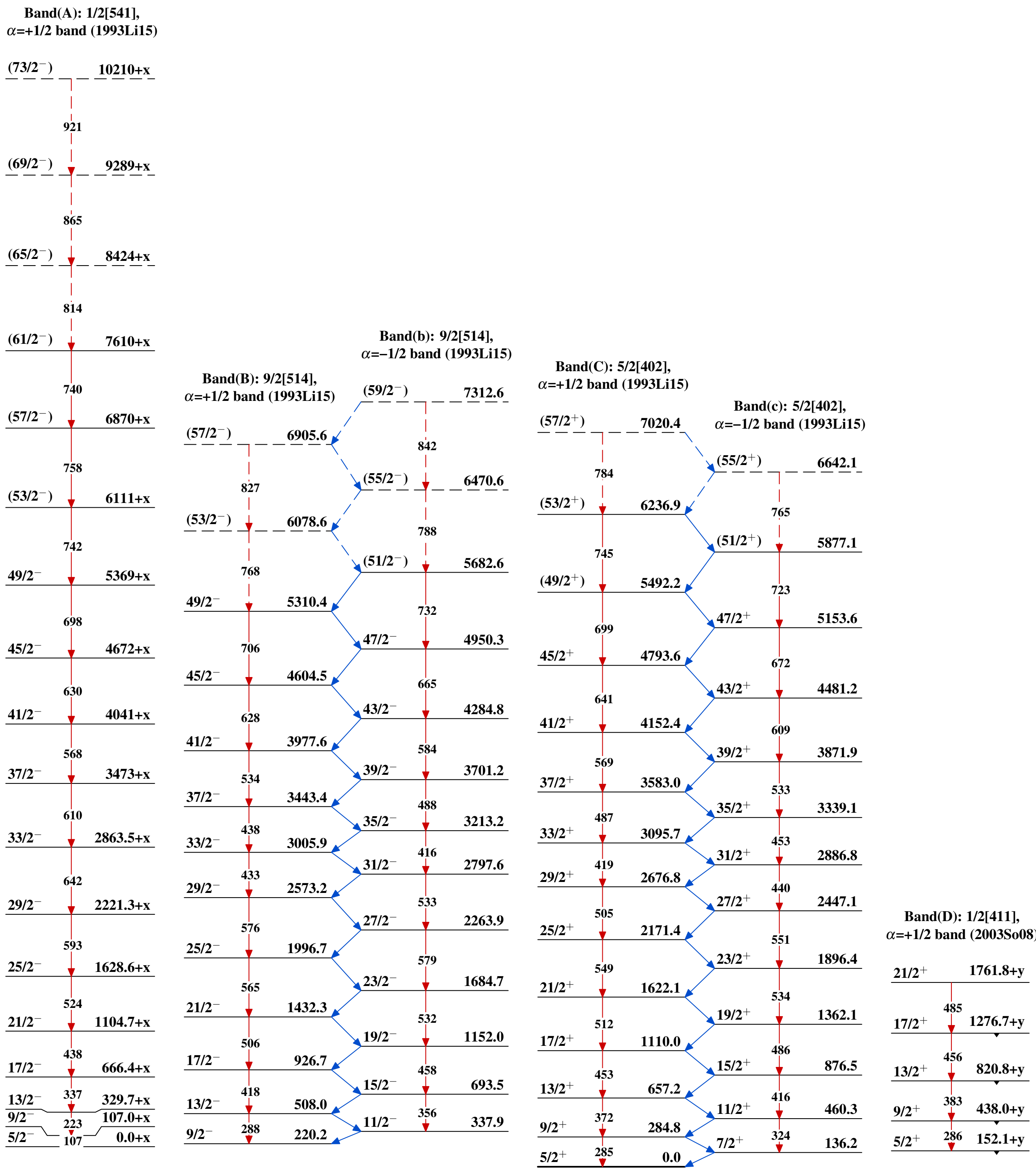
$^{155}Gd(^{19}F,5n\gamma)$, $^{122}Sn(^{51}V,4n\gamma)$ 1993Li15,2003So08

Level Scheme (continued)

Intensities: Relative I_γ

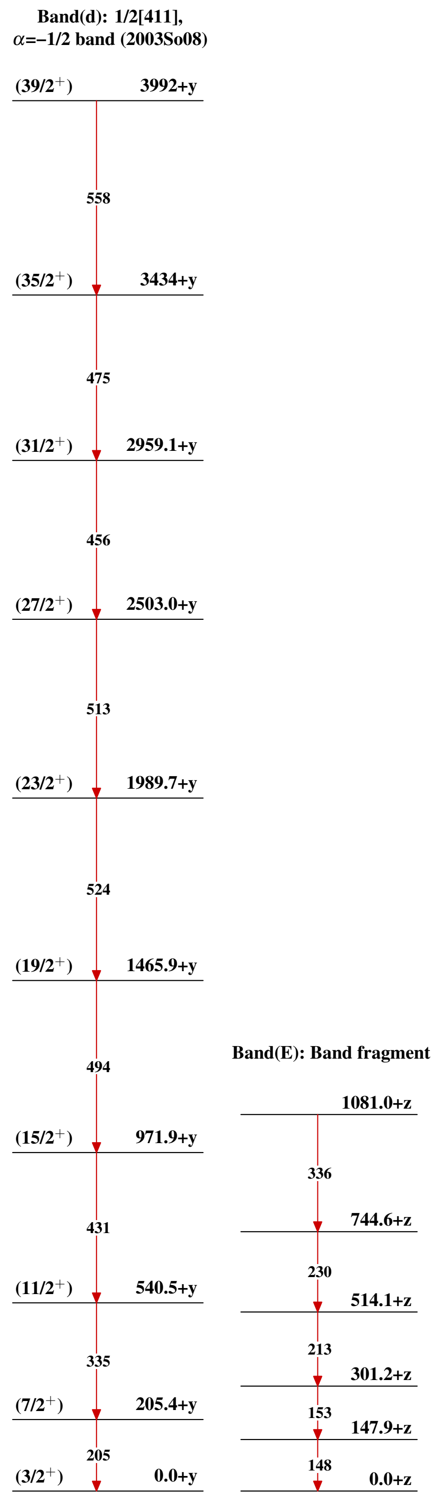


$^{155}Gd(^{19}F,5n\gamma)$, $^{122}Sn(^{51}V,4n\gamma)$ 1993Li15,2003So08



$^{169}_{73}Ta_{96}$

^{155}Gd(^{19}F,5nγ), ^{122}Sn(^{51}V,4nγ) 1993Li15,2003So08 (continued)



$^{169}_{73}Ta_{96}$