

$^{160}\text{Dy}(\text{d,p})$ 1986Sc16,1977Be03,1970Gr46

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	C. W. Reich	NDS 112,2497 (2011)	1-Jun-2011

Additional information 1.

Data for levels below 1400 keV are from 1986Sc16 and above 1440 keV are from 1970Gr46, unless otherwise noted. These studies used $E(\text{d})=12$ to 22 MeV and had $\text{FWHM}=3$ to ≈ 9 keV. Other (d,p) studies: 1977Be03 with $E(\text{d})=12$ MeV.

1970Gr46: $^{160}\text{Dy}(\text{d,p})$ reaction with $E(\text{d})=12.1$ MeV. p measured in magnetic spectrograph at 60° , 90° , and 125° . FWHM not given, but expected to be ≈ 13 keV, and uncertainty in level energy expected to be 3-5 keV. $^{162}\text{Dy}(\text{d,t})$ reaction also studied.

1977Be03: $^{160}\text{Dy}(\text{d,p})$ reaction with $E(\text{d})=12$ MeV. p measured in magnetic spectrograph at 75° , 95° , and 115° . FWHM ≈ 15 keV.

Report L values. Excitation energies measured relative to the peak for 367 level.

1986Sc16: $^{160}\text{Dy}(\text{d,p})$: $E(\text{d})=14$ MeV at $\theta=45^\circ$ and 22 MeV at $\theta=35^\circ$. Isotope-separated targets. Q3D spectrograph. Data recorded using two multiwire proportional counters, operated in coincidence with a scintillation counter. FWHM=3-5 keV.

Measured Q(d,p) 4237 10 (1970Gr46) and 4231 10 keV (1977Be03).

 ^{161}Dy Levels

Additional information 2.

E(level) [†]	J^π [‡]	Relative I _p At $\theta=35^\circ$ [#]	Comments
0.0 ^b	5/2 ⁺	18 3	
25.69 ^c 24	5/2 ⁻	142 8	
43.1 ^b 4	7/2 ⁺	10.0 25	
74.56 ^d 14	3/2 ⁻	283 14	
100.7 ^b 3	9/2 ⁺	358 23	
105.7 ^c 8	7/2 ⁻	61 9	
132.10 ^d 21	5/2 ⁻	39 6	
183.3 ^b 7	11/2 ⁺	21 5	
201.06 ^c 15	9/2 ⁻	275 13	
213.08 ^d 13	7/2 ⁻	1000	
267.74 ^b 17	13/2 ⁺	496 18	
313.9 ^d 5	9/2 ⁻	14 4	
319.9 ^c 3	11/2 ⁻	31 6	
367.08 ^e 12	1/2 ⁻	8.5×10^2 6	
418.16 ^e 17	3/2 ⁻	151 19	
443.40 ^d 18	11/2 ⁻	122 7	
451.56 ^e 15	5/2 ⁻	352 16	
485.56 ^f 16	11/2 ⁻	73 7	
512 ^{&}			
534.2 3		13 4	
550 ^g 1	3/2 ⁺	195 12	E(level): energy given as 550 13 in 1986Sc16, but evaluator assumes that this is a misprint and that the uncertainty should actually be 1.3 keV.
568.4 ^e 3	7/2 ⁻	5.9×10^2 4	
607.61 ^h 18	1/2 ⁺	236 20	E(level): doublet with the 609 level (1986Sc16).
609 ^g	5/2 ⁺		E(level): doublet with the 607.6 level (1986Sc16).
626.4 ^e 3	9/2 ⁻	101 29	
632.6 ^h 3	5/2 ⁺	64 29	
678.65 ⁱ 18	3/2 ⁺	48 6	J^π : assigned as (7/2 ⁻) by 1977Be03 and 3/2 ⁺ by 1970Gr46.
688.3 3		17 4	

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$^{160}\text{Dy}(\text{d,p})$ [1986Sc16](#),[1977Be03](#),[1970Gr46](#) (continued) ^{161}Dy Levels (continued)

E(level) [†]	J ^π [‡]	Relative I _p At θ=35° [#]	Comments
696.5 ^g 3	7/2 ⁺	42 6	J ^π : assigned as 5/2 ⁻ , 7/2 ⁺ by 1977Be03 from L=(1). L=2,3 from 1975Ho21 , and L=4 from 1976Pe02 (d,t).
717.05 22		44 6	
731.24 ⁱ 18	5/2 ⁺	30 6	In 1977Be03 , this level is assigned as 5/2 ⁻ , 3/2[532], and the 1/2 ⁺ state is placed at 777 keV.
773.34 ^j 14	1/2 ⁺	29 7	
777.7 ^k 4	1/2 ⁻	105 22	E(level): probably the same level as the 849.44, 5/2 ⁺ level in (d,t).
790.2 ^l 5	5/2 ⁻	91 21	
803.93 ^k 22	3/2 ⁻	29 7	E(level): doublet with the 858.4 level (1986Sc16). E(level): doublet with the 857 level (1986Sc16).
808 ^{&e}	(11/2 ⁻)		
825.91 ^h 16	3/2 ⁺	26 11	E(level): level and assignment are shown as tentative by 1986Sc16 .
847.7 3		61 7	
857 ⁱ	(7/2) ⁺		J ^π : assigned by 1970Gr46 (at 995 keV) and 1977Be03 (at 990 keV).
858.39 ^m 20	3/2 ⁻	135 11	
866.9 ^k 5	5/2 ⁻	105 10	J ^π : assigned as 3/2 ⁺ by 1977Be03 .
878.51 ^l 15	7/2 ⁻	1.67×10 ³ 8	
898.87 22		62 6	E(level): multiplet (1970Gr46).
923.01 20	5/2 ⁻ , 7/2 ⁻	104 9	
957.0 ^m 3	7/2 ⁻	16 3	
972.8 9		36 5	
988.0 ^l 10	9/2 ⁻	250 24	
1005.29 24	1/2 ⁺ , 3/2 ⁺	18 3	
1027.3 6		35 5	
1038 ^a 2			
1062.1 6		17 6	
1098.3 6	3/2 ⁺	48 6	
1111.2 4		40 6	
1125.4 3		22 4	
1142.3 7		83 17	
1146.8 7		32 14	
1163.0 5		173 5	
1210.9 5		20 6	
1240 ^a 2			
1271.9 6		44 5	
1287.5 6		36 5	
1302.9 ⁿ 3	3/2 ⁻	7.7×10 ² 5	
1359.7 4	1/2 ⁻ , 3/2 ⁻	305 23	
1363 ^{@n}	5/2 ⁻		
1378.8 5	3/2 ⁻	146 12	
1446 ^{@n}	7/2 ⁻		
1477 [@]			
1516 ^{&}			
1535 ^{&}			
1562 ^{&}			
1594 ^{&}			
1645 ^{&}			
1712 ^{&}			

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$^{160}\text{Dy}(\text{d,p})$ [1986Sc16](#),[1977Be03](#),[1970Gr46](#) (continued) ^{161}Dy Levels (continued)

E(level) [†]	J ^π [‡]	Comments
1825&		
1923&		
1946&		
1977& ^o	3/2 ⁻	
1996&		
2039& ^o	5/2 ⁻	
2113& ^o	(7/2 ⁻)	E(level): this level is assumed (1970Gr46) to constitute the main part of an unresolved peak at this energy.

[†] Values are from [1986Sc16](#), unless otherwise noted. Values are authors' average from (d,t) and (d,p) reactions.

[‡] From adopted values.

Values are those of [1986Sc16](#) for E(d)=22 MeV.

@ Reported only by [1970Gr46](#) and [1977Be03](#).

& Reported only by [1970Gr46](#).

^a Reported only by [1977Be03](#).

^b Band(A): g.s. band. configuration=5/2[642].

^c Band(B): 5/2[523] band.

^d Band(C): 3/2[521] band.

^e Band(D): 1/2[521] band.

^f Band(E): Bandhead of 11/2[505].

^g Band(F): 3/2[402] band with an admixture of 3/2[651].

^h Band(G): 1/2[660] band with an admixture of 1/2[400].

ⁱ Band(H): 3/2[651] band with an admixture of 3/2[402].

^j Band(I): 1/2[400] band with an admixture of 1/2[660].

^k Band(J): K-2 γ -vibrational band based on 3/2[521].

^l Band(K): 5/2[512] band.

^m Band(L): 1/2[530] band.

ⁿ Band(M): 1/2[510] band.

^o Band(N): 3/2[512] band.

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Band(D): 1/2[521] band

(11/2⁻) 808Band(F): 3/2[402] band
with an admixture of
3/2[651]7/2⁺ 696.59/2⁻ 626.45/2⁺ 6097/2⁻ 568.43/2⁺ 550Band(E): Bandhead of
11/2[505]11/2⁻ 485.56

Band(C): 3/2[521] band

11/2⁻ 443.405/2⁻ 451.563/2⁻ 418.161/2⁻ 367.08

Band(B): 5/2[523] band

11/2⁻ 319.99/2⁻ 313.9

Band(A): g.s. band

13/2⁺ 267.749/2⁻ 201.067/2⁻ 213.0811/2⁺ 183.35/2⁻ 132.109/2⁺ 100.77/2⁻ 105.73/2⁻ 74.567/2⁺ 43.15/2⁻ 25.695/2⁺ 0.0

 $^{160}\text{Dy}(\text{d,p})$ 1986Sc16,1977Be03,1970Gr46 (continued)

		Band(K): 5/2[512] band			
		<u>9/2⁻</u>	<u>988.0</u>		
		Band(L): 1/2[530] band			
		<u>7/2⁻</u>	<u>957.0</u>		
		Band(J): K-2 γ-vibrational band based on 3/2[521]			
		<u>5/2⁻</u>	<u>866.9</u>	<u>7/2⁻</u>	<u>878.51</u>
				<u>3/2⁻</u>	<u>858.39</u>
		Band(H): 3/2[651] band with an admixture of 3/2[402]			
		<u>(7/2)⁺</u>	<u>857</u>		
		Band(G): 1/2[660] band with an admixture of 1/2[400]			
		<u>3/2⁺</u>	<u>825.91</u>		
		Band(I): 1/2[400] band with an admixture of 1/2[660]		<u>3/2⁻</u>	<u>803.93</u>
		<u>1/2⁺</u>	<u>773.34</u>	<u>5/2⁻</u>	<u>790.2</u>
				<u>1/2⁻</u>	<u>777.7</u>
		<u>5/2⁺</u>	<u>731.24</u>		
		<u>3/2⁺</u>	<u>678.65</u>		
		<u>5/2⁺</u>	<u>632.6</u>		
		<u>1/2⁺</u>	<u>607.61</u>		

¹⁶⁰Dy(d,p) 1986Sc16,1977Be03,1970Gr46 (continued)

Band(N): 3/2[512] band

(7/2⁻) 2113

5/2⁻ 2039

3/2⁻ 1977

Band(M): 1/2[510] band

7/2⁻ 1446

5/2⁻ 1363

3/2⁻ 1302.9

¹⁶¹₆₆Dy₉₅