(HI,xnγ) 1995Ri01

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	N. Nica	NDS 132, 1 (2016)	4-Dec-2015

Experimental methods:
1979HoZQ: abstract; ^{144}Sm(^{16}O,p2nγ) at 107 MeV, no specific data.
1985Ko30: ^{147}Sm(^{14}N,4nγ) at 80 − 120 MeV. Report 6 γ′s.
1987AnZQ: ^{126}Te^{36}(Cl,4nγ) at 150 MeV. Measured E_γ, I_γ, and γ(θ) and report 40 levels.
1988RiZY, 1988RiZX, 1989RiZU, 1989RiZX: preliminary reports, see 1995Ri01.
1995Ri01: ^{110}Pd(^{51}V,4nγ) at 220 MeV. Measured E_γ, I_γ, and γ(θ) and report 53 levels. The authors of this article report a private communication from S. Andre and C. Foin in which the latter report γ polarization measurements.

^{157}Tm Levels

E(level)†	Jπ‡	E(level)†	Jπ‡	E(level)†	Jπ‡	E(level)†	Jπ‡
x[#]	11/2−	x+2544.3[c]	27/2+	x+4508.7[a]	41/2−	x+7184.3[e]	55/2+
x+393.0[#]	15/2−	x+2756.9[d]	29/2+	x+4728.3[e]	43/2+	x+7486.5[a]	57/2−
x+405.6[@]	13/2−	x+2814.3[e]	31/2+	x+4876.7[&]	43/2−	x+7601.3[f]	57/2+
x+909.7[@]	17/2−	x+2939.7[#]	31/2−	x+5120.6[f]	45/2+	x+7659	57/2−
x+913.7[#]	19/2−	x+3141.6[&]	31/2−	x+5168.2[a]	45/2−	x+8272.7[a]	61/2−
x+1511.1[@]	21/2−	x+3210.0[f]	33/2+	x+5534.6[&]	47/2−	x+8467.4	(61/2−)
x+1525.0[#]	23/2−	x+3297.4[a]	33/2−	x+5564.1[e]	47/2+	x+9352.4[a]	65/2−
x+1574.2[c]	19/2+	x+3382.9[e]	35/2+	x+5953.4[f]	49/2+	x+9906.6[a]	69/2−
x+1851.3[d]	21/2+	x+3638.8[&]	35/2−	x+5976.1[a]	49/2−	x+10638.8[a]	73/2−
x+2036.2[c]	23/2+	x+3788.4[f]	37/2+	x+6321.4[&]	51/2−	x+11195.4[b]	75/2(−)
x+2180.7[@]	25/2−	x+3877.9[a]	37/2−	x+6414.8[e]	51/2+	x+11960.8[b]	79/2(−)
x+2207.3[#]	27/2−	x+4025.3[e]	39/2+	x+6749.7[a]	53/2−	x+13242.4[b]	83/2(−)
x+2287.8[d]	25/2+	x+4232.9[&]	39/2−	x+6808.6[f]	53/2+		
x+2338.6[e]	27/2+	x+4426.6[f]	41/2+	x+7136.0[&]	55/2−		

† Energies are relative to the 11/2− level and are from 1995Ri01. Uncertainties are expected to increase from 0.1 at the lower levels to 1.2 keV at the upper levels.
‡ From 1995Ri01 and based on analysis of data for whole scheme including γ multipolarities from DCO′s and the band structure.
[#] Band(A): Signature=−1/2 portion of 11/2− band.
[@] Band(B): Signature=+1/2 portion of 11/2− band.
[&] Band(C): Signature=−1/2 portion of negative-parity band.
[a] Band(D): Signature=+1/2 portion of negative-parity band.
[b] Band(E): Signature=−1/2 portion of another negative-parity band.
[c] Band(F): Signature=−1/2 portion of 1st positive-parity band.
[d] Band(G): Signature=+1/2 portion of 1st positive-parity band.
[e] Band(H): Signature=−1/2 portion of 2nd positive-parity band.
[f] Band(I): Signature=+1/2 portion of 2nd positive-parity band.

(HI,xnγ) 1995Ri01 (continued)

γ(^{157}Tm)

E_γ[†]	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#@]	Comments
50.8[a]	4.1 *1*	x+2338.6	27/2$^+$	x+2287.8	25/2$^+$	M1+E2	
57.4[a]	3 *1*	x+2814.3	31/2$^+$	x+2756.9	29/2$^+$	M1+E2	
155.3	8 *1*	x+3297.4	33/2$^-$	x+3141.6	31/2$^-$	M1+E2	Mult.: DCO=0.54 *5*.
157.5	2 *1*	x+2338.6	27/2$^+$	x+2180.7	25/2$^-$	E1	Mult.: DCO=0.52 *10*.
172.8	3 *1*	x+3382.9	35/2$^+$	x+3210.0	33/2$^+$	M1+E2	Mult.: DCO=0.58 *10*.
185.0	1.0 *5*	x+2036.2	23/2$^+$	x+1851.3	21/2$^+$	M1+E2	Mult.: DCO=0.81 *29*.
201.8	4 *1*	x+3141.6	31/2$^-$	x+2939.7	31/2$^-$	M1+E2	Mult.: DCO=1.10 *12*.
212.5	4 *1*	x+2756.9	29/2$^+$	x+2544.3	27/2$^+$	M1+E2	Mult.: DCO=0.41 *7*.
236.8	3 *1*	x+4025.3	39/2$^+$	x+3788.4	37/2$^+$	M1+E2	Mult.: DCO=0.66 *8*.
239.1	10 *1*	x+3877.9	37/2$^-$	x+3638.8	35/2$^-$	M1+E2	Mult.: DCO=0.56 *8*.
251.5	3 *1*	x+2287.8	25/2$^+$	x+2036.2	23/2$^+$	(M1+E2)	
256.1	2.0 *5*	x+2544.3	27/2$^+$	x+2287.8	25/2$^+$	M1+E2	Mult.: DCO=0.61 *4*.
270.0	6 *1*	x+2814.3	31/2$^+$	x+2544.3	27/2$^+$	E2	Mult.: DCO=1.14 *18*.
275.9	7 *1*	x+4508.7	41/2$^-$	x+4232.9	39/2$^-$	M1+E2	Mult.: DCO=0.55 *8*.
291.2	5 *1*	x+5168.2	45/2$^-$	x+4876.7	43/2$^-$	M1+E2	Mult.: DCO=0.63 *9*.
301.3	5 *1*	x+4728.3	43/2$^+$	x+4426.6	41/2$^+$	M1+E2	
302.3	12 *2*	x+2338.6	27/2$^+$	x+2036.2	23/2$^+$	E2	Mult.: DCO=1.02 *22*, but is for unresolved doublet.
341.0	8 *1*	x+3638.8	35/2$^-$	x+3297.4	33/2$^-$	M1+E2	Mult.: DCO=0.62 *9*.
345.2	9 *1*	x+6321.4	51/2$^-$	x+5976.1	49/2$^-$	M1+E2	Mult.: DCO=0.53 *7*.
350.4	6 *1*	x+7486.5	57/2$^-$	x+7136.0	55/2$^-$	M1+E2	Mult.: DCO=0.53 *11*.
354.9	9 *1*	x+4232.9	39/2$^-$	x+3877.9	37/2$^-$	M1+E2	Mult.: DCO=0.55 *8*.
357.6	5 *1*	x+3297.4	33/2$^-$	x+2939.7	31/2$^-$	M1+E2	Mult.: DCO=0.61 *11*.
363.7	7 *2*	x+2544.3	27/2$^+$	x+2180.7	25/2$^-$	E1	Mult.: DCO=0.56 *11*.
366.5	8 *1*	x+5534.6	47/2$^-$	x+5168.2	45/2$^-$	M1+E2	Mult.: DCO=0.53 *9*, but is for unresolved doublet.
368.0	7 *2*	x+4876.7	43/2$^-$	x+4508.7	41/2$^-$	M1+E2	Mult.: DCO=0.53 *9*, but is for unresolved doublet.
375.7	2 *1*	x+7184.3	55/2$^+$	x+6808.6	53/2$^+$	M1+E2	
386.3	4 *1*	x+7136.0	55/2$^-$	x+6749.7	53/2$^-$	M1+E2	Mult.: DCO=0.52 *23*.
389.0	2 *1*	x+5953.4	49/2$^+$	x+5564.1	47/2$^+$	M1+E2	Mult.: DCO=0.63 *15*.
392.0		x+5120.6	45/2$^+$	x+4728.3	43/2$^+$	M1+E2	
392.9		x+393.0	15/2$^-$	x	11/2$^-$	E2	I_γ: I_γ values are from coincidences with this gate, so there is no value for this γ. Mult.: DCO=0.99 *7*.
393.8		x+6808.6	53/2$^+$	x+6414.8	51/2$^+$	M1+E2	
395.9	8 *1*	x+3210.0	33/2$^+$	x+2814.3	31/2$^+$	M1+E2	Mult.: DCO=0.57 *8*.
400.9	6 *1*	x+4426.6	41/2$^+$	x+4025.3	39/2$^+$	M1+E2	Mult.: DCO=0.47 *20*.
405.1	8 *1*	x+3788.4	37/2$^+$	x+3382.9	35/2$^+$	M1+E2	Mult.: DCO=0.90 *13*, but is for unresolved doublet.
405.6	13 *2*	x+405.6	13/2$^-$	x	11/2$^-$	M1+E2	Mult.: DCO=0.90 *13*, but is for unresolved doublet.
417.1	4 *1*	x+7601.3	57/2$^+$	x+7184.3	55/2$^+$	M1+E2	Mult.: DCO=0.47 *17*.
428.3	5 *1*	x+6749.7	53/2$^-$	x+6321.4	51/2$^-$	M1+E2	Mult.: DCO=0.50 *10*.
436.1	3 *1*	x+2287.8	25/2$^+$	x+1851.3	21/2$^+$	(E2)	Mult.: DCO=0.91 *15*.
440.9	5 *1*	x+5976.1	49/2$^-$	x+5534.6	47/2$^-$	M1+E2	Mult.: DCO=0.53 *8*.
443.0	2.1 *5*	x+5564.1	47/2$^+$	x+5120.6	45/2$^+$	M1+E2	
453.2	2.0 *5*	x+3210.0	33/2$^+$	x+2756.9	29/2$^+$	E2	
461.3	3 *1*	x+6414.8	51/2$^+$	x+5953.4	49/2$^+$	M1+E2	
462.0	6 *1*	x+2036.2	23/2$^+$	x+1574.2	19/2$^+$	E2	Mult.: DCO=0.87 *15*, but is for unresolved doublet.
468.5	3 *1*	x+2756.9	29/2$^+$	x+2287.8	25/2$^+$	E2	Mult.: DCO=0.96 *27*.
475.5	17 *1*	x+2814.3	31/2$^+$	x+2338.6	27/2$^+$	E2	Mult.: DCO=0.90 *8*.
496.9	1.5 *5*	x+3638.8	35/2$^-$	x+3141.6	31/2$^-$	E2	
504.2	11 *2*	x+909.7	17/2$^-$	x+405.6	13/2$^-$	E2	Mult.: DCO=1.3 *8*.
507.8	8 *1*	x+2544.3	27/2$^+$	x+2036.2	23/2$^+$	E2	Mult.: DCO=1.1 *4*.
516.6	15 *1*	x+909.7	17/2$^-$	x+393.0	15/2$^-$	M1+E2	Mult.: DCO=1.20 *26*.
520.7	100	x+913.7	19/2$^-$	x+393.0	15/2$^-$	E2	Mult.: DCO=0.98 *5*.
525.0	16 *1*	x+2036.2	23/2$^+$	x+1511.1	21/2$^-$	E1[&]	Mult.: DCO=0.45 *12*.
549.4	6 *1*	x+2756.9	29/2$^+$	x+2207.3	27/2$^-$	E1[&]	Mult.: DCO=0.53 *8*.

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(HI,xnγ) 1995Ri01 (continued)

$\gamma(^{157}Tm)$ (continued)

E_γ[†]	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#@]	Comments
554.1	10 *2*	x+9906.6	69/2$^-$	x+9352.4	65/2$^-$	E2	Mult.: DCO=0.87 *6*.
556.4	6 *2*	x+11195.4	75/2$^{(-)}$	x+10638.8	73/2$^-$	(M1+E2)	Mult.: DCO=0.43 *6*.
568.6	27 *2*	x+3382.9	35/2$^+$	x+2814.3	31/2$^+$	E2	Mult.: DCO=1.13 *8*.
578.5	4 *1*	x+3788.4	37/2$^+$	x+3210.0	33/2$^+$	E2	Mult.: DCO=0.97 *9*.
580.6	17 *2*	x+3877.9	37/2$^-$	x+3297.4	33/2$^-$	E2	Mult.: DCO=0.97 *9*.
594.2	6 *1*	x+4232.9	39/2$^-$	x+3638.8	35/2$^-$	E2	Mult.: DCO=0.79 *22*.
597.3	16 *1*	x+1511.1	21/2$^-$	x+913.7	19/2$^-$	M1+E2	Mult.: DCO=1.12 *11*.
601.3	16 *1*	x+1511.1	21/2$^-$	x+909.7	17/2$^-$	E2	Mult.: DCO=1.08 *15*.
611.3	81 *3*	x+1525.0	23/2$^-$	x+913.7	19/2$^-$	E2	Mult.: DCO=1.05 *5*.
630.7	20 *2*	x+4508.7	41/2$^-$	x+3877.9	37/2$^-$	E2	Mult.: DCO=0.99 *8*.
638.3	7 *1*	x+4426.6	41/2$^+$	x+3788.4	37/2$^+$	E2	Mult.: DCO=1.5 *3*.
642.5	19 *2*	x+4025.3	39/2$^+$	x+3382.9	35/2$^+$	E2	Mult.: DCO=1.09 *22*.
643.5	7.9 *20*	x+4876.7	43/2$^-$	x+4232.9	39/2$^-$	E2	Mult.: DCO=1.01 *7*.
655.4	6 *1*	x+2180.7	25/2$^-$	x+1525.0	23/2$^-$	M1+E2	Mult.: DCO=1.21 *23*.
657.9	6 *1*	x+5534.6	47/2$^-$	x+4876.7	43/2$^-$	E2	Mult.: DCO=1.13 *11*, but is for unresolved doublet.
659.4	14 *1*	x+5168.2	45/2$^-$	x+4508.7	41/2$^-$	E2	Mult.: DCO=1.13 *11*, but is for unresolved doublet.
664.6	8 *1*	x+1574.2	19/2$^+$	x+909.7	17/2$^-$	E1	Mult.: DCO=0.73 *15*.
669.4	6 *1*	x+2180.7	25/2$^-$	x+1511.1	21/2$^-$	E2	Mult.: DCO=0.95 *25*.
682.3	51 *2*	x+2207.3	27/2$^-$	x+1525.0	23/2$^-$	E2	Mult.: DCO=0.99 *4*.
695.0	3 *1*	x+5120.6	45/2$^+$	x+4426.6	41/2$^+$	E2	
698.9	10 *1*	x+3638.8	35/2$^-$	x+2939.7	31/2$^-$	E2	Mult.: DCO=1.00 *14*.
703.3	13 *1*	x+4728.3	43/2$^+$	x+4025.3	39/2$^+$	E2	Mult.: DCO=1.20 *14*.
732.0	8 *2*	x+10638.8	73/2$^-$	x+9906.6	69/2$^-$	E2	Mult.: DCO=0.91 *5*, but is for unresolved doublet.
732.5	34 *3*	x+2939.7	31/2$^-$	x+2207.3	27/2$^-$	E2	Mult.: DCO=0.91 *5*, but is for an unresolved doublet.
736.8	7 *1*	x+7486.5	57/2$^-$	x+6749.7	53/2$^-$	E2	Mult.: DCO=0.95 *13*.
759.5	7 *1*	x+7184.3	55/2$^+$	x+6414.8	51/2$^+$	E2	Mult.: DCO=1.00 *18*. E_γ: The reported γ energy is 769.5, but is apparently in error by 10 keV.
763.0	23 *2*	x+2287.8	25/2$^+$	x+1525.0	23/2$^-$	E1[&]	Mult.: DCO=0.53 *5*.
765.2	3 *1*	x+11960.8	79/2$^{(-)}$	x+11195.4	75/2$^{(-)}$	E2	Mult.: DCO=1.00 *20*.
773.7	11 *1*	x+6749.7	53/2$^-$	x+5976.1	49/2$^-$	E2	Mult.: DCO=0.98 *14*.
786.2	15 *2*	x+8272.7	61/2$^-$	x+7486.5	57/2$^-$	E2	Mult.: DCO=0.98 *6*, but is for unresolved doublet.
786.9	7 *2*	x+6321.4	51/2$^-$	x+5534.6	47/2$^-$	E2	Mult.: DCO=0.98 *6*, but is for unresolved doublet.
793.2	2 *1*	x+7601.3	57/2$^+$	x+6808.6	53/2$^+$	E2	Mult.: DCO=1.09 *21*.
808.0	11 *2*	x+5976.1	49/2$^-$	x+5168.2	45/2$^-$	E2	Mult.: DCO=0.99 *11*.
808.1	2 *1*	x+8467.4	(61/2$^-$)	x+7659	57/2$^-$	(E2)	
814.6	7.0 *15*	x+7136.0	55/2$^-$	x+6321.4	51/2$^-$	E2	Mult.: DCO=1.02 *16*, but is for unresolved doublet.
832.8	4 *1*	x+5953.4	49/2$^+$	x+5120.6	45/2$^+$	E2	
836.0	10 *1*	x+5564.1	47/2$^+$	x+4728.3	43/2$^+$	E2	Mult.: DCO=0.94 *15*.
850.8	8 *1*	x+6414.8	51/2$^+$	x+5564.1	47/2$^+$	E2	Mult.: DCO=0.95 *16*.
855.1	3 *1*	x+6808.6	53/2$^+$	x+5953.4	49/2$^+$	E2	Mult.: DCO=0.91 *16*.
884.9	2 *1*	x+9352.4	65/2$^-$	x+8467.4	(61/2$^-$)		Mult.: DCO=0.75 *23*.
934.4	17 *1*	x+3141.6	31/2$^-$	x+2207.3	27/2$^-$	E2	Mult.: DCO=0.94 *6*.
937.7	3 *1*	x+1851.3	21/2$^+$	x+913.7	19/2$^-$	E1	Mult.: DCO=0.54 *18*.
1079.6	11 *1*	x+9352.4	65/2$^-$	x+8272.7	61/2$^-$	E2	Mult.: DCO=0.99 *7*.
1281.6	2.0 *5*	x+13242.4	83/2$^{(-)}$	x+11960.8	79/2$^{(-)}$	E2	Mult.: DCO=0.91 *23*.

[†] From general comment (1995Ri01), uncertainties are 0.1 keV for most γ's, but as large as 0.5 keV for weak and contaminated γ's. The evaluator has not assigned uncertainties.

[‡] Predominately from the 393-gated spectrum.

[#] From 1995Ri01 and based on analysis of data for the whole scheme including J^π assignments; note that multipolarity assignments are made for all γ's.

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(HI,xnγ) 1995Ri01 (continued)

$\gamma(^{157}Tm)$ (continued)

@ DCO is the ratio $I_\gamma(87°,24°)/I_\gamma(24°,87°)$ where $I_\gamma(87°,24°)$ is intensity measured at 24° in coincidence with 87° detector.
& Multipolarity verified by linear polarization by S. Andre and C. Foin as cited in 1995Ri01.
a Placement of transition in the level scheme is uncertain.

(HI,xnγ) 1995Ri01

Level Scheme

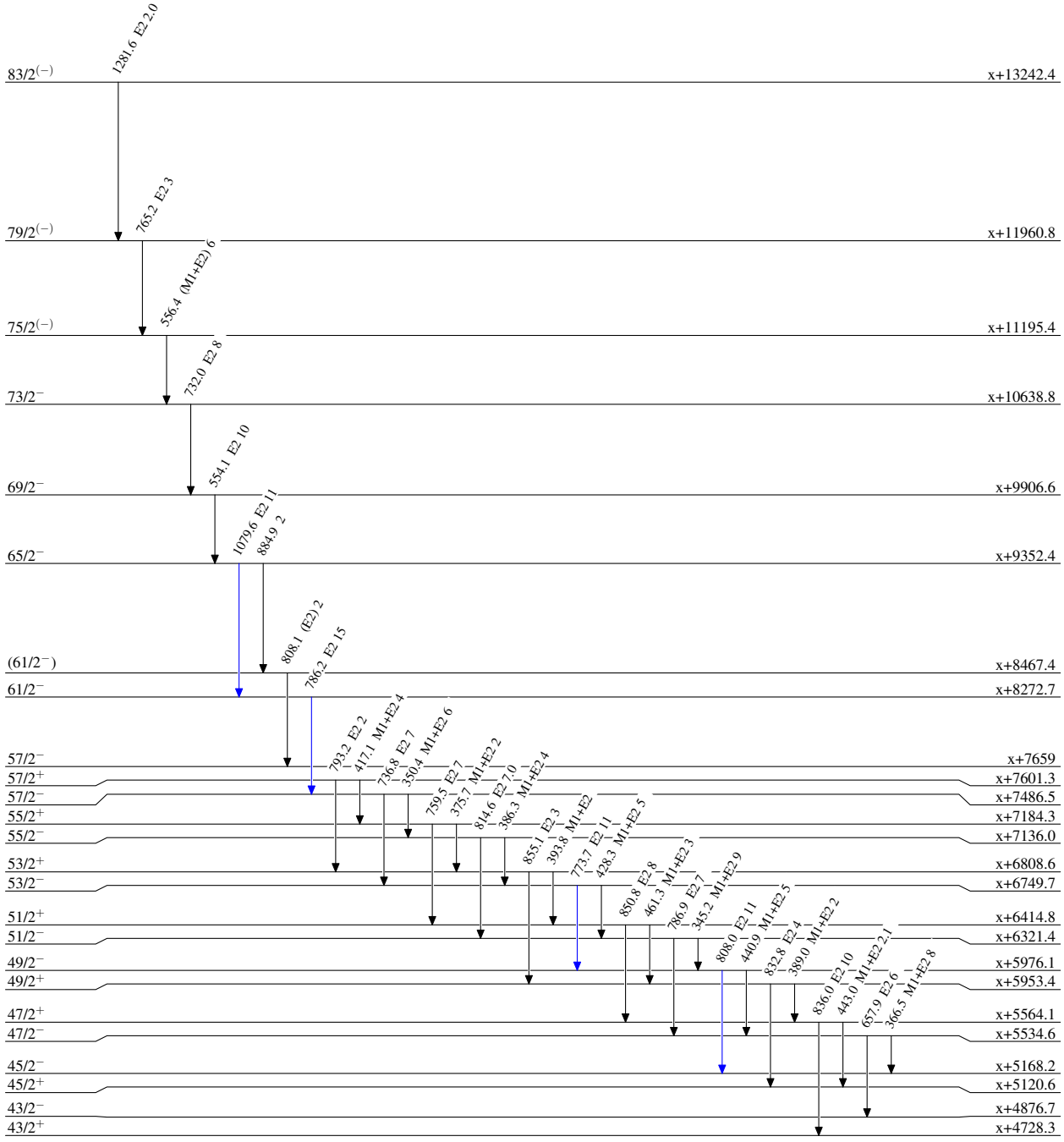
Intensities: Relative I_γ

Legend

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

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

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

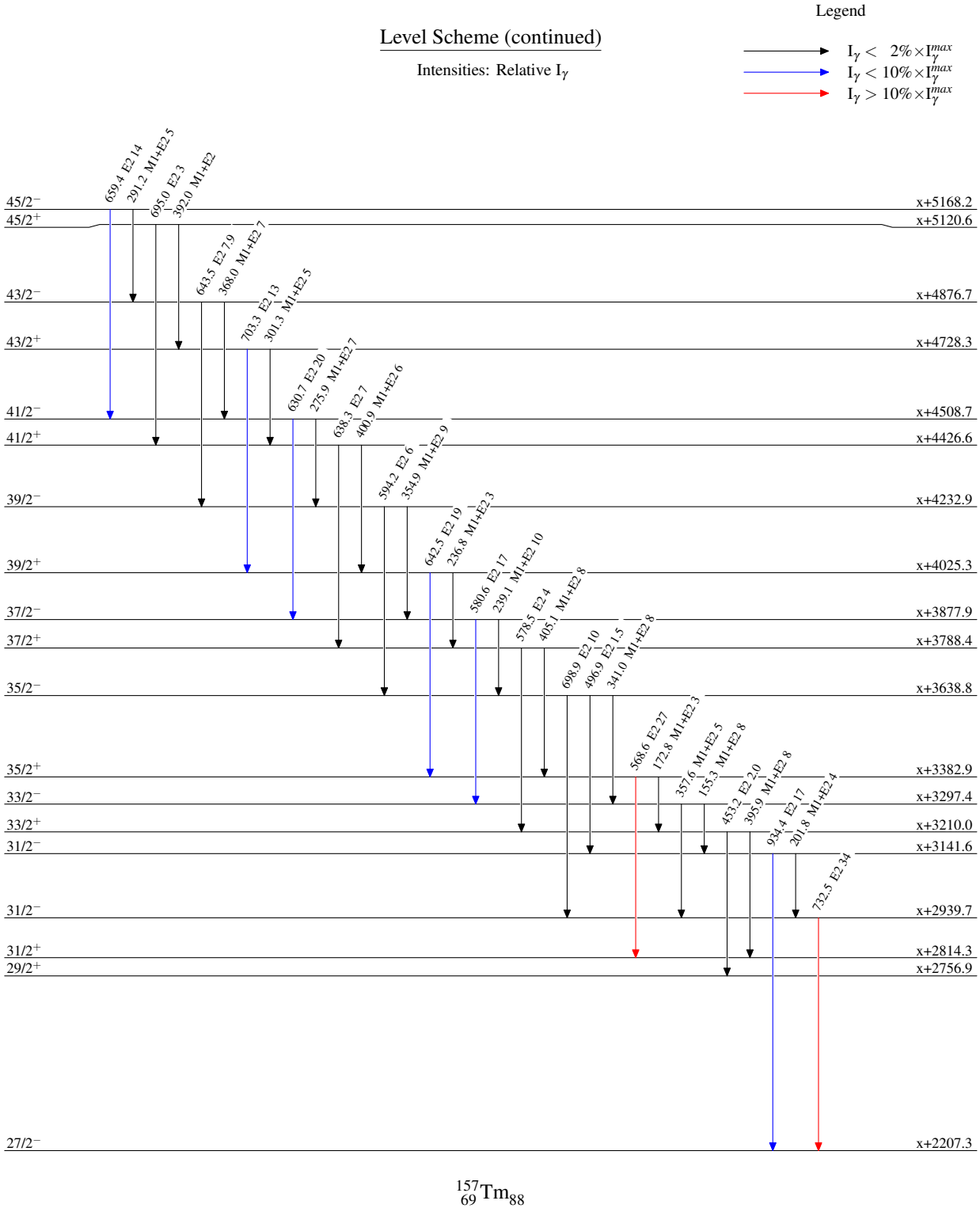


$^{157}_{69}Tm_{88}$

(HI,xnγ) 1995Ri01

Level Scheme (continued)

Intensities: Relative I_γ



$^{157}_{69}Tm_{88}$

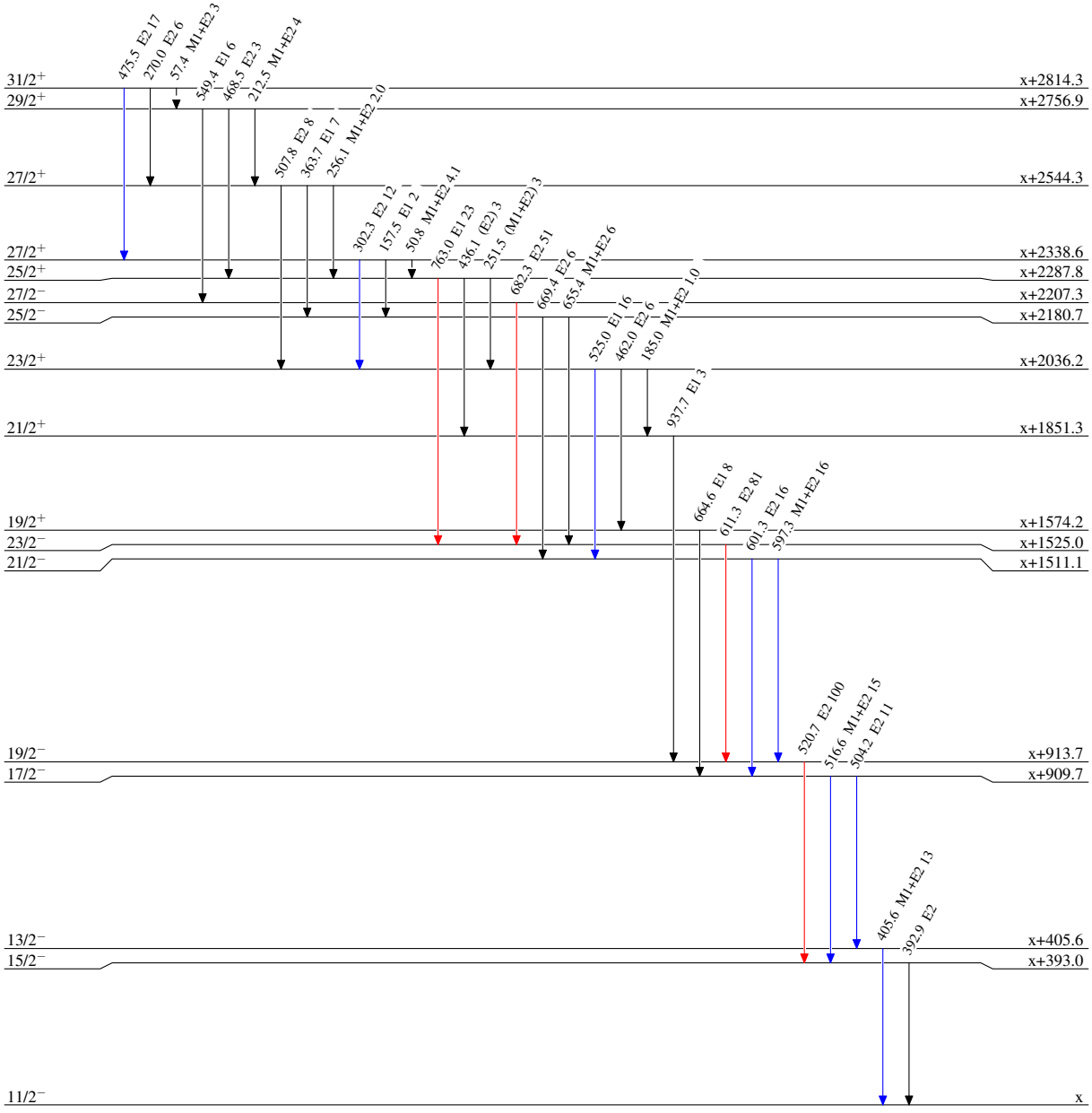
(HI,xnγ) 1995Ri01

Level Scheme (continued)

Intensities: Relative I_γ

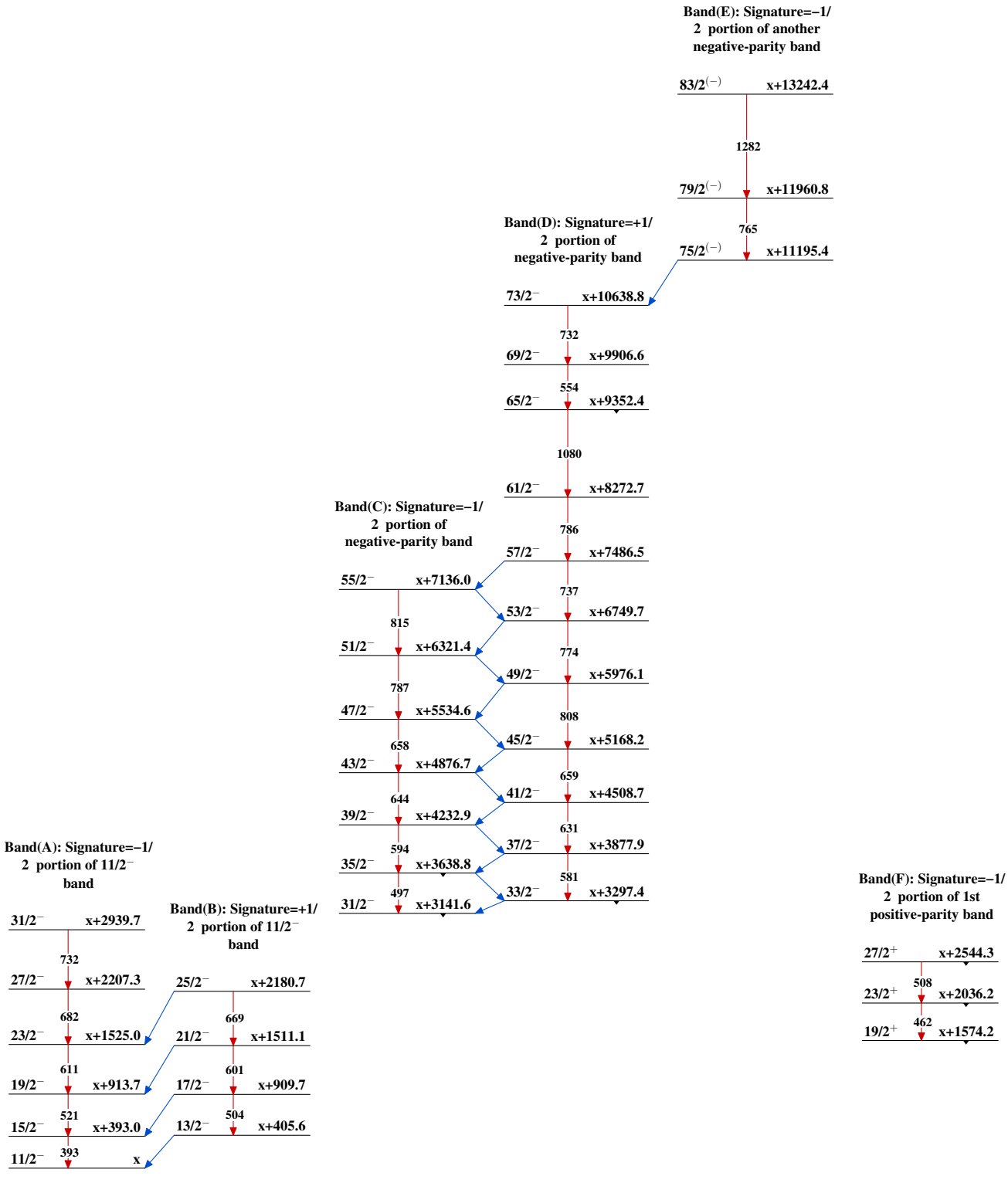
Legend

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



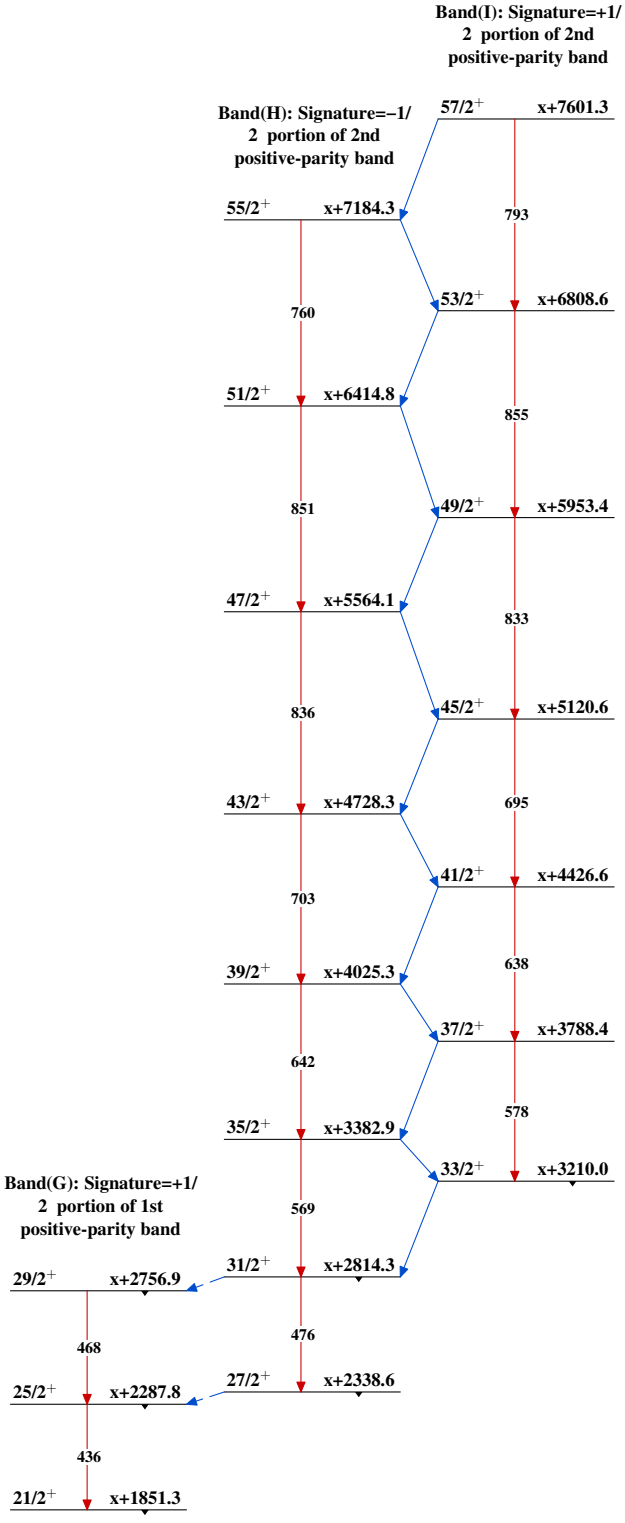
$^{157}_{69}Tm_{88}$

(HI,xnγ) 1995Ri01



$^{157}_{69}Tm_{88}$

(HI,xnγ) 1995Ri01 (continued)



$^{157}_{69}Tm_{88}$