(HI,xnγ)

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	N. Nica	NDS 170, 1 (2020)	16-Aug-2020

Data are from 1983Ko45, 1988CuZY, 1991Zh35, and 2002Ap04.

1983Ko45: $^{124}Sn(^{34}S,5n)$ at E=145-165 MeV; measured excitation function, $\gamma(\theta)$, $\gamma\gamma$ coincidence, γ(t).

1988CuZY: $^{124}Sn(^{34}S,5n)$ at E=170 MeV; measured $\gamma\gamma$ coincidences and $\gamma(\theta)$ and γ polarization.

1991Zh35: $^{122}Sn(^{36}S,5n)$ at E=165 MeV; measured $\gamma\gamma$ coincidences and $\gamma(\theta)$.

2002Ap04: $^{124}Sn(^{34}S,5n\gamma)$ at E=182 MeV; measured Eγ, Iγ, $\gamma\gamma$ coincidences, and $\gamma(\theta)$ using EUROGAM II array with 30 Compton-suppressed Ge detectors and 24 Clover detectors. The data from this paper were compiled for the XUNDL database by B. Singh, McMaster University, October 2002.

^{153}Dy Levels

The super-deformed bands are shown separately.

E(level)[†]	J^{π}[‡]	$T_{1/2}$	Comments
0.0	$7/2^-$		
295.80 *10*	$9/2^-$		
636.68 *20*	$11/2^-$		
712.2[d] *5*	$13/2^+$		
829.3[@]	$13/2^+$		
1040.2	$13/2^{(-)}$		
1159.5[d] *6*	$17/2^+$		
1272.4	$15/2^-$		
1600.3[e]	$17/2^{(-)}$		
1647.2[d] *7*	$21/2^+$		
2041.1[e]	$21/2^{(-)}$		
2179.3[d] *8*	$25/2^+$		
2521.6[e]	$25/2^{(-)}$		
2760.4[d] *9*	$29/2^+$		
3073.8[e]	$29/2^{(-)}$		
3167.9	$29/2^{(-)}$		
3387.3[d] *9*	$33/2^+$		
3742.2	$33/2^{(-)}$		
3827.1[e]	$33/2^{(-)}$		
4061.6[d] *10*	$37/2^+$		
4459.4	$37/2^{(-)}$		
4485.0[e]	$37/2^{(-)}$		
4780.2[d] *11*	$41/2^+$		
5139.0	$41/2^{(-)}$		
5205.4	$41/2^{(-)}$		
5242.6[e]	$41/2^{(-)}$		
5375.7	$43/2^{(-)}$		
5539.5[cd] *12*	$45/2^+$		
5590.6	$47/2^{(-)}$	2.3 ns	$T_{1/2}$: From γ(t) (1983Ko45).
5758.8	49/2		E(level): 1991Zh35 has the 169.3 and 957.3 γ's in the opposite order, so "this" level is at 6549.1 keV; 1988CuZY has "this" level at 5761.
6107.5[&]			
6225.8	(51/2)		
6338.8[cd] *13*	$49/2^+$		

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(HI,xnγ) (continued)

^{153}Dy Levels (continued)

E(level)[†]	J^{π}[‡]	E(level)[†]	J^{π}[‡]	E(level)[†]	J^{π}[‡]	E(level)[†]	J^{π}[‡]
6716.3	51/2	8603.5[@]		9997.5[cd] *16*	$65/2^+$	11897[@]	
6739.8[@]		8634.8[@]		10115.4[b]		12091[@]	
6944.8[&]		8636.0[a]	61/2	10269.1[@]		12118[@]	
6997.7	53/2	8663.2[@]		10378.8[@]		12159.4[cd] *19*	$73/2^+$
7063.1[#]	(55/2)	8822.2[@]		10682[&]		12333[c]	
7179.0[cd] *14*	$53/2^+$	9003.7[cd] *16*	$61/2^+$	10800.2[@]		13330.2[cd] *19*	$77/2^+$
7532.5[@]		9017.1[@]		10840.0[@]		14067	
7580.8[&]		9170[b]		11048.9[cd] *18*	$69/2^+$	14560.5[cd] *20*	$81/2^+$
7762.6[@]		9211.3[b]		11114[@]		15848.6[cd] *22*	$85/2^+$
7882.0[@]		9271.1[@]		11335[@]		17192.9[cd] *23*	$89/2^+$
7932.3[#]	(59/2)	9618.3[@]		11430[@]		18592.4[cd] *24*	$93/2^+$
8027.5[a]	57/2	9803.9[@]		11534[@]		20050[cd] *3*	$97/2^+$
8065.9[cd] *15*	$57/2^+$	9852.9[@]		11538[@]		21565?[cd] *4*	$101/2^+$
8129.8[@]		9880.8[@]		11614[@]			
8450.2	(61/2)	9927[b]		11756[@]			
8460.9[@]		9964.5[&]		11851[&]			

[†] From weighted fit where γ energies have uncertainties unweighted otherwise.
[‡] Listed assignments are those of the authors.
[#] From 1983Ko45 only.
[@] From 1991Zh35 only.
[&] From 1991Zh35 and 1988CuZY.
[a] From 1983Ko45 and 1988CuZY.
[b] From 1988CuZY only.
[c] From 2002Ap04 only.
[d] Band(A): Band based on $i_{13/2}$, α=+1/2.
[e] Band(B): Negative-parity band based on $17/2^-$ level.

$\gamma(^{153}$Dy)

E_γ[†]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	Comments
75.6[@]	712.2	$13/2^+$	636.68	$11/2^-$	E1[&]	
133.3	5375.7	$43/2^{(-)}$	5242.6	$41/2^{(-)}$	M1[a]	
142.1	11756		11614			
169.3	5758.8	49/2	5590.6	$47/2^{(-)}$		
170.3	5375.7	$43/2^{(-)}$	5205.4	$41/2^{(-)}$		
173.9	8634.8		8460.9			
192.7	829.3	$13/2^+$	636.68	$11/2^-$		
204.9	6944.8		6739.8			
211.0	1040.2	$13/2^{(-)}$	829.3	$13/2^+$		
213.9	5590.6	$47/2^{(-)}$	5375.7	$43/2^{(-)}$	E2	Mult.: R_{asym}=1.20 *5*, P=+0.40 *12*.
236.6	5375.7	$43/2^{(-)}$	5139.0	$41/2^{(-)}$		Mult.: R_{asym}=1.02 *5*, P=+0.40 *12*. Mult.: (E1,E2).
247.7	8129.8		7882.0			
278.4	11614		11335			
281.5	6997.7	53/2	6716.3	51/2	M1	Mult.: R_{asym}=0.66 *3*, P=−0.63 *15*.

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(HI,xnγ) (continued)

$\gamma(^{153}Dy)$ (continued)

E_γ [†]	I_γ [‡]	E_i(level)	J^π_i	E_f	J^π_f	Mult. [#]	Comments
295.8[@] *1*		295.80	9/2⁻	0.0	7/2⁻	M1[&]	
314.1		3073.8	29/2$^{(-)}$	2760.4	29/2⁺		
328.1		1040.2	13/2$^{(-)}$	712.2	13/2⁺		
328.1		1600.3	17/2$^{(-)}$	1272.4	15/2⁻		
341.0[@]		636.68	11/2⁻	295.80	9/2⁻		
342.1		2521.6	25/2$^{(-)}$	2179.3	25/2⁺		
354.1		9017.1		8663.2			
358.4		5139.0	41/2$^{(-)}$	4780.2	41/2⁺		
361.7		12118		11756			
367.1		8129.8		7762.6			
393.7		2041.1	21/2$^{(-)}$	1647.2	21/2⁺		
403.7		1040.2	13/2$^{(-)}$	636.68	11/2⁻		Mult.: R_{asym}=0.95 *5*, P=+0.29 *15*. Mult.: (E1,E2).
421.2		11756		11335			
421.2		11851		11430			
423.4		4485.0	37/2$^{(-)}$	4061.6	37/2⁺		
424.8		11538		11114			
439.5		3827.1	33/2$^{(-)}$	3387.3	33/2⁺		
440.7		1600.3	17/2$^{(-)}$	1159.5	17/2⁺		Mult.: R_{asym}=1.20 *5*, P=+0.40 *12* for 440.7γ and 441.3γ. Mult.: ce data imply E2 but J^π's require E1.
441.3		2041.1	21/2$^{(-)}$	1600.3	17/2$^{(-)}$	E2	Mult.: R_{asym}=1.20 *8*, P=+0.47 *12*, P for 532.2γ and 534γ.
447.3 *4*	100 *6*	1159.5	17/2⁺	712.2	13/2⁺	E2	Mult.: R_{asym}=1.31 *5*, P=+0.31 *10*.
465.2		10269.1		9803.9			
480.8		2521.6	25/2$^{(-)}$	2041.1	21/2$^{(-)}$	E2	Mult.: R_{asym}=1.33 *5*, P=+0.30 *12*.
487.6 *4*	84 *5*	1647.2	21/2⁺	1159.5	17/2⁺	E2	Mult.: R_{asym}=1.25 *5*, P=+0.16 *12*.
495.2		11335		10840.0			
517.7		6107.5		5590.6	47/2$^{(-)}$	E1	Mult.: R_{asym}=0.27 *8*, P=+0.418*8*.
518.0		8450.2	(61/2)	7932.3	(59/2)		
532.0 *4*	127 *5*	2179.3	25/2⁺	1647.2	21/2⁺	E2	Mult.: R_{asym}=1.20 *5*, P=+0.40 *12* for 440.7γ and 441.3γ.
533.0		9803.9		9271.1			
534		9170		8636.0	61/2	E2	Mult.: R_{asym}=1.20 *8*, P=+0.47 *12*, P for 532.2γ and 534γ.
551.8		3073.8	29/2$^{(-)}$	2521.6	25/2$^{(-)}$	E2	Mult.: R_{asym}=1.35 *5*, P=+0.30 *10*.
560.4		1600.3	17/2$^{(-)}$	1040.2	13/2$^{(-)}$	E2	Mult.: R_{asym}=1.22 *10*, P=+0.43 *13*.
575.0		9211.3		8636.0	61/2	(E2)	Mult.: R_{asym}=1.90 *5*.
575.3		10378.8		9803.9			
581.1 *4*	97 *5*	2760.4	29/2⁺	2179.3	25/2⁺	E2	Mult.: R_{asym}=1.65 *10*, P=+0.60 *20*.
608.1		8636.0	61/2	8027.5	57/2	(E2)	Mult.: R_{asym}=1.35 *5*, P=+0.52 *10* for 608.1γ and 609.0γ.
608.1		9271.1		8663.2			
608.7		6716.3	51/2	6107.5			Mult.: R_{asym}=1.35 *5*, P=+0.52 *10* for 608.1γ and 609.0γ. Mult.: E2 γ not supported by ΔJ=1 from levels.
609.8		9880.8		9271.1			
626.8 *4*	93 *5*	3387.3	33/2⁺	2760.4	29/2⁺	E2	Mult.: R_{asym}=1.42 *10*, P=+0.50 *12*.
635.9		7580.8		6944.8			
636.0		1272.4	15/2⁻	636.68	11/2⁻		
636.2		8663.2		8027.5	57/2		
636.3		6225.8	(51/2)	5590.6	47/2$^{(-)}$		
636.7[@] *2*		636.68	11/2⁻	0.0	7/2⁻	E2	Mult.: R_{asym}=1.50 *5*, P=+0.49 *7*.
646.6		3167.9	29/2$^{(-)}$	2521.6	25/2$^{(-)}$	E2	Mult.: R_{asym}=1.20 *10*, P=+0.40 *17*.
654.0		5139.0	41/2$^{(-)}$	4485.0	37/2$^{(-)}$	E2	Mult.: R_{asym}=1.71 *15*, P=+0.28 *15*.
657.9		4485.0	37/2$^{(-)}$	3827.1	33/2$^{(-)}$	E2	E_γ: See comment on 659.6 γ from 3829 level. Mult.: R_{asym}=1.21 *9*, P=+0.58 *16*, P for 657.9γ and 659.6γ.

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(HI,xnγ) (continued)

$\gamma(^{153}Dy)$ (continued)

E_γ†	I_γ‡	E_i(level)	J_i^π	E_f	J_f^π	Mult.#	Comments
659.6		3827.1	$33/2^{(-)}$	3167.9	$29/2^{(-)}$	E2	E_γ: 1988CuZY places this 659.6 γ from 4486 level and the 657.9 γ from this level, but this may be a typographical error; 1991Zh35 places the 659.6 γ here. Mult.: R_{asym}=1.23 7, P=+0.58 16, P for 657.9γ and 659.6γ.
668.9		3742.2	$33/2^{(-)}$	3073.8	$29/2^{(-)}$	E2	Mult.: R_{asym}=1.27 6, P=+0.48 10.
674.2 4	81 5	4061.6	$37/2^+$	3387.3	$33/2^+$	E2	Mult.: R_{asym}=1.20 8, P=+0.38 13.
679.8		5139.0	$41/2^{(-)}$	4459.4	$37/2^{(-)}$	(E2)	Mult.: R_{asym}=1.35 10.
692.4		8822.2		8129.8			
712.0@ 5		712.2	$13/2^+$	0.0	$7/2^-$		
717.6		4459.4	$37/2^{(-)}$	3742.2	$33/2^{(-)}$	E2	Mult.: R_{asym}=1.25 6, P=+0.40 10.
718		10682		9964.5			
718.6 4	79 5	4780.2	$41/2^+$	4061.6	$37/2^+$	E2	Mult.: R_{asym}=1.28 10, P=+0.37 15 for 718.6γ and 720.3γ.
720.3		5205.4	$41/2^{(-)}$	4485.0	$37/2^{(-)}$	(E2)	Mult.: R_{asym}=1.28 10, P=+0.37 15 for 718.6γ and 720.3γ.
733.4		11534		10800.2			
757		9927		9170			
757.6		5242.6	$41/2^{(-)}$	4485.0	$37/2^{(-)}$	(E2)	Mult.: R_{asym}=1.23 5.
759.3 5	41 6	5539.5	$45/2^+$	4780.2	$41/2^+$		
782.9		11897		11114			
783.4		5242.6	$41/2^{(-)}$	4459.4	$37/2^{(-)}$		Mult.: R_{asym}=0.86 7, P=+0.25 15. Mult.: ce data imply E1 but J^π's require E2.
787.0		9803.9		9017.1			
792.6		7532.5		6739.8			
796.1		9618.3		8822.2			
799.2 5	42 6	6338.8	$49/2^+$	5539.5	$45/2^+$		
835.7		10800.2		9964.5			
837.1		6944.8		6107.5		(E2)	Mult.: R_{asym}=1.71 5, P=+0.72 15 for 837.1γ and 837.4γ.
837.4		7063.1	(55/2)	6225.8	(51/2)	(E2)	Mult.: R_{asym}=1.71 5, P=+0.72 15 for 837.1γ and 837.4γ. E_γ,Mult.: 1988CuZY places 837.4 γ from level at 6947 keV with mult=(E2).
840.2 5	37 6	7179.0	$53/2^+$	6338.8	$49/2^+$		
844.5		11114		10269.1			
869.2		8450.2	(61/2)	7580.8		(E2)	Mult.: R_{asym}=2.00 25, P=+0.85 20 for 869.2γ and 869.3γ.
869.3		7932.3	(59/2)	7063.1	(55/2)	(E2)	Mult.: R_{asym}=2.00 25, P=+0.85 20 for 869.2γ and 869.3γ. E_γ,Mult.: 1988CuZY places 869.2 γ from level at 8450 keV with mult=(E2).
880.1		8460.9		7580.8			
886.9 5	31 6	8065.9	$57/2^+$	7179.0	$53/2^+$		
903.3		12333		11430			
903.7		10115.4		9211.3		(E2)	Mult.: R_{asym}=1.38 15.
937.8 5	26 6	9003.7	$61/2^+$	8065.9	$57/2^+$		
957.7		6716.3	51/2	5758.8	49/2	E1	Mult.: R_{asym}=0.68 4, P=+0.65 14.
959.2		10840.0		9880.8			
993.8 5	25 5	9997.5	$65/2^+$	9003.7	$61/2^+$		
1022.7		8603.5		7580.8			
1029.9		8027.5	57/2	6997.7	53/2	E2	Mult.: R_{asym}=1.79 15, P=+0.70 25.
1046.3		7762.6		6716.3	51/2		
1051.4 6	17 5	11048.9	$69/2^+$	9997.5	$65/2^+$		
1051.5		11430		10378.8			
1070.9		8603.5		7532.5			
1077.4		5139.0	$41/2^{(-)}$	4061.6	$37/2^+$		Mult.: R_{asym}=1.21 12.
1110.5 6	17 4	12159.4	$73/2^+$	11048.9	$69/2^+$		
1132.1		8129.8		6997.7	53/2		
1150.1		6739.8		5590.6	$47/2^{(-)}$		
1165.7		7882.0		6716.3	51/2		

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(HI,xnγ) (continued)

$\gamma(^{153}Dy)$ (continued)

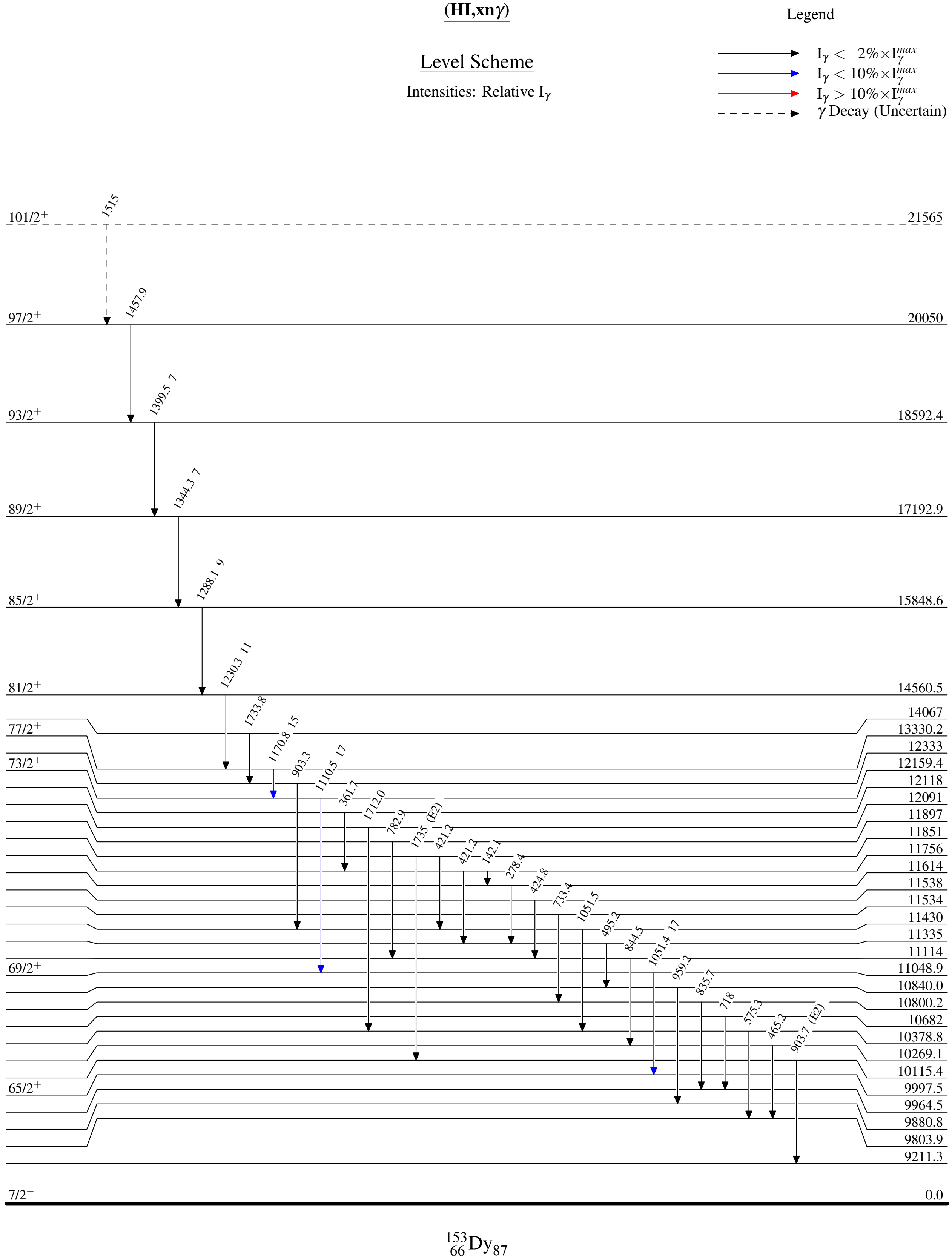
E_γ[†]	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	Comments
1170.8 *6*	15 *4*	13330.2	77/2+	12159.4	73/2+		
1230.3 *6*	11 *4*	14560.5	81/2+	13330.2	77/2+		
1288.1 *7*	9 *3*	15848.6	85/2+	14560.5	81/2+		
1344.3 *7*	7 *3*	17192.9	89/2+	15848.6	85/2+		
1399.5 *7*	7 *3*	18592.4	93/2+	17192.9	89/2+		
1402.7		9852.9		8450.2	(61/2)		
1430.5		9880.8		8450.2	(61/2)		
1457.9 *10*		20050	97/2+	18592.4	93/2+		
1514.3		9964.5		8450.2	(61/2)	E2	Mult.: R_{asym}=1.52 *15*, P=+0.95 *40*.
1515[b] *2*		21565?	101/2+	20050	97/2+		
1712.0		12091		10378.8			
1733.8		14067		12333			
1735		11851		10115.4		(E2)	Mult.: R_{asym}=1.50 *25*.

† Values with uncertainties are from 2002Ap04, unless noted otherwise; and others are from 1983Ko45 and 1991Zh35. The energies of 2002Ap04 are generally smaller than those of the previous authors.
‡ From 2002Ap04.
\# From γ angular distribution and polarization (1988CuZY), unless otherwise noted. Given in comments are the values of asymmetry ratios, $R_{asym}=I_\gamma(12°)/I_\gamma(90°)$ (ΔJ=1 γ for R_{asym}<1 and ΔJ=2 γ for R_{asym}>1); and experimental polarization measurements, P (E γ for P>0 and M γ for P<0).
@ From Adopted γ data.
& From Adopted γ data.
a From intensity imbalance in delayed spectrum.
b Placement of transition in the level scheme is uncertain.

(HI,xnγ)

Level Scheme

Intensities: Relative I_γ



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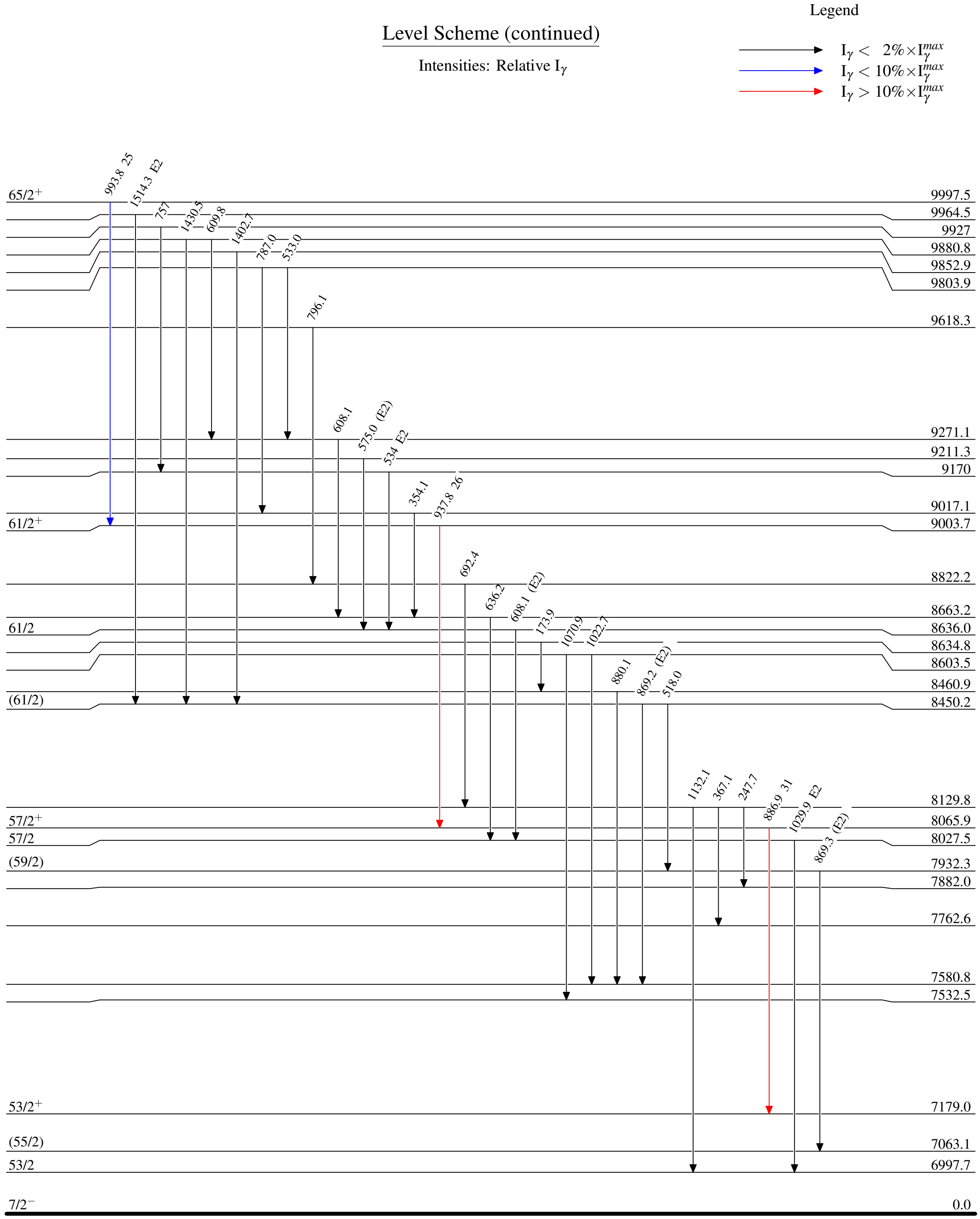
Level Scheme (continued)

Intensities: Relative I_γ



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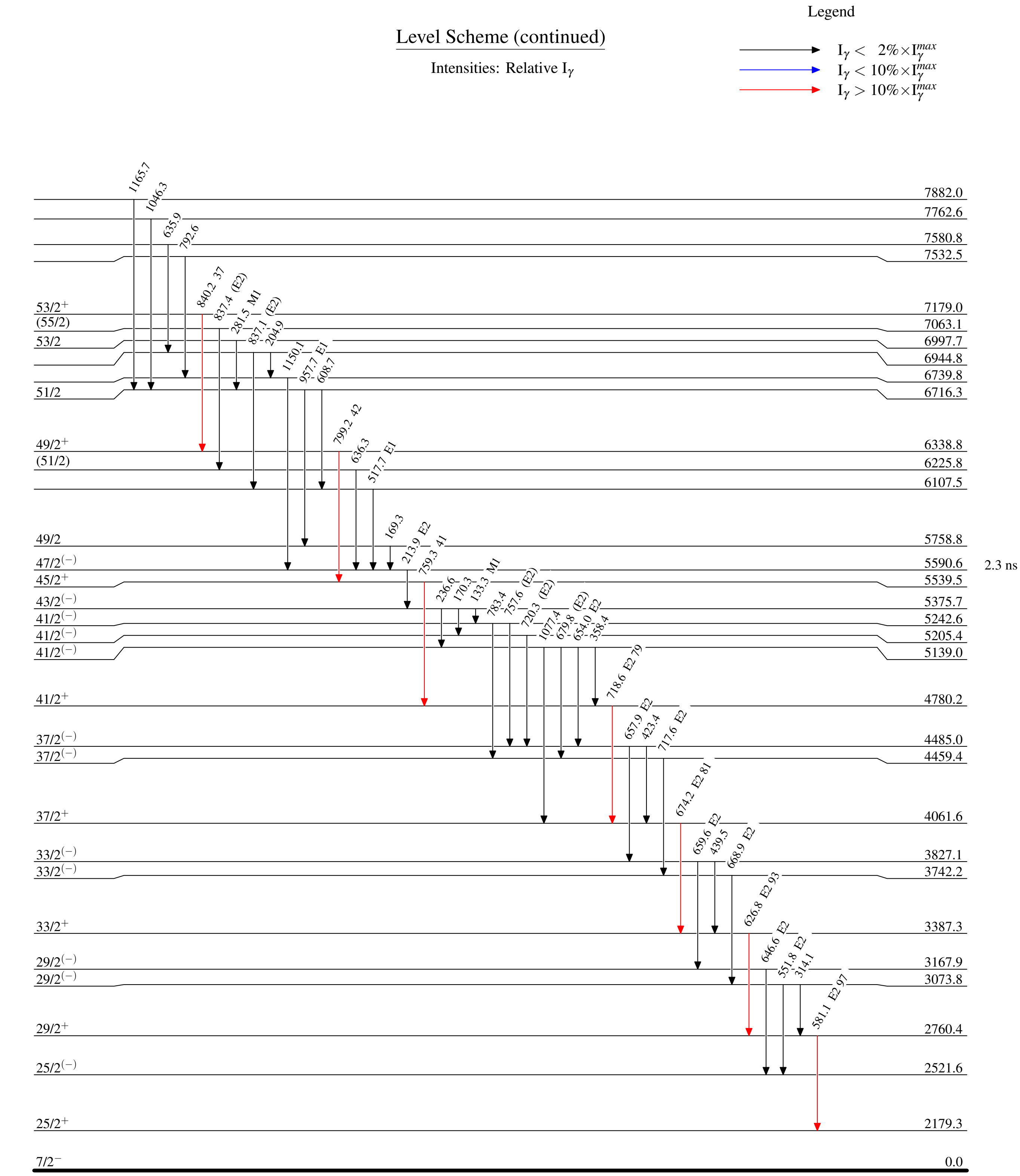

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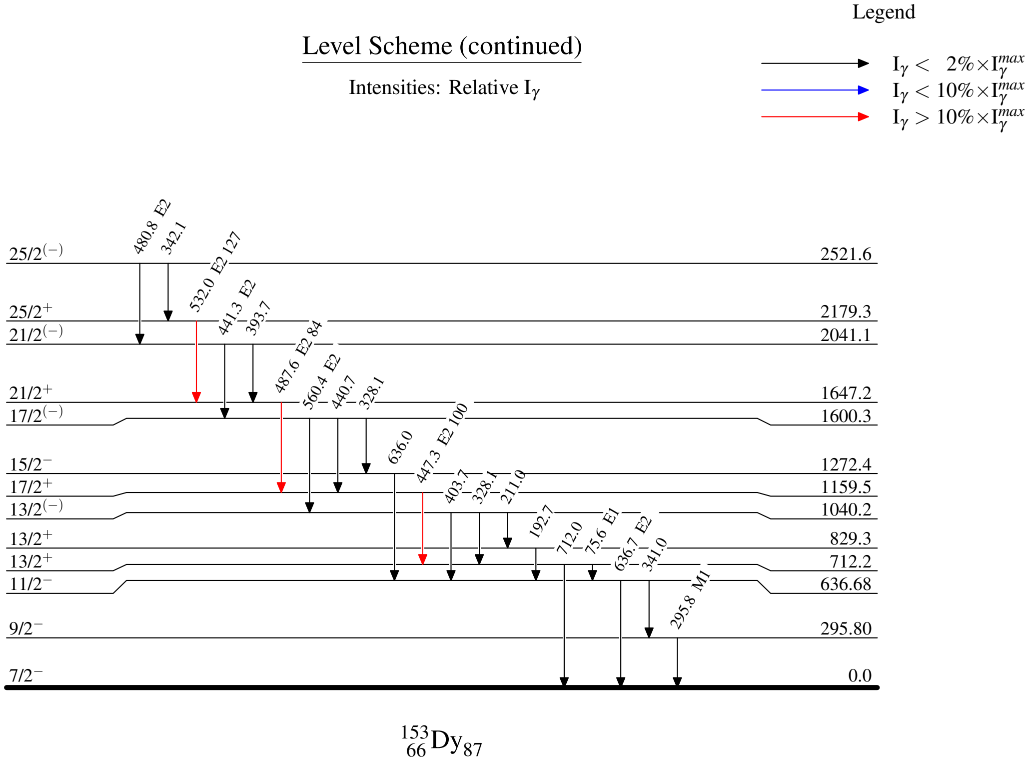
(HI,xnγ)

Level Scheme (continued)

Intensities: Relative I_γ



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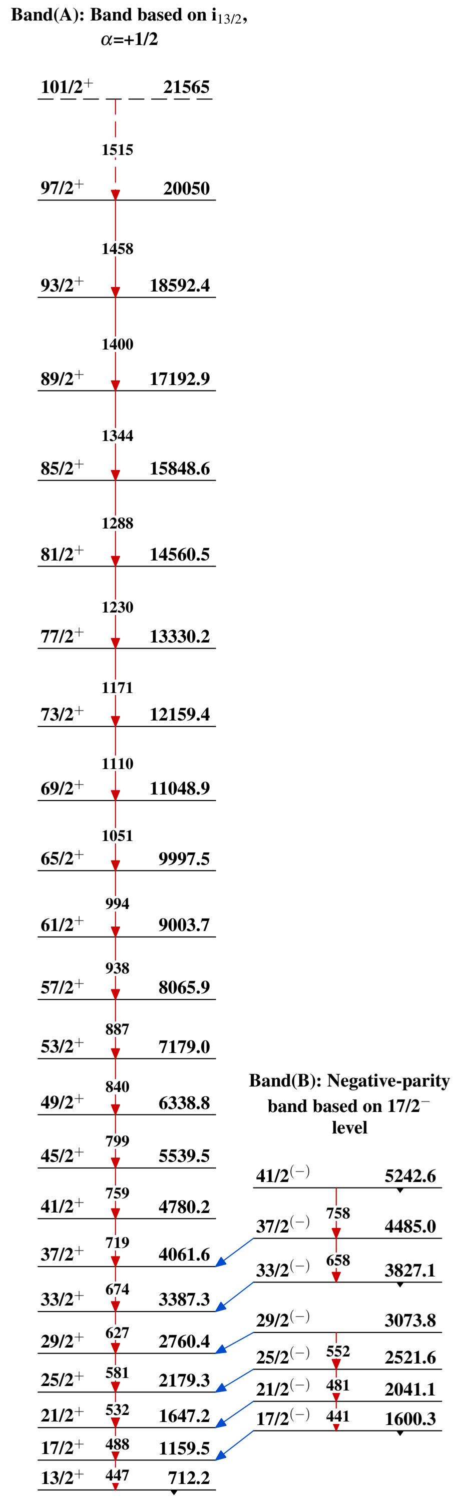

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