(HI,xnγ)

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	N. Nica	NDS 141, 1 (2017)	1-Feb-2017

Data are from 1972Jo02, 1972Th02, 1981Em01, 1979SuZP, and 1972Fe08.
Experimental parameters:
^{162}Dy(^{3}He,α3nγ) with E(^{3}He)=45 MeV (1987At01).
^{156}Gd(α,2nγ) with E(α)=30 MeV (1969Ka03,1997Al04).
^{157}Gd(α,3nγ) with E(α)=30 MeV (1969Ka03) and ≈ 40 MeV (1972Fe08, 1972Jo02).
^{158}Gd(α,4nγ) with E(α)=40 MeV (1972Fe08).
^{154}Sm(^{12}C,2$\alpha\gamma$) with E(^{12}C)=85 and 109 MeV (1978Zo02).
^{150}Nd(^{13}C,5nγ) with E(^{13}C) ≤ 75 MeV (1972Th02,1979SuZP).
^{26}Mg(^{136}Xe,4nγ) with E(^{136}Xe)=4.1 MeV/nucleon (1981Em01).
Measurements include E_γ, I_γ, $\gamma(\theta)$ (1972Jo02, 1972Th02, 1994Gu04), $T_{1/2}$ (1981Em01), and g-factors (1997Al04).
Special remarks: 1963Mo14 is an important experimental paper in the sense that it is likely to be the first paper on high-spin spectroscopy. 1986Bo27 and 1987At01 deal with continuum gamma-ray spectroscopic studies to investigate population mechanisms. Also 1963Mo14, 1981Em02 (that supersedes 1982EmZZ), 1986Bo27 and 1987At01 contain (among others papers) model calculations that may be of interest.

^{158}Dy Levels

E(level)[†]	J^{π}[‡]	$T_{1/2}$[#]	Comments
0.0[a]	0^+		
98.8[a] *3*	2^+		
317.0[a] *4*	4^+	71 ps *5*	μ=1.33 *10* μ: from g-factor=0.333 *25* from rotation of $\gamma\gamma(\theta)$ in magnetic field (1997Al04).
637.6[a] *5*	6^+	9.1 ps *10*	μ=1.42 *13* μ: from g-factor=0.236 *22* from rotation of $\gamma\gamma(\theta)$ in magnetic field (1997Al04).
1043.9[a] *6*	8^+	2.9 ps *6*	μ=2.5 *7* μ: from g-factor=0.31 *9* from rotation of $\gamma\gamma(\theta)$ in magnetic field (1997Al04).
1314[@d]	5^+		
1519.9[a] *9*	10^+	1.41 ps *19*	
1675[@d]	7^+		
2049.2[a] *9*	12^+	0.85 ps *16*	
2478[&b]	(10,11)		
2612.6[a] *10*	14^+	0.73 ps *15*	
2808[&b]	(12,13)		
2887[&c]	(13)		
3190.7[a] *10*	16^+	0.63 ps *9*	
3218[&b]	(14,15)		
3369[&c]	(15)		
3700[&b]	(16,17)		
3781.7[a] *11*	18^+	0.55 ps *8*	
3903[&c]	(17)		
4243[&b]	(18,19)		
4407.5[a] *11*	20^+	0.40 ps *8*	
4490[&c]	(19)		
4838[&b]	(20,21)		
5085.6[a] *12*	22^+	0.33 ps *9*	
5127[&c]	(21)		
5482[&b]	(22,23)		
5811[&c]	(23)		

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(HI,xnγ) (continued)

^{158}Dy Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$[#]
5820.3[a] *13*	24+	0.28 ps *10*
6175[&b]	(24,25)	
6542[&c]	(25)	
6612.9[a] *14*	26+	0.17 ps *10*
6919[&b]	(26,27)	
7453[a]	(28+)	

[†] From γ energies, except as noted.
[‡] From authors′ band assignments and γ multipolarities. These assignments agree with those in the Adopted Levels.
[#] From (HI,xnγ) measurements (1981Em01); see ^{158}Dy Adopted Levels for all measurements.
[@] From 1972Fe08.
[&] From 1979SuZP.
[a] Band(A): $K^\pi=0^+$ ground-state band.
[b] Band(B): 2nd band.
[c] Band(C): 3rd band.
[d] Band(D): $K^\pi=2^+$ γ-vibrational band.

γ(^{158}Dy)

Angular distribution coefficients A_2 and A_4 given in the table are normalized to A_0. Also given in the table are relative intensities for the g.s. rotational band populated in different reactions (units can differ in between references; for 1978Zo02 only the relative intensities at incident energy of 85 keV are given; those at 109 keV in good agreement but less precise).

E_γ[†]	I_γ[‡]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[#]	Comments
98.8 *3*	26	98.8	2+	0.0	0+	E2	A_2=0.162 *18*, A_4=−0.073 *26* (1972Th02). A_2=0.12 *3*, A_4=−0.01 *3* (1972Jo02). I_γ: 34 (1972Jo02).
218.2 *3*	100	317.0	4+	98.8	2+	E2	A_2=0.291 *7*, A_4=−0.075 *10* (1972Th02). A_2=0.28 *2*, A_4=−0.07 *2* (1972Jo02). I_γ: 112 (1972Jo02); 101 *6* (1978Zo02); 606 *21* (1994Gu04).
320.6 *3*	99	637.6	6+	317.0	4+	E2	A_2=0.162 *18*, A_4=−0.073 *26* (1972Th02). A_2=0.31 *2*, A_4=−0.10 *3* (1972Jo02). I_γ: 100 (1972Jo02); 100 (1978Zo02); 474 *19* (1994Gu04).
330[&]		2808	(12,13)	2478	(10,11)		
406.3 *3*	90	1043.9	8+	637.6	6+	E2	A_2=0.306 *8*, A_4=−0.073 *12* (1972Th02). A_2=0.33 *2*, A_4=−0.11 *2* (1972Jo02). I_γ: 78 (1972Jo02); 94 *6* (1978Zo02); 291 *18* (1994Gu04).
410[&]		3218	(14,15)	2808	(12,13)		
476.0 *3*	80	1519.9	10+	1043.9	8+	E2	A_2=0.310 *9*, A_4=−0.073 *13* (1972Th02). A_2=0.39 *6*, A_4=−0.10 *6* (1972Jo02). I_γ: 54 (1972Jo02); 42.0 *14* (1972Fe08,(α,4n)), 44 *2* (1972Fe08,(α,3n)); 91 *7* (1978Zo02); 152 *15* (1994Gu04).
481.9[&]		3369	(15)	2887	(13)		
482.5[&]		3700	(16,17)	3218	(14,15)		
529.3 *3*	59	2049.2	12+	1519.9	10+	E2	A_2=0.322 *12*, A_4=−0.066 *18* (1972Th02).

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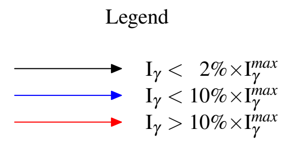
(HI,xnγ) (continued)

$\gamma(^{158}Dy)$ (continued)

E_γ †	I_γ ‡	E_i(level)	J^π_i	E_f	J^π_f	Mult. #	Comments
							A_2=0.40 *10*, A_4=−0.24 *13* (1972Jo02). I_γ: 29 (1972Jo02); 17.0 *13* (1972Fe08,(α,4n)), 30 *2* (1972Fe08,(α,3n)); 80 *6* (1978Zo02); 77 *11* (1994Gu04).
534.4&		3903	(17)	3369	(15)		
543.4&		4243	(18,19)	3700	(16,17)		
563.4 *3*	42	2612.6	14^+	2049.2	12^+	E2	A_2=0.292 *16*, A_4=−0.117 *25* (1972Th02). A_2=0.32 *4*, A_4=−0.14 *4* (1972Jo02). I_γ: 19 (1972Jo02); 10.0 *13* (1972Fe08,(α,4n)), 19.0 *17* (1972Fe08,(α,3n)); 68 *6* (1978Zo02); 48 *8* (1994Gu04).
578.1 *3*	28	3190.7	16^+	2612.6	14^+	E2	A_2=0.349 *24*, A_4=−0.166 *36* (1972Th02). A_2=0.34 *4*, A_4=−0.12 *4* (1972Jo02). I_γ: 11 (1972Jo02); 7.0 *12* (1972Fe08,(α,4n)), 8.5 *20* (1972Fe08,(α,3n)); 42 *7* (1978Zo02); 38 *8* (1994Gu04).
587.2&		4490	(19)	3903	(17)		
591.0 *3*	23	3781.7	18^+	3190.7	16^+	E2	A_2=0.362 *29*, A_4=−0.128 *44* (1972Th02). I_γ: 31 *5* (1978Zo02); 21 *12* (1994Gu04).
595.8&		4838	(20,21)	4243	(18,19)		
625.8 *3*	13	4407.5	20^+	3781.7	18^+	E2	A_2=0.280 *50*, A_4=−0.023 *76* (1972Th02). I_γ: 18 *6* (1978Zo02).
636.8&		5127	(21)	4490	(19)		
644.6&		5482	(22,23)	4838	(20,21)		
678.1 *3*	≈6	5085.6	22^+	4407.5	20^+	(E2)	A_2=198 *51*, A_4=+0.059 *79* (1972Th02, tentative values).
683.6&		5811	(23)	5127	(21)		
693&		6175	(24,25)	5482	(22,23)		
731&		6542	(25)	5811	(23)		
734.7@		5820.3	24^+	5085.6	22^+		
744&		6919	(26,27)	6175	(24,25)		
756.8&		3369	(15)	2612.6	14^+		
758&		2808	(12,13)	2049.2	12^+		
792.6@		6612.9	26^+	5820.3	24^+		
837.9&		2887	(13)	2049.2	12^+		
841&		7453	(28^+)	6612.9	26^+		
957.7&		2478	(10,11)	1519.9	10^+		
998[a]		1314	5^+	317.0	4^+		
1038[b]		1675	7^+	637.6	6^+		

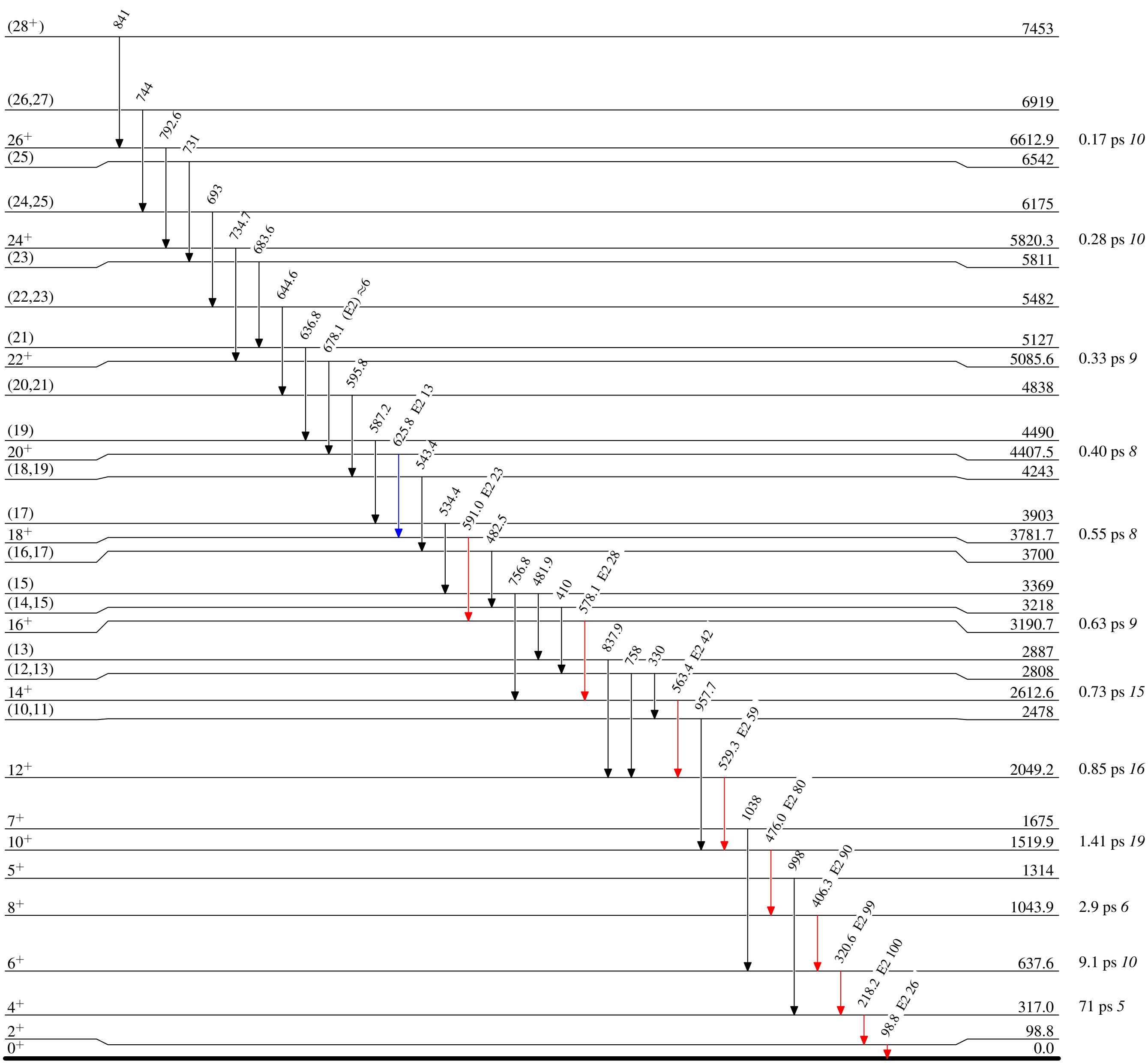
† From 1972Th02 where uncertainties are given in a general comment, unless noted otherwise.
‡ From 1972Th02 for (^{13}C,5nγ) at 71 MeV; others: (α,3nγ) at 40 MeV (1972Fe08), (α,4nγ) at ≈ 42 MeV (1972Fe08,1972Jo02), (^{12}C,αγ) at 85 and 109 MeV (1978Zo02), (^{3}He,α3nγ) at 45 MeV (1994Gu04).
# From γ(θ) (1972Jo02,1972Th02) combined with the Recommended Upper Limits (RUL) for the γ-ray strengths calculated using on the measured $T_{1/2}$ values that confirm that the stretched quadrupole transitions are E2′s.
@ From 1981Em01.
& From 1979SuZP.
[a] From 1972Fe08.
[b] From 1972Fe08; authors give 1308, but from their level energies the value is 1038.

(HI,xnγ)

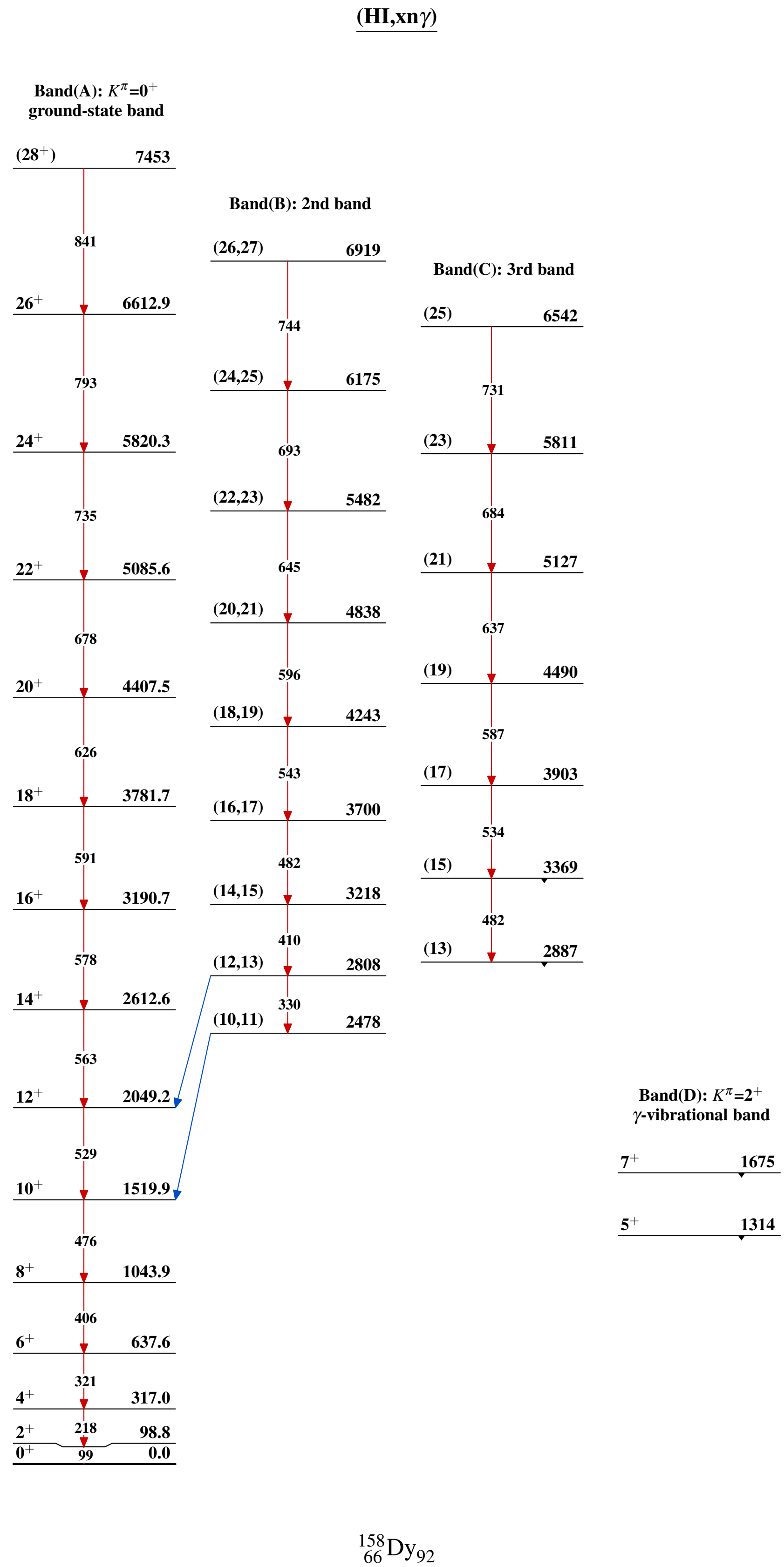


Level Scheme

Intensities: Type not specified



$^{158}_{66}Dy_{92}$


(HI,xnγ)
Band(A): Kπ=0+
ground-state band
(28+) 7453
841
26+ 6612.9
793
24+ 5820.3
735
22+ 5085.6
678
20+ 4407.5
626
18+ 3781.7
591
16+ 3190.7
578
14+ 2612.6
563
12+ 2049.2
529
10+ 1519.9
476
8+ 1043.9
406
6+ 637.6
321
4+ 317.0
218
2+ 98.8
99
0+ 0.0
Band(B): 2nd band
(26,27) 6919
744
(24,25) 6175
693
(22,23) 5482
645
(20,21) 4838
596
(18,19) 4243
543
(16,17) 3700
482
(14,15) 3218
410
(12,13) 2808
330
(10,11) 2478
Band(C): 3rd band
(25) 6542
731
(23) 5811
684
(21) 5127
637
(19) 4490
587
(17) 3903
534
(15) 3369
482
(13) 2887
Band(D): Kπ=2+
γ-vibrational band
7+ 1675
5+ 1314
158 66 Dy 92