^{164}Dy(d,t) 1989Sc31,1976Ma33,1970Gr46

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	C. W. Reich, Balraj Singh	NDS 111, 1211 (2010)	12-Apr-2010

Additional information 1.

1989Sc31: E= 14 MeV. Measured proton and deuteron spectra at θ(lab)= 45° with magnetic spectrometer, multiwire detector and scintillation counter in coincidence. FWHM=3 to 5.

1976Ma33 (also 1973Ma43): E= 17 MeV. Measured $\sigma(\theta)$ for 13 angles between 8° and 60°. FWHM= 9 keV. DWBA analysis for L-transfers and C^2S values.

1970Gr46: E= 12.1 MeV. Measured σ(60°,90°,125°). J^π and Nilsson assignments based on intensity pattern of rotational levels. Levels reported up to 1840.

Others:

1967Sc05: E= 12 MeV. Measured σ(55°). FWHM≈30 (evaluators′ estimate). Levels reported up to 1503.

1980Pe07, 1980St29, 1980St31: reanalysis of data.

1973Ga12: calculated $\sigma(\theta)$.

See band assignments in Adopted Levels.

Energy (1989Sc31)	relative intensity (1989Sc31)	dσ/dΩ (30°) μb/sr (1976Ma33)
0.0	100	74
73.6	73 *3*	60
167.3	59.0 *19*	48
251.1	23.4 *12*	25
281.5	18 *2*	19
336.5	166 *7*	170
351.2	222 *9*	210
389.8	3.8 *7*	18
421.9	620 *40*	600
450 a		19
475.5	26 *2*	21
497.2	82 *5*	64
514.6	283 *11*	200
553.1	316 *13*	180
591 a		12
612 a		25
646.3	16.7 *14*	15
718.2	11.0 *14*	15
727.6	20.7 *22*	
737.4	362 *16*	230
766.3	33.0 *21*	30
781.5	10.3 *17*	28
793.8	156 *11*	77
801.7		30
821.0	8.9 *11*	23
826.8	4.7 *8*	
851.5	104 *11*	
859.6	850 *50*	140
884.0	214 *12*	140
893 a		33
916.1	51 *5*	60
935.5	59 *4*	45
946.3	41 *3*	62
953.5	13.5 *25*	
966.4	13.4 *13*	34
981.6	7.0 *12*	
991.2	35 *4*	32

999.5		5.5 *13*		
1049.4		420 *30*		
1058.4		1490 *90*		1020
1073.2		25 *5*		
1084.1		100 *6*		86
1093.1		12 *4*		
1119.9		31 *4*		40
1131.0		90 *11*		78
1134.9		25 *6*		
1147.6		11 *5*		29
1162.2		6.8 *11*		21
1183.7		5.0 *9*		
1195.8		31 *4*		15
1202.0		95 *10*		90
1217	a		9	
1253.6		14.0 *18*		17
1276			130	
1295	b		4	b (60°)
1312			25	
1339			6	
1360			25	
1395			18	
1427			24	
1481	b		5	b (90°)
1499			18	
1527			50	
1572			37	
1613			32	
1631			50	
1649			7	
1660			19	
1691			46	
1708			92	
1753			110	
1812			18	
1843			130	
1876			63	
1949			48	
1986			16	
2042			26	
2105			17	
2156			14	
2179			17	
2194			13	
2275			12	
2285			32	
2378			80	
2387			60	
2609			10	
2645			15	
2691			12	

E(level): above 1260, from 1976Ma33, unless noted otherwise.
a: from 1976Ma33
b: from 1970Gr46

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^{164}Dy(d,t) 1989Sc31,1976Ma33,1970Gr46 (continued)

^{163}Dy Levels

E(level)[†]	Jπ[‡]	L[#]	S[#]	Comments
0.0	5/2⁻	3	0.10	E(level): 0.1 *2* (1989Sc31).
73.6 *2*	7/2⁻	3	0.081	
167.3 *2*	9/2⁻	5	0.74	
251.1 *2*	5/2⁺	2	0.023	
281.5[f] *4*	11/2⁻			Jπ: from 1970Gr46 and 1989Sc31.
284.9[f] *5*	7/2⁺	(4)[i]	0.095	E(level): 283 (1976Ma33).
336.5 *2*	9/2⁺	4	0.66	
351.2 *2*	(1/2)⁻	1	0.072	
389.8 *3*	3/2⁻	1	0.007	
421.9 *2*	(3/2)⁻	1	0.20	
450?[g]		3	0.049	
475.5 *2*		*i*		S: 0.036 for L=3 expected for 5/2⁻ assignment (1970Gr46,1989Sc31).
497.2 *2*	13/2⁺	6	1.3	
514.6 *2*	7/2⁻	3	0.30	
553.1 *2*	7/2⁻	3	0.40	
591[c]		*j*		E(level): could correspond to 587.5 in (d,p) (1989Sc31). S: 0.20 for L=5 expected for 9/2⁻ assignment (1970Gr46).
612 *2*		1	0.005	E(level): from 1976Ma33. Not reported by 1989Sc31 and 1970Gr46.
646.3 *2*	9/2⁻	5	0.32	
718.2 *2*		*i*		S: 0.32 for L=6 expected for 13/2⁺ assignment (1970Gr46).
727.6[b] *5*				
737.4 *2*	1/2⁺	0	0.14	
766.3 *2*	(3/2)⁺&(11/2⁻)	(5+2)	0.12,0.025	E(level),Jπ: consistent with the possibility that this is a doublet which is predominantly the 3/2⁺ member of $K^{\pi}=1/2^{+}$ band (from 5/2[642]-Q_{22}), but may also contain a 11/2⁻, 3/2[521] component (1989Sc31).
781.5 *3*	5/2⁺	(2)	0.024	E(level): 780 (1970Gr46), 773 (1976Ma33).
793.8[f] *3*	(1/2)⁻	1	0.060	E(level): 792 (1976Ma33).
801.7[f] *3*				E(level): 806 (1976Ma33).
821.0[@] *2*	(3/2)⁻	(1)[h]	0.008	
826.8[@] *3*		*h*		
851.5 *2*	11/2⁻			Jπ: Assigned as the bandhead of 11/2[505].
859.6 *2*	(3/2)⁺	2	0.70	
884.0 *2*		0	0.080	E(level): 882 (1976Ma33). Doublet in 1989Sc31.
893?[g] *2*		(0)	0.020	
915.2[&] *2*		*i*		S: 0.87 for L=5 expected for 9/2⁻ assignment (1970Gr46).
916.1[&] *3*				
935.2 *2*	5/2⁺	2	0.060	S: for 5/2⁺. $J^{\pi}=(3/2)^{+}$ in Adopted Levels.
946.3 *2*		3	0.11	
953.5[b] *3*				
966.4 *3*		0	0.019	
981.6[b] *5*				
991.2 *3*		(2)	0.048	
999.5 *6*				E(level): 1005 (1967Sc05).
1049.4 *2*		1	0.16	
1058.4 *2*	1/2⁺	0	0.52	
1073.2[b] *6*				
1084.1 *3*	(3/2)⁺	2	0.14	E(level): doublet (1989Sc31).
1093.1[b] *3*				
1109?[c] *2*		0	0.026	E(level): this group may be composite of 1093.1+1119.9 in 1989Sc31.
1119.9[b] *3*				
1131.0 *3*		2	0.13	

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^{164}Dy(d,t) 1989Sc31,1976Ma33,1970Gr46 (continued)

^{163}Dy Levels (continued)

E(level)†	Jπ‡	L#	S#	Comments
1134.9[b] 3				
1147.6 4		0	0.021	L: inconsistent with adopted $J^{\pi}=3/2^{+}$.
1162.2 6		j		S: 0.009 for L=1 expected for $1/2^{-}$ (1970Gr46).
1183.7 5				E(level): 1175 (1967Sc05).
1195.8[a] 3		(0)	0.007	E(level): 1191 (1976Ma33).
1202.0[a] 5	$(5/2)^{+}$	(2)[i]	0.089	S: 0.089 for L=1 expected for $3/2^{-}$ (1970Gr46).
1217[c]		(2)	0.020	
1253.6 4	$(5/2^{-})$	(3)	0.04	L,Jπ: inconsistent with adopted $J^{\pi}=3/2^{+}$. It is possible that this group corresponds to $5/2^{-}$, 1258 level.
1276 2		(3)[i]	0.22	S: 0.060 for L=1 expected for $3/2^{-}$ (1970Gr46).
1295[d]				
1312[c]		0	0.003	
1339[c]		(0)	0.004	
1360		(3)	0.027	S: for $J^{\pi}=7/2^{-}$.
1395[c]		(1)	0.008	
1427		(0)[i]	0.003	S: 0.77 for L=5 expected for $9/2^{-}$ (1970Gr46).
1481[d]				
1499		(2)	0.034	
1527 2		(1)	0.023	
1572 2		1	0.019	
1613 2		1	0.017	
1631 2		3	0.11	
1649[ce]				
1660[c]		(3)	0.046	
1691 2		1	0.025	
1708 2		3	0.22	
1753 2		1	0.057	
1812[e]				
1843 2		(3)[i]	0.33	S: 1.8 for L=4 expected for $7/2^{+}$ (1970Gr46).
1876 2		(3)	0.17	
1949 2		1	0.030	
1986		2	0.044	
2042 2		2	0.064	
2105		j		
2156		(0)	0.012	
2179		j		
2194		(1)	0.012	
2275		2	0.036	
2285 2		(2)	0.040	
2378 2		3	0.27	
2387 2		2	0.18	
2609		(3)	0.048	
2645		(1)	0.082	
2691		j		

† From 1989Sc31 for levels below 1260 and from 1976Ma33 for levels above this energy. Values from 1989Sc31 are the averages of (d,p) and (d,t) when a level is populated in both reactions, unless noted otherwise. Above 1260, uncertainty of 2 keV is based on a general statement by 1976Ma33 about accuracy of energy levels.

‡ From Adopted Levels, except as noted.

From DWBA analysis of 1976Ma33. For spectroscopic factors, a normalization factor=3.33 was used in DWBA calculations. For the measured relative intensities and cross sections for the individual triton groups, see the table (above) in this data set.

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^{164}Dy(d,t) 1989Sc31,1976Ma33,1970Gr46 (continued)

^{163}Dy Levels (continued)

[@] 820 (1970Gr46), 825 (1976Ma33).
[&] 915 (1967Sc05), 912 (1970Gr46). 1989Sc31 suggest that only the 916.1 level is populated in (d,t), but this assignment is model dependent.
[a] 1204 (1967Sc05), 1199 (1970Gr46), 1198 (1976Ma33).
[b] From 1989Sc31 only.
[c] From 1976Ma33 only.
[d] From 1970Gr46 only.
[e] Populated weakly, no meaningful $\sigma(\theta)$ could be extracted by 1976Ma33.
[f] From (d,p), unresolved doublet in (d,t) (1989Sc31).
[g] From 1976Ma33 only, but possibly a contaminant due to ^{162}Dy in the target (1989Sc31).
[h] For 821+827 doublet (1976Ma33).
[i] Anomalous $\sigma(\theta)$. Angular distribution could not be fit with an L-transfer consistent with Nilsson assignment (1970Gr46) based on intensity pattern of rotational states.
[j] Anomalous $\sigma(\theta)$, could not be fit by any DWBA calculation.