(HI,xnγ) 1998Ha54

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	N. Nica	NDS 160, 1 (2019)	21-Oct-2019

Data are from a study of the two reactions ^{124}Sn(^{36}S,p4n) and ^{152}Sm(^{7}Li,4n) by 1998Ha54. They are consistent with, but much more extensive than, those from the following two earlier studies: ^{124}Sn(^{36}S,p4n), by 1996Ri02 (by many of the authors of 1998Ha54); and ^{148}Nd(^{11}B,4n), ^{150}Nd(^{11}B,6n), by 1982Be46. These earlier studies are not further referenced here.

Data set adapted by the evaluator from the XUNDL data file compilation of the work of 1998Ha54 by J. Chenkin and B. Singh (McMaster Univ.) and D. Radford (ORNL) (June 1, 1999).

^{124}Sn(^{36}S,p4nγ): E(^{36}S)=165 MeV. Two thin (≈0.35 mg/cm^2) stacked targets. Measured Eγ, Iγ, γγ, and DCO ratios using the GAMMASPHERE array having 93 Compton-suppressed Ge detectors.

^{152}Sm(^{7}Li,4nγ): E(^{7}Li)=45 MeV. Single-foil target of thickness ≈5 mg/cm^2. γ radiation studied using three Compton-suppressed Ge detectors placed at 90° with respect to the beam direction and two other such detectors placed at 145°. Measured γγ and DCO ratios to determine γ-ray multipolarities.

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         Band-labeling conventions of 1998Ha54
   for neutrons:
     A      α=+1/2,  π=+,   the lowest orbital associated with the
                              i13/2    spherical shell-model state
     B      α=-1/2,  π=+,   the lowest orbital associated with the
                              i13/2    spherical shell-model state
     C      α=+1/2   , π=+,  the next lowest orbital associated with
                              the i13/2    spherical shell model state
     D      α=-1/2   , π=+,  the next lowest orbital associated with
                              the i13/2    spherical shell model state
     E      α=+1/2   , π=-,  mixture of orbitals from the h9/2    and
                              f7/2   shells
     F      α=-1/2   , π=-,  mixture of orbitals from the h9/2    and
                              f7/2   shells
   for protons:
     Ap     α=-1/2   , π=-,  orbital associated with the h11/2
                              spherical shell-model state
     Bp     α=+1/2   , π=-,  orbital associated with the h11/2
                              spherical shell-model state
     Cp     α=-1/2   , π=-,  orbital associated with the h11/2
                              spherical shell-model state
     Dp     α=+1/2   , π=-,  orbital associated with the h11/2
                              spherical shell-model state
     Ep     α=+1/2   , π=+,  orbital associated with the d5/2    state
     Fp     α=-1/2   , π=+,  orbital associated with the d5/2    state
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^{155}Tb Levels

E(level)	Jπ†	E(level)	Jπ†	E(level)	Jπ†	E(level)	Jπ†
0.0‡	3/2+	452.4@ 4	9/2+	1056.3b 3	19/2−	1911.3a 4	25/2−
65.5# 3	5/2+	555.2a 3	13/2−	1161.6‡ 3	19/2+	1923.7# 4	25/2+
155.80‡ 20	7/2+	576.0# 3	13/2+	1170.1@ 4	17/2+	2071.0b 4	27/2−
227.00a 20	5/2−	595.8& 4	11/2+	1376.3a 4	21/2−	2176.0‡ 4	27/2+
249.9b 3	7/2−	673.0b 3	15/2−	1394.1& 4	19/2+	2177.1@ 4	25/2+
274.16# 24	9/2+	747.5‡ 3	15/2+	1411.6# 3	21/2+	2452.8& 4	27/2+
317.0a 3	9/2−	766.8@ 4	13/2+	1528.2b 4	23/2−	2485.4# 4	29/2+
334.8& 5	7/2+	916.8a 3	17/2−	1641.0‡ 3	23/2+	2498.7a 4	29/2−
397.3b 3	11/2−	955.3& 4	15/2+	1645.0@ 4	21/2+	2662.2b 4	31/2−
408.65‡ 25	11/2+	959.0# 3	17/2+	1897.4& 4	23/2+	2745.1c 4	27/2(+)

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(HI,xnγ) 1998Ha54 (continued)

^{155}Tb Levels (continued)

E(level)	J^{π}[†]	E(level)	J^{π}[†]	E(level)	J^{π}[†]	E(level)	J^{π}[†]
2748.5[@] *5*	$29/2^+$	4349.5[b] *5*	$43/2^-$	6970.0[c] *19*	$(55/2^+)$	10132.5[b] *21*	$(71/2^-)$
2756.3[‡] *4*	$31/2^+$	4572.3[‡] *5*	$43/2^+$	6997.5[a] *11*	$(57/2^-)$	10453[‡] *3*	$(71/2^+)$
3058.4[&] *7*	$31/2^+$	4669.4[a] *5*	$45/2^-$	7190.4[#] *18*	$(57/2^+)$	10503[c] *3*	$(71/2^+)$
3069.4[a] *4*	$33/2^-$	4762.0[c] *6*	$(43/2^+)$	7340.5[b] *12*	$(59/2^-)$	10978.5[a] *23*	$(73/2^-)$
3084.3[#] *4*	$33/2^+$	4895.4[#] *5*	$(45/2^+)$	7617.9[‡] *19*	$(59/2^+)$	11130.5[b] *24*	$(75/2^-)$
3104.4[c] *5*	$31/2^{(+)}$	4994.9[b] *5*	$(47/2^-)$	7793.0[c] *21*	$(59/2^+)$	11481[c] *3*	$(75/2^+)$
3246.5[b] *4*	$35/2^-$	5238.9[‡] *6*	$(47/2^+)$	7913.5[a] *15*	$(61/2^-)$	11482?[‡] *3*	$(75/2^+)$
3358.2[@] *7*	$(33/2^+)$	5367.9[a] *5*	$(49/2^-)$	8053.4[#] *21*	$(61/2^+)$	12088.5[a] *25*	$(77/2^-)$
3367.4[‡] *4*	$35/2^+$	5453.0[c] *12*	$(47/2^+)$	8233.5[b] *16*	$(63/2^-)$	12174[b] *3*	$(79/2^-)$
3533.1[a] *4*	$37/2^-$	5597.4[#] *12*	$(49/2^+)$	8519.9[‡] *21*	$(63/2^+)$	12513?[c] *3*	$(79/2^+)$
3571.6[c] *5*	$35/2^{(+)}$	5712.7[b] *8*	$(51/2^-)$	8662.0[c] *23*	$(63/2^+)$	13223[a] *3*	$(81/2^-)$
3681.2[#] *5*	$37/2^+$	5969.9[‡] *12*	$(51/2^+)$	8886.5[a] *18*	$(65/2^-)$	13284[b] *3*	$(83/2^-)$
3777.3[b] *5*	$39/2^-$	6146.4[a] *9*	$(53/2^-)$	8956.4[#] *23*	$(65/2^+)$	14469[b] *3*	$(87/2^-)$
3966.9[‡] *5*	$39/2^+$	6190.0[c] *16*	$(51/2^+)$	9166.5[b] *19*	$(67/2^-)$	15734[b] *3*	$(91/2^-)$
4056.5[a] *5*	$41/2^-$	6364.4[#] *15*	$(53/2^+)$	9466.9[‡] *23*	$(67/2^+)$	17070?[b] *4*	$(95/2^-)$
4130.0[c] *6*	$(39/2^+)$	6497.5[b] *10*	$(55/2^-)$	9569[c] *3*	$(67/2^+)$		
4259.6[#] *5*	$41/2^+$	6764.9[‡] *16*	$(55/2^+)$	9909.5[a] *21*	$(69/2^-)$		

[†] From the adopted values. For those levels seen only in the heavy ion-induced reactions, the values are those reported by 1998Ha54 from the usual considerations of expected band structure and the multipolarities of the deexciting γ transitions.
[‡] Band(A): 3/2[411] band, signature=−1/2 portion. Band is crossed by AB and, at higher energies, by A_pB_p.
[#] Band(B): 3/2[411] band, signature=+1/2 portion. Band is crossed by AB and, at higher energies, by A_pB_p.
[@] Band(C): 5/2[413] band, signature=+1/2 portion. Band observed only in the (^{7}Li,4nγ) reaction. Band crossing by AB is observed.
[&] Band(D): 5/2[413] band,signature=−1/2 portion. Band observed only in the (^{7}Li,4nγ) reaction. Band crossing by AB is observed.
[a] Band(E): "5/2[532]" band, signature=+1/2 portion. Band is strongly mixed with other orbitals associated with the $h_{11/2}$ shell-model state. Band is crossed by AB and, at higher energies, most likely, by A_pD_p.
[b] Band(F): "5/2[532]" band, signature=−1/2 portion. Band is strongly mixed with other orbitals associated with the $h_{11/2}$ shell-model state. Band is crossed by AB and, at higher energies, by B_pC_p.
[c] Band(G): Decoupled band, signature=−1/2. Probable configuration is A_pAF. Band is crossed by BC and, at higher energies, by B_pC_p. Positive parity suggested by 1998Ha54, based on assumed similarity with ^{153}Tb.

γ(^{155}Tb)

1998Ha54 do not list multipolarities for the γ transitions. However, they do present and discuss B(M1)/B(E2) ratios for the decay of a number of levels. It appears that DCO ratios near unity correspond to $\Delta J=2$ (presumably E2) transitions, while those smaller than unity may correspond to $\Delta J=1$ transitions. These authors do not explicitly list their deduced multipolarities, and the evaluator has not listed them here.

Relative intensities from 1998Ha54 measured in (^{7}Li,4nγ) and (^{36}S,p4nγ) reactions are rather discrepant. When both are available adopted are those from (^{7}Li,4nγ) which are generally more precise.

E_{γ}[†&]	E_i(level)	J^{π}_i	E_f	J^{π}_f	Comments
65.5	65.5	$5/2^+$	0.0	$3/2^+$	E_{γ}: nominal value from Adopted Gammas.
67.0	317.0	$9/2^-$	249.9	$7/2^-$	E_{γ}: nominal value from Adopted Gammas.
80.4	397.3	$11/2^-$	317.0	$9/2^-$	E_{γ}: nominal value from Adopted Gammas.

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(HI,xnγ) 1998Ha54 (continued)

γ(^{155}Tb) (continued)

$E_γ$ [†&]	$I_γ$ [‡]	E_i(level)	$J^π_i$	E_f	$J^π_f$	Comments
90.3		155.80	7/2+	65.5	5/2+	$E_γ$: nominal value from Adopted Gammas.
118.0 *2*	47 *2*	673.0	15/2−	555.2	13/2−	DCO=0.85 *5*. $I_γ$: 32 *4* (^{36}S,p4nγ).
118.3 *2*	69 *4*	274.16	9/2+	155.80	7/2+	DCO=0.90 *5*. $I_γ$: 33 *4* (^{36}S,p4nγ).
123.3 *5*	≈1	397.3	11/2−	274.16	9/2+	
134.5 *2*	60 *3*	408.65	11/2+	274.16	9/2+	DCO=0.85 *5*. $I_γ$: 24 *3* (^{36}S,p4nγ).
139.4 *2*	25 *1*	1056.3	19/2−	916.8	17/2−	DCO=0.70 *4*. $I_γ$: 22 *3* (^{36}S,p4nγ).
147.4 *2*	≈10	397.3	11/2−	249.9	7/2−	
151.9 *2*	9.6 *5*	1528.2	23/2−	1376.3	21/2−	DCO=0.73 *4*. $I_γ$: 12 *2* (^{36}S,p4nγ).
155.8 *2*	≈15	155.80	7/2+	0.0	3/2+	
157.9 *2*	81 *4*	555.2	13/2−	397.3	11/2−	DCO=0.85 *3*. $I_γ$: 45 *5* (^{36}S,p4nγ).
159.7 *2*	4.8 *3*	2071.0	27/2−	1911.3	25/2−	DCO=0.53 *5*. $I_γ$: 7 *1* (^{36}S,p4nγ).
161.3 *2*	≈20	317.0	9/2−	155.80	7/2+	
163.3 *2*	2.4 *2*	2662.2	31/2−	2498.7	29/2−	DCO=0.62 *8*. $I_γ$: 6 *1* (^{36}S,p4nγ).
167.4 *2*	48 *2*	576.0	13/2+	408.65	11/2+	DCO=0.78 *3*. $I_γ$: 21 *2* (^{36}S,p4nγ).
171.4 *2*	32 *1*	747.5	15/2+	576.0	13/2+	DCO=0.73 *2*. $I_γ$: 14 *2* (^{36}S,p4nγ).
177.2 *2*	1.5 *1*	3246.5	35/2−	3069.4	33/2−	DCO=0.62 *8*. $I_γ$: 7 *1* (^{36}S,p4nγ).
184.6 *2*	≈165	249.9	7/2−	65.5	5/2+	DCO=0.64 *1*.
202.6 *5*	2.7 *2*	452.4	9/2+	249.9	7/2−	DCO=0.56 *6*.
202.6 *2*	17.6 *8*	1161.6	19/2+	959.0	17/2+	DCO=0.68 *4*. $I_γ$: 11 *2* (^{36}S,p4nγ).
208.8 *2*	24 *1*	274.16	9/2+	65.5	5/2+	DCO=1.03 *6*. $I_γ$: 11 *3* (^{36}S,p4nγ).
211.4 *2*	26 *1*	959.0	17/2+	747.5	15/2+	DCO=0.76 *4*. $I_γ$: 14 *2* (^{36}S,p4nγ).
227.0 *2*	65	227.00	5/2−	0.0	3/2+	DCO=0.69 *2*.
229.1 *2*	9.9 *5*	1641.0	23/2+	1411.6	21/2+	DCO=0.70 *3*. $I_γ$: 7 *2* (^{36}S,p4nγ).
238.2 *2*	35 *2*	555.2	13/2−	317.0	9/2−	DCO=1.06 *4*. $I_γ$: 21 *2* (^{36}S,p4nγ).
243.8 *2*	54 *2*	916.8	17/2−	673.0	15/2−	DCO=0.81 *2*. $I_γ$: 47 4 (^{36}S,p4nγ).
244.0 *2*	2.4 *2*	3777.3	39/2−	3533.1	37/2−	DCO=0.75 *2*. $I_γ$: 18 *2* (^{36}S,p4nγ).
249.8 *2*	14.5 *6*	1411.6	21/2+	1161.6	19/2+	DCO=0.70 *3*. $I_γ$: 10 *2* (^{36}S,p4nγ).
252.2 *2*	5.7 *7*	2176.0	27/2+	1923.7	25/2+	$I_γ$: from Iγ(252)/Iγ(535) in (^{7}Li,4nγ) and Iγ(535) in (^{36}S,p4nγ). From (^{36}S,p4nγ), Iγ<5.
252.8 *2*	38 *3*	408.65	11/2+	155.80	7/2+	DCO=0.98 *3*. $I_γ$: 27 *5* (^{36}S,p4nγ).
260.9 *5*	2.3 *1*	595.8	11/2+	334.8	7/2+	DCO=1.1 *1*.
269.4 *5*	3.0 *2*	334.8	7/2+	65.5	5/2+	
270.7 *5*	2.3 *1*	2756.3	31/2+	2485.4	29/2+	DCO=0.53 *5*. $I_γ$: <5 (^{36}S,p4nγ).

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(HI,xnγ) 1998Ha54 (continued)

γ(^{155}Tb) (continued)

E_γ [†&]	I_γ [‡]	E_i(level)	J_i^π	E_f	J_f^π	Comments
275.6 2	71 3	673.0	15/2⁻	397.3	11/2⁻	DCO=1.02 3. Iγ: 53 5 (^{36}S,p4nγ).
278.7 5	3.6 3	595.8	11/2⁺	317.0	9/2⁻	DCO=0.46 5.
279.1 2	2.4 1	4056.5	41/2⁻	3777.3	39/2⁻	DCO=0.63 4. Iγ: 21 2 (^{36}S,p4nγ).
282.8 2	7.2 3	1923.7	25/2⁺	1641.0	23/2⁺	DCO=0.69 3. Iγ: 11 2 (^{36}S,p4nγ).
283.1 5	1.3 1	3367.4	35/2⁺	3084.3	33/2⁺	DCO=0.53 4. Iγ: <5 (^{36}S,p4nγ).
286.5 2	6.9 3	3533.1	37/2⁻	3246.5	35/2⁻	DCO=0.59 2. Iγ: 31 3 (^{36}S,p4nγ).
293.2 2	1.4 1	4349.5	43/2⁻	4056.5	41/2⁻	DCO=0.7 1. Iγ: 17 2 (^{36}S,p4nγ).
296.7 5	1.7 1	452.4	9/2⁺	155.80	7/2⁺	DCO=0.46 6.
301.8 2	64 3	576.0	13/2⁺	274.16	9/2⁺	DCO=1.00 5. Iγ: 32 4 (^{36}S,p4nγ).
309.4 2	4.5 2	2485.4	29/2⁺	2176.0	27/2⁺	DCO=0.61 4. Iγ: 7 2 (^{36}S,p4nγ).
314.0 5	1.4 1	3681.2	37/2⁺	3367.4	35/2⁺	Iγ: <5 (^{36}S,p4nγ).
314.6 5	3.4 2	766.8	13/2⁺	452.4	9/2⁺	DCO=1.02 7.
320.0[a] 2	29[a] 1	1376.3	21/2⁻	1056.3	19/2⁻	DCO=0.78 4. Iγ: 27 3 (^{36}S,p4nγ).
320.0[a] 2	1.0[a] 1	4669.4	45/2⁻	4349.5	43/2⁻	Iγ: 11 2 (^{36}S,p4nγ).
321.6 5	3.0 2	595.8	11/2⁺	274.16	9/2⁺	DCO=0.59 7.
325.4[b] 2	17[@] 2	4994.9	(47/2⁻)	4669.4	45/2⁻	Iγ: Iγ<1, in (^{7}Li,4nγ).
328.0 5	2.1 1	3084.3	33/2⁺	2756.3	31/2⁺	DCO=0.56 7. Iγ: <5 (^{36}S,p4nγ).
338.8 2	69 3	747.5	15/2⁺	408.65	11/2⁺	DCO=1.04 2. Iγ: 34 3 (^{36}S,p4nγ).
343[#] 1	5[@] 2	7340.5	(59/2⁻)	6997.5	(57/2⁻)	
345[#] 1	14[@] 3	5712.7	(51/2⁻)	5367.9	(49/2⁻)	
351[#] 1	8[@] 3	6497.5	(55/2⁻)	6146.4	(53/2⁻)	
358.5 5	2.1 1	766.8	13/2⁺	408.65	11/2⁺	DCO=0.51 5.
359.3 2	3.9 2	3104.4	31/2$^{(+)}$	2745.1	27/2$^{(+)}$	DCO=1.2 2. Iγ: 8 3 (^{36}S,p4nγ).
359.5 2	9.7 5	955.3	15/2⁺	595.8	11/2⁺	DCO=1.02 6.
361.7 2	48 2	916.8	17/2⁻	555.2	13/2⁻	DCO=0.99 4. Iγ: 40 6 (^{36}S,p4nγ).
369.7 5	2.2 1	766.8	13/2⁺	397.3	11/2⁻	DCO=0.64 6.
373[#] 1	8[@] 2	5367.9	(49/2⁻)	4994.9	(47/2⁻)	
379.4 5	3.2 3	955.3	15/2⁺	576.0	13/2⁺	DCO=0.39 5.
382.9 2	61 3	959.0	17/2⁺	576.0	13/2⁺	DCO=1.02 3. Iγ: 32 3 (^{36}S,p4nγ).
383.1 2	22 1	1911.3	25/2⁻	1528.2	23/2⁻	DCO=0.88 5. Iγ: 19 2 (^{36}S,p4nγ).
383.3 2	116 5	1056.3	19/2⁻	673.0	15/2⁻	DCO=1.01 3. Iγ: 88 6 (^{36}S,p4nγ).
400.1 5	4.0 2	955.3	15/2⁺	555.2	13/2⁻	DCO=0.49 5.
403.4 2	8.0 4	1170.1	17/2⁺	766.8	13/2⁺	DCO=0.88 8.
407.1 2	8.7 4	3069.4	33/2⁻	2662.2	31/2⁻	DCO=0.75 3. Iγ: 27 4 (^{36}S,p4nγ).
414.0 2	62 3	1161.6	19/2⁺	747.5	15/2⁺	DCO=1.04 2. Iγ: 36 8 (^{36}S,p4nγ).

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(HI,xnγ) 1998Ha54 (continued)

γ(^{155}Tb) (continued)

E_γ [†&]	I_γ [‡]	E_i(level)	J^π_i	E_f	J^π_f	Comments
422.3 *5*	2.1 *1*	1170.1	17/2+	747.5	15/2+	
427.6 *2*	9.5 *5*	2498.7	29/2−	2071.0	27/2−	DCO=0.74 *4*. I_γ: 18 *3* (^{36}S,p4nγ).
434[#] *1*	<5[@]	6146.4	(53/2−)	5712.7	(51/2−)	
435.3 *5*	1.8 *1*	1394.1	19/2+	959.0	17/2+	
438.7 *2*	12.0 *6*	1394.1	19/2+	955.3	15/2+	DCO=0.91 *7*.
452.6 *2*	48 *2*	1411.6	21/2+	959.0	17/2+	DCO=0.99 *3*. I_γ: 35 *5* (^{36}S,p4nγ).
459.4 *2*	44 *2*	1376.3	21/2−	916.8	17/2−	DCO=1.02 *4*. I_γ: 38 4 (^{36}S,p4nγ).
463.7 *2*	7.5 *4*	3533.1	37/2−	3069.4	33/2−	DCO=0.99 *9*. I_γ: 30 *6* (^{36}S,p4nγ).
467.2 *2*	2.8 *2*	3571.6	35/2(+)	3104.4	31/2(+)	DCO=1.1 *2*. I_γ: 8 *3* (^{36}S,p4nγ).
471.9 *2*	100	1528.2	23/2−	1056.3	19/2−	DCO=1.02 *2*. I_γ: 100 (^{36}S,p4nγ).
475.1 *2*	10.2 *5*	1645.0	21/2+	1170.1	17/2+	DCO=1.07 *9*.
477.2 *5*	3.8 *3*	1394.1	19/2+	916.8	17/2−	
479.3 *2*	51 *2*	1641.0	23/2+	1161.6	19/2+	DCO=1.00 *2*. I_γ: 35 *7* (^{36}S,p4nγ).
484.1 *5*	2.1 *1*	1645.0	21/2+	1161.6	19/2+	
485.9 *5*	1.6 *1*	1897.4	23/2+	1411.6	21/2+	
497.4 *5*	2.9 *2*	1170.1	17/2+	673.0	15/2−	
500[#] *1*	<5[@]	6997.5	(57/2−)	6497.5	(55/2−)	
503.3 *2*	11.8 *6*	1897.4	23/2+	1394.1	19/2+	DCO=1.08 *7*.
512.1 *2*	33 *2*	1923.7	25/2+	1411.6	21/2+	DCO=0.95 *3*. I_γ: 34 *6* (^{36}S,p4nγ).
520.9 *5*	2.2 *1*	1897.4	23/2+	1376.3	21/2−	
523.3 *2*	4.6 *2*	4056.5	41/2−	3533.1	37/2−	DCO=1.0 *1*. I_γ: 36 *5* (^{36}S,p4nγ).
530.9 *2*	7.2 *4*	3777.3	39/2−	3246.5	35/2−	DCO=1.04 *5*. I_γ: 41 4 (^{36}S,p4nγ).
532.4 *2*	10.8 *6*	2177.1	25/2+	1645.0	21/2+	DCO=0.85 *6*.
534.2 *5*	2.4 *3*	2177.1	25/2+	1641.0	23/2+	E_γ: poor fit. Level-energy difference=536.1 *5*.
535.0 *2*	34 *2*	2176.0	27/2+	1641.0	23/2+	DCO=0.96 *3*. I_γ: 34 *5* (^{36}S,p4nγ).
535.1 *2*	32 *1*	1911.3	25/2−	1376.3	21/2−	DCO=1.02 *4*. I_γ: 33 *3* (^{36}S,p4nγ).
542.8 *2*	74 *3*	2071.0	27/2−	1528.2	23/2−	DCO=1.02 *2*. I_γ: 105 *8*(^{36}S,p4nγ).
555.4 *2*	9.8 *5*	2452.8	27/2+	1897.4	23/2+	DCO=1.02 *6*.
558.4 *2*	1.0 *1*	4130.0	(39/2+)	3571.6	35/2(+)	I_γ: 7 *2* (^{36}S,p4nγ).
561.7 *2*	22 *1*	2485.4	29/2+	1923.7	25/2+	DCO=1.01 *4*. I_γ: 32 6 (^{36}S,p4nγ).
570.8 *2*	10.8 *5*	3069.4	33/2−	2498.7	29/2−	DCO=1.04 *7*. I_γ: 32 *3* (^{36}S,p4nγ).
571.4 *2*	6.1 *3*	2748.5	29/2+	2177.1	25/2+	DCO=1.05 *9*.
572.3 *2*	32 *4*	4349.5	43/2−	3777.3	39/2−	DCO=1.07 *5*. I_γ: 32 *4* (^{36}S,p4nγ).
578.4 *2*	2.7 *1*	4259.6	41/2+	3681.2	37/2+	DCO=1.2 *1*. I_γ: 21 5 (^{36}S,p4nγ).
580.4 *2*	18.5 *8*	2756.3	31/2+	2176.0	27/2+	DCO=0.98 *5*. I_γ: 28 *6* (^{36}S,p4nγ) =18.5 *8*, in (^{7}Li,4nγ).

Continued on next page (footnotes at end of table)

(HI,xnγ) 1998Ha54 (continued)

γ(^{155}Tb) (continued)

E_γ [†&]	I_γ [‡]	E_i(level)	J^π_i	E_f	J^π_f	Comments
584.3 *2*	19.3 *9*	3246.5	35/2⁻	2662.2	31/2⁻	DCO=1.02 *3*. I_γ: 70 *7* (^{36}S,p4nγ).
587.4 *2*	16.8 *8*	2498.7	29/2⁻	1911.3	25/2⁻	DCO=0.9 *1*. I_γ: 34 *6* (^{36}S,p4nγ).
589.2 *5*	2.1 *2*	1645.0	21/2⁺	1056.3	19/2⁻	
591.3 *2*	43 *2*	2662.2	31/2⁻	2071.0	27/2⁻	DCO=1.03 *3*. I_γ: 108 *9* (^{36}S,p4nγ).
596.9 *2*	8.4 *4*	3681.2	37/2⁺	3084.3	33/2⁺	DCO=0.92 *4*. I_γ: 24 *8* (^{36}S,p4nγ).
598.8 *2*	12.7 *6*	3084.3	33/2⁺	2485.4	29/2⁺	DCO=0.92 *4*. I_γ: 28 *8* (^{36}S,p4nγ).
599.5 *2*	4.5 *2*	3966.9	39/2⁺	3367.4	35/2⁺	DCO=0.90 *7*. I_γ: 24 *6* (^{36}S,p4nγ).
605.4 *2*	2.8 *1*	4572.3	43/2⁺	3966.9	39/2⁺	DCO=0.9 *1*. I_γ: 21 *4* (^{36}S,p4nγ).
605.6 *5*	4.8 *3*	3058.4	31/2⁺	2452.8	27/2⁺	DCO=0.96 *8*.
609.7 *5*	2.0 *1*	3358.2	(33/2⁺)	2748.5	29/2⁺	
611.1 *2*	10.4 *4*	3367.4	35/2⁺	2756.3	31/2⁺	DCO=1.02 *6*. I_γ: 26 *5* (^{36}S,p4nγ).
612.9 *2*	3.2 *1*	4669.4	45/2⁻	4056.5	41/2⁻	DCO=0.9 *2*. I_γ: 37 *6* (^{36}S,p4nγ).
632.0 *2*	7[@] *2*	4762.0	(43/2⁺)	4130.0	(39/2⁺)	I_γ: Iγ<1, in (^{7}Li,4nγ).
635.8 *2*	20[@] *5*	4895.4	(45/2⁺)	4259.6	41/2⁺	I_γ: Iγ<1, in (^{7}Li,4nγ).
645.4 *2*	32[@] *4*	4994.9	(47/2⁻)	4349.5	43/2⁻	I_γ: Iγ<1, in (^{7}Li,4nγ).
666.6 *2*	19[@] *4*	5238.9	(47/2⁺)	4572.3	43/2⁺	I_γ: Iγ<1, in (^{7}Li,4nγ).
674.0[b] *5*		2745.1	27/2⁽⁺⁾	2071.0	27/2⁻	I_γ: Iγ<1, in (^{7}Li,4nγ).
691[#] *1*	6[@] *2*	5453.0	(47/2⁺)	4762.0	(43/2⁺)	
698.5 *2*	37[@] *8*	5367.9	(49/2⁻)	4669.4	45/2⁻	I_γ: Iγ<1, in (^{7}Li,4nγ).
702[#] *1*	18[@] *4*	5597.4	(49/2⁺)	4895.4	(45/2⁺)	
718[#] *1*	31[@] *5*	5712.7	(51/2⁻)	4994.9	(47/2⁻)	
731[#] *1*	17[@] *4*	5969.9	(51/2⁺)	5238.9	(47/2⁺)	
737[#] *1*	6[@] *2*	6190.0	(51/2⁺)	5453.0	(47/2⁺)	
767[#] *1*	16[@] *4*	6364.4	(53/2⁺)	5597.4	(49/2⁺)	
778[#] *1*	33[@] *4*	6146.4	(53/2⁻)	5367.9	(49/2⁻)	
780[#] *1*	5[@] *1*	6970.0	(55/2⁺)	6190.0	(51/2⁺)	
785[#] *1*	31[@] *4*	6497.5	(55/2⁻)	5712.7	(51/2⁻)	
795[#] *1*	16[@] *4*	6764.9	(55/2⁺)	5969.9	(51/2⁺)	
823[#] *1*	<5[@]	7793.0	(59/2⁺)	6970.0	(55/2⁺)	
826[#] *1*	15[@] *4*	7190.4	(57/2⁺)	6364.4	(53/2⁺)	
833.8 *2*	9 *3*	2745.1	27/2⁽⁺⁾	1911.3	25/2⁻	DCO=0.58 *6*. I_γ: Iγ=6.0 *3*, in (^{7}Li,4nγ). Mult.: 1998Ha54 assign this γ as a ΔJ=1 transition.
843[#] *1*	27[@] *4*	7340.5	(59/2⁻)	6497.5	(55/2⁻)	
851[#] *1*	24[@] *4*	6997.5	(57/2⁻)	6146.4	(53/2⁻)	
853[#] *1*	8[@] *3*	7617.9	(59/2⁺)	6764.9	(55/2⁺)	
863[#] *1*	7[@] *3*	8053.4	(61/2⁺)	7190.4	(57/2⁺)	
869[#] *1*	<5[@]	8662.0	(63/2⁺)	7793.0	(59/2⁺)	
893[#] *1*	21[@] *3*	8233.5	(63/2⁻)	7340.5	(59/2⁻)	
902[#] *1*	<5[@]	8519.9	(63/2⁺)	7617.9	(59/2⁺)	

Continued on next page (footnotes at end of table)

(HI,xnγ) 1998Ha54 (continued)

$\gamma(^{155}Tb)$ (continued)

E_{γ} [†&]	I_{γ} [‡]	E_i(level)	J_i^{π}	E_f	J_f^{π}
903[#] 1	<5[@]	8956.4	(65/2+)	8053.4	(61/2+)
907[#] 1	<5[@]	9569	(67/2+)	8662.0	(63/2+)
916[#] 1	17[@] 3	7913.5	(61/2−)	6997.5	(57/2−)
933[#] 1	10[@] 3	9166.5	(67/2−)	8233.5	(63/2−)
934[#] 1	<5[@]	10503	(71/2+)	9569	(67/2+)
947[#] 1	<5[@]	9466.9	(67/2+)	8519.9	(63/2+)
966[#] 1	8[@] 2	10132.5	(71/2−)	9166.5	(67/2−)
973[#] 1	7[@] 2	8886.5	(65/2−)	7913.5	(61/2−)
978[#] 1	<5[@]	11481	(75/2+)	10503	(71/2+)
986[#] 1	<5[@]	10453	(71/2+)	9466.9	(67/2+)
998[#] 1	7[@] 1	11130.5	(75/2−)	10132.5	(71/2−)
1023[#] 1	<5[@]	9909.5	(69/2−)	8886.5	(65/2−)
1029[#b] 1	<5[@]	11482?	(75/2+)	10453	(71/2+)
1032[#b] 1	<5[@]	12513?	(79/2+)	11481	(75/2+)
1043[#] 1	<5[@]	12174	(79/2−)	11130.5	(75/2−)
1069[#] 1	<5[@]	10978.5	(73/2−)	9909.5	(69/2−)
1110[#] 1	<5[@]	12088.5	(77/2−)	10978.5	(73/2−)
1110[#] 1	<5[@]	13284	(83/2−)	12174	(79/2−)
1134[#b] 1	<5[@]	13223	(81/2−)	12088.5	(77/2−)
1185[#] 1	<5[@]	14469	(87/2−)	13284	(83/2−)
1265[#] 1	<5[@]	15734	(91/2−)	14469	(87/2−)
1336[#b] 1	<5[@]	17070?	(95/2−)	15734	(91/2−)

† From ^{152}Sm(^{7}Li,4nγ), unless noted otherwise. Uncertainty assigned (by the evaluator) as 0.2 keV for Iγ>5 and 0.5 keV for Iγ<5, based on a general statement by 1998Ha54. Δ(Eγ)=1 keV, when the energy is stated to the nearest keV.

‡ From (^{7}Li,4nγ) (1998Ha54, normalized to 100 for 471.9γ from 1528 level), unless noted otherwise.

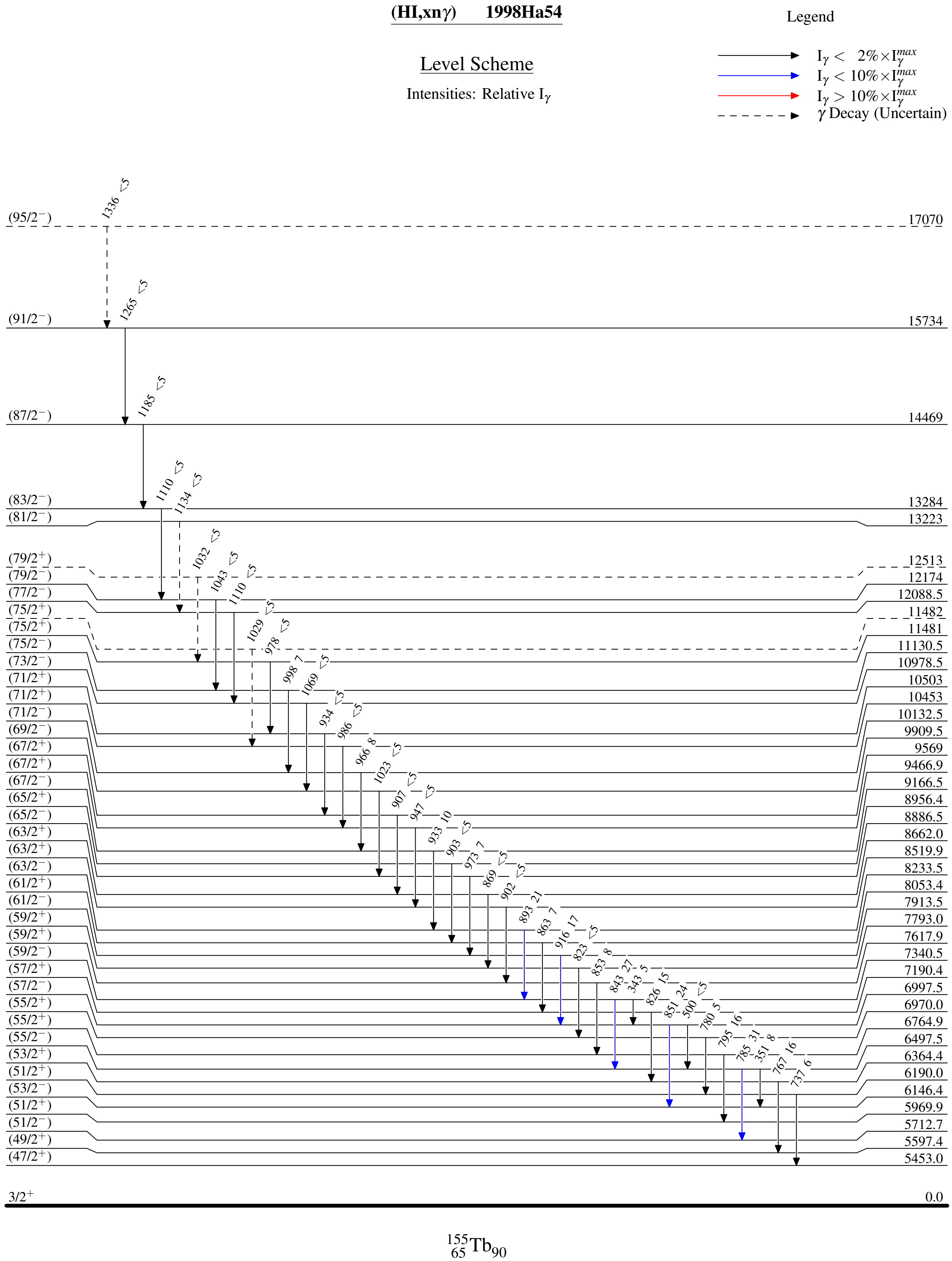
From (^{36}S,p4nγ).

@ From (^{36}S,p4nγ) (1998Ha54).

& From a least-squares fit using the listed γ-ray energies.

a Multiply placed with intensity suitably divided.

b Placement of transition in the level scheme is uncertain.


(HI,xnγ) 1998Ha54
Level Scheme
Intensities: Relative Iγ
Legend
Iγ < 2%×Iγmax
Iγ < 10%×Iγmax
Iγ > 10%×Iγmax
γ Decay (Uncertain)
(95/2−) 17070
(91/2−) 15734
(87/2−) 14469
(83/2−) 13284
(81/2−) 13223
(79/2+) 12513
(79/2−) 12174
(77/2−) 12088.5
(75/2+) 11482
(75/2+) 11481
(75/2−) 11130.5
(73/2−) 10978.5
(71/2+) 10503
(71/2+) 10453
(71/2−) 10132.5
(69/2−) 9909.5
(67/2+) 9569
(67/2+) 9466.9
(67/2−) 9166.5
(65/2+) 8956.4
(65/2−) 8886.5
(63/2+) 8662.0
(63/2+) 8519.9
(63/2−) 8233.5
(61/2+) 8053.4
(61/2−) 7913.5
(59/2+) 7793.0
(59/2+) 7617.9
(59/2−) 7340.5
(57/2+) 7190.4
(57/2−) 6997.5
(55/2+) 6970.0
(55/2+) 6764.9
(55/2−) 6497.5
(53/2+) 6364.4
(51/2+) 6190.0
(53/2−) 6146.4
(51/2+) 5969.9
(51/2−) 5712.7
(49/2+) 5597.4
(47/2+) 5453.0
3/2+ 0.0
1336 <5
1265 <5
1185 <5
1110 <5
1134 <5
1032 <5
1043 <5
1110 <5
1029 <5
978 <5
998 7
1069 <5
934 <5
986 <5
966 8
1023 <5
907 <5
947 <5
933 10
903 <5
973 7
869 <5
902 <5
893 21
863 7
916 17
823 <5
853 8
843 27
343 5
826 15
851 24
500 <5
780 5
795 16
785 31
351 8
767 16
737 6
$^{155}_{65}Tb_{90}$

(HI,xnγ) 1998Ha54

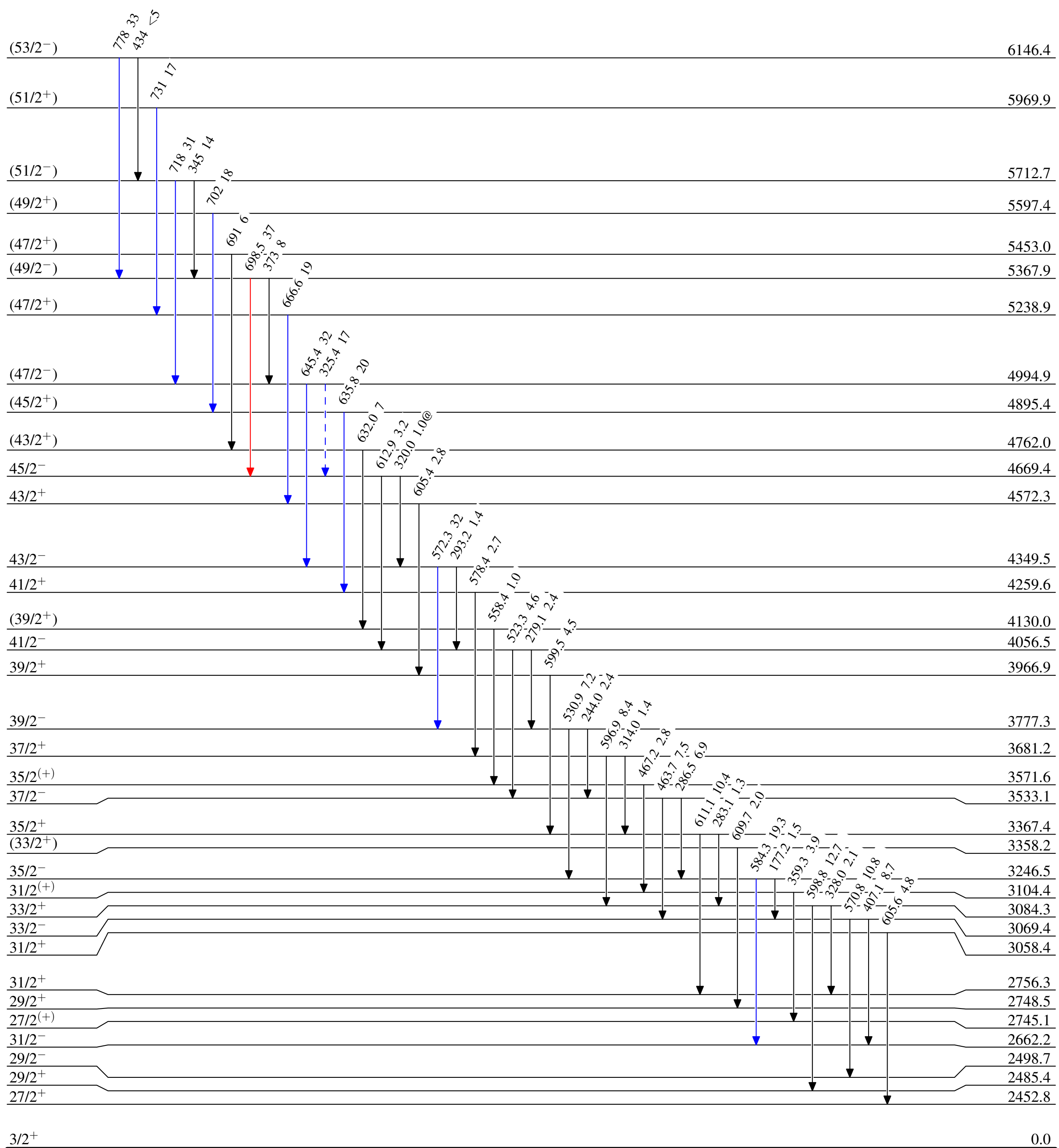
Level Scheme (continued)

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)



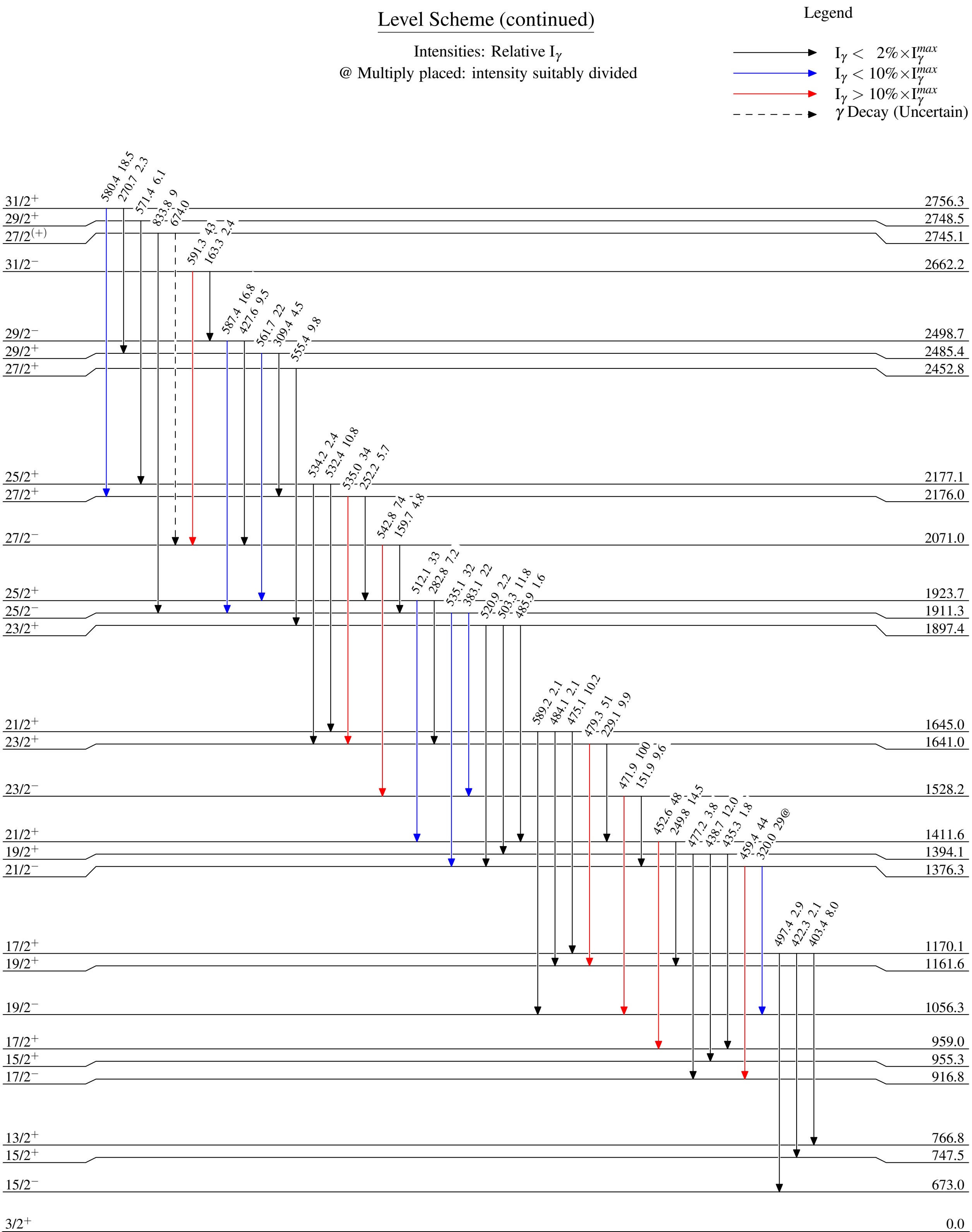
$^{155}_{65}Tb_{90}$

(HI,xnγ) 1998Ha54

Level Scheme (continued)

Intensities: Relative I_γ

@ Multiply placed: intensity suitably divided



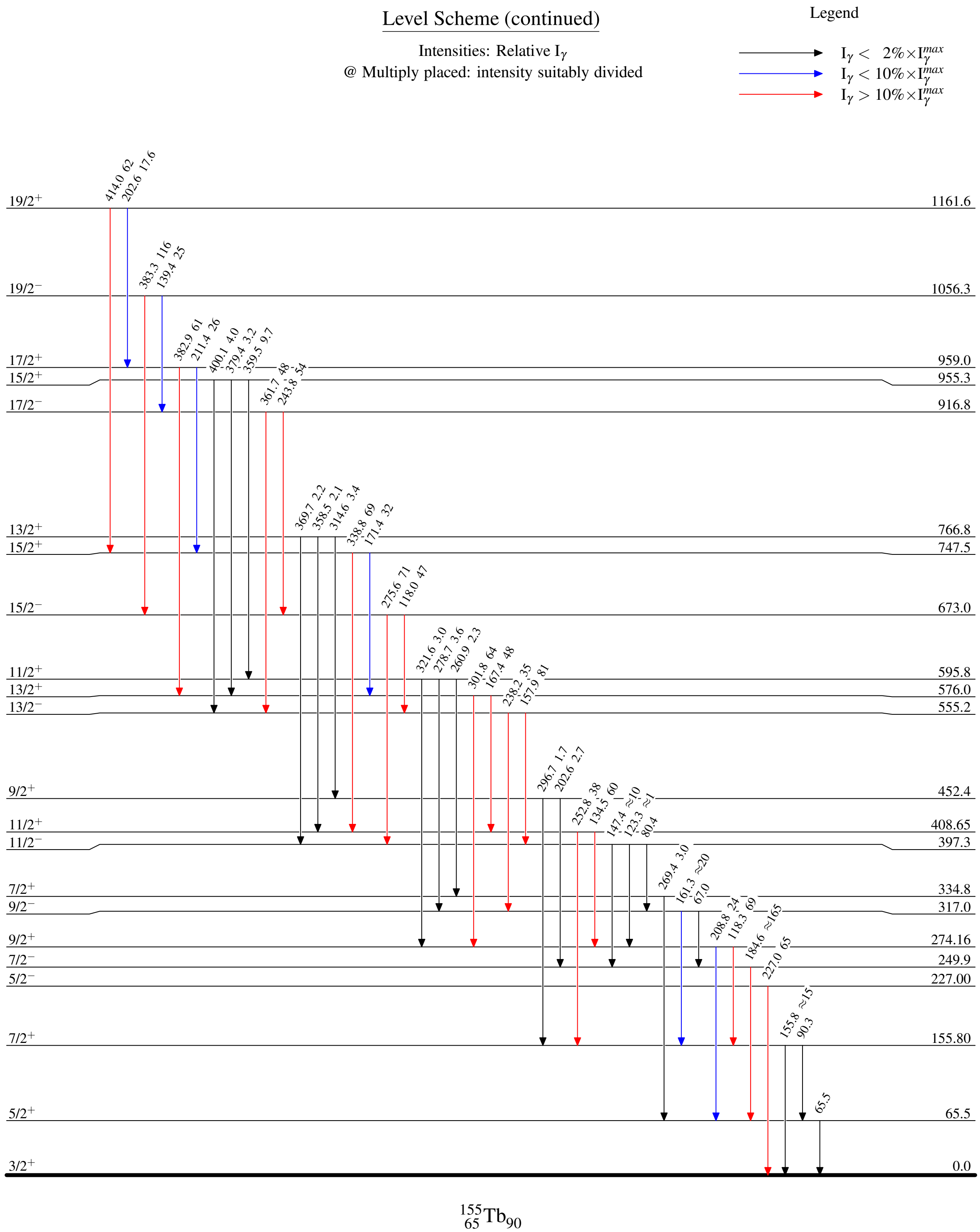
$^{155}_{65}Tb_{90}$

(HI,xnγ) 1998Ha54

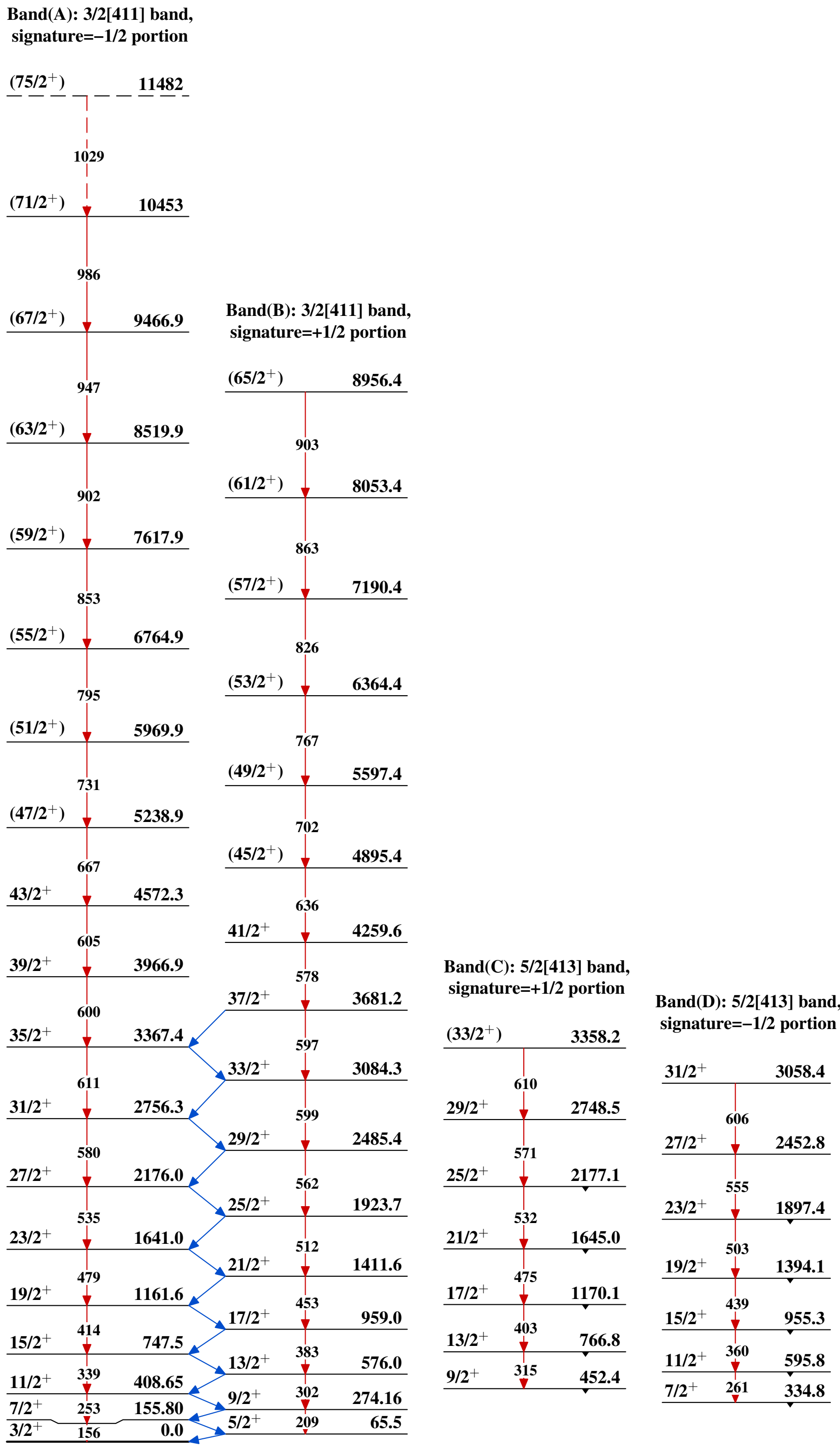
Level Scheme (continued)

Intensities: Relative I_γ

@ Multiply placed: intensity suitably divided

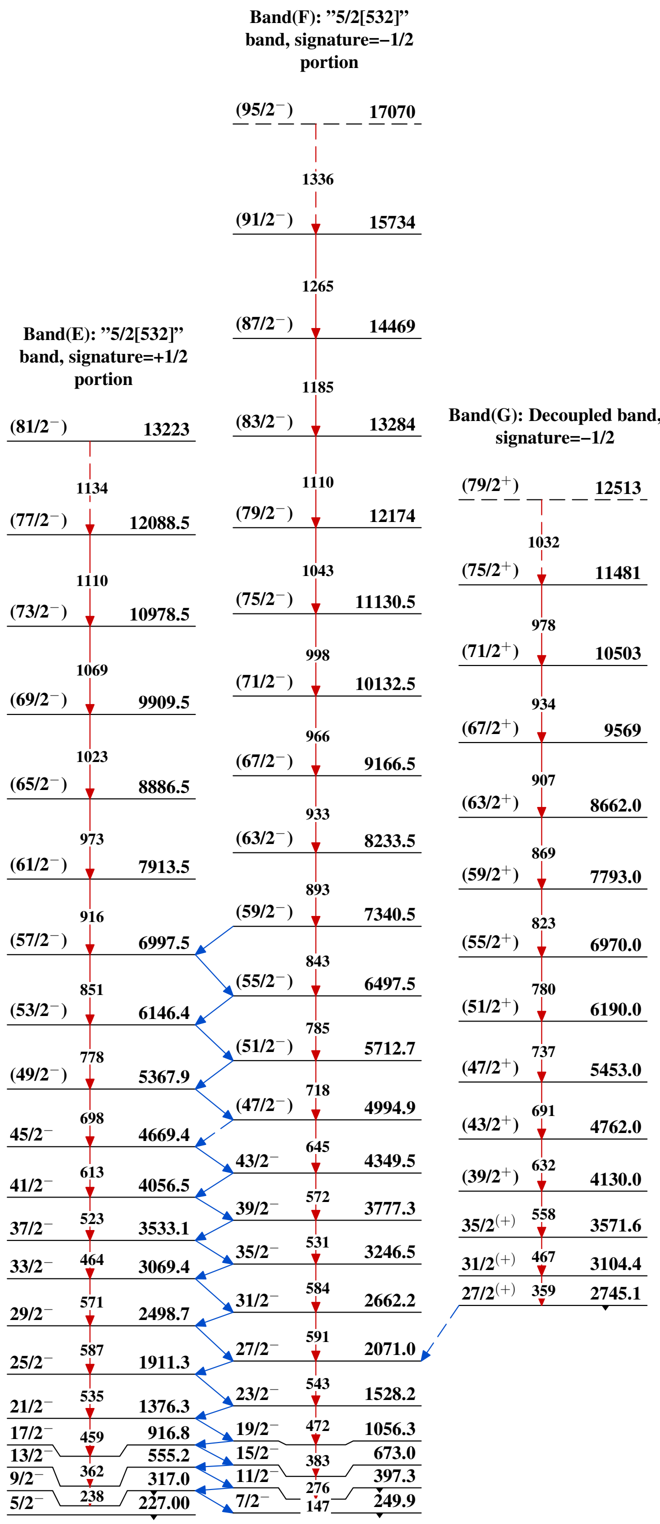


(HI,xnγ) 1998Ha54



$^{155}_{65}Tb_{90}$

(HI,xnγ) 1998Ha54 (continued)



$^{155}_{65}Tb_{90}$