^{160}Gd(α,3nγ) 1972Hj01

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

Additional information 1.

1972Hj01: ^{160}Gd(α,3nγ), E(α)=23-43 MeV. Enriched (86% ^{160}Gd,12% ^{158}Gd) metallic target. γ singles measured using 43 cm^3 coaxial Ge(Li) detector having FWHM=1.9 keV. Uncertainties in Eγ and Iγ, for the well-defined peaks, are≈0.3 keV and≈10%, respectively. For the low-energy (<250 keV) region of the γ spectrum, a planar Ge(Li) detector, having FWHM=0.6 keV, was used, which gave uncertainties in Eγ≈0.1 keV. γ(θ) was measured at θ=65°, 90°, 110°, 125° and 155°. Measured γ singles, excitation functions, and γ(θ). Multipolarities deduced from γ(θ). 42 gammas are placed and 76 are unplaced in the proposed level scheme.

^{161}Dy Levels

Additional information 2.

E(level)	J$^\pi$ †	E(level)	J$^\pi$ †	E(level)	J$^\pi$ †	E(level)	J$^\pi$ †
0.0‡	5/2+	131.8&	5/2−	320.8@	11/2−	1118.2#	23/2+
25.7@	5/2−	184.2#	11/2+	407.0#	15/2+	1222.0‡	25/2+
43.8#	7/2+	201.1@	9/2−	457.4@	13/2−	1601.5#	27/2+
74.6&	3/2−	213.0&	7/2−	508.1‡	17/2+	1692.7‡	29/2+
100.4‡	9/2+	267.4‡	13/2+	718.6#	19/2+	2161.1#	31/2+
103.1@	7/2−	315.0?&	9/2−	826.2‡	21/2+	2233.9‡	33/2+

† From adopted values. In this study, the J$^\pi$ and band assignments are based on γ(θ) and considerations of the expected band structure. In all cases, the (α,3nγ) values agree with the adopted values.
‡ Band(A): 5/2[642] band, α=+1/2 branch.
# Band(B): 5/2[642] band, α=−1/2 branch.
@ Band(C): 5/2[523] band.
& Band(D): 3/2[521] band.

γ(^{161}Dy)

E$_\gamma$ †	I$_\gamma$ #@	E$_i$(level)	J$^\pi_i$	E$_f$	J$^\pi_f$	Mult.&	Comments
56.64	45	100.4	9/2+	43.8	7/2+		
57.22	8.1	131.8	5/2−	74.6	3/2−		
59.4	2.2	103.1	7/2−	43.8	7/2+		
x68.85	14						
72.7b	6.3	2233.9	33/2+	2161.1	31/2+	D	A_2=0.09 *12*
74.60	20	74.6	3/2−	0.0	5/2+		
77.45	11	103.1	7/2−	25.7	5/2−		
81.21	19	213.0	7/2−	131.8	5/2−		
83.20	77	267.4	13/2+	184.2	11/2+		
83.83	109	184.2	11/2+	100.4	9/2+		
91.9	2.5	1692.7	29/2+	1601.5	27/2+		
98.02	7.8	201.1	9/2−	103.1	7/2−		
x99.41	13						
100.38	13	100.4	9/2+	0.0	5/2+		
101.12	55	508.1	17/2+	407.0	15/2+		
101.99b	27	315.0?	9/2−	213.0	7/2−		

Continued on next page (footnotes at end of table)

^{160}Gd(α,3nγ) 1972Hj01 (continued)

γ(^{161}Dy) (continued)

E_γ[†]	I_γ[#@]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[&]	Comments
103.01	19	103.1	7/2−	0.0	5/2+		
103.6	3.7	1222.0	25/2+	1118.2	23/2+		
107.60	18	826.2	21/2+	718.6	19/2+	D	A_2=−0.68 *30*
[x]109.85	25						
119.9	6.5	320.8	11/2−	201.1	9/2−		
[x]128.39	21						
136.37	<11	457.4	13/2−	320.8	11/2−		
138.46	10	213.0	7/2−	74.6	3/2−		
139.54	127	407.0	15/2+	267.4	13/2+		
140.38	63	184.2	11/2+	43.8	7/2+		
[x]143.76	16						
157.23	22	201.1	9/2−	43.8	7/2+		
167.00	100	267.4	13/2+	100.4	9/2+	Q	A_2=0.38 *3*
[x]173.19	18						
175.60	32	201.1	9/2−	25.7	5/2−		
183.28[b]	23	315.0?	9/2−	131.8	5/2−		
210.33	122	718.6	19/2+	508.1	17/2+	D	A_2=−0.22 *3*
217.57	44	320.8	11/2−	103.1	7/2−		
222.78	194	407.0	15/2+	184.2	11/2+	Q	A_2=0.31 *3*; A_4=−0.05 *2*
[x]236.2	12						
240.72	239	508.1	17/2+	267.4	13/2+	Q	A_2=0.34 *3*
256.3	37	457.4	13/2−	201.1	9/2−	Q	A_2=0.30 *3*; A_4=0.05 *4*
[x]266.5	9.3						
[x]272.3	38						
[x]273.1	21						
[x]284.5	15						
292.1	34	1118.2	23/2+	826.2	21/2+	D	A_2=−0.74 *18*
311.6	193	718.6	19/2+	407.0	15/2+	Q	A_2=0.36 *3*; A_4=−0.06 *4*
[x]317.4	50						
318.1	275	826.2	21/2+	508.1	17/2+		
[x]350.3	16						
[x]354.6	39						
[x]375.4	14						
380.0	26	1601.5	27/2+	1222.0	25/2+	[a]	
[x]382.4	20						
395.9	213	1222.0	25/2+	826.2	21/2+	Q	A_2=0.29 *3*; A_4=−0.09 *4*
399.6[‡]	211	1118.2	23/2+	718.6	19/2+	Q	A_2=0.31 *3*; A_4=−0.03 *3*
[x]411.2	12						
[x]414.4	28						
[x]416.7	6.7						
[x]424.8[‡]	49						
[x]431.1	40						
[x]459.7	43						
[x]466.3	17						
468.9	14	2161.1	31/2+	1692.7	29/2+	D	A_2=−0.41 *17*; A_4=0.42 *21*
470.7	90	1692.7	29/2+	1222.0	25/2+	Q	A_2=0.36 *4*; A_4=−0.16 *7*
[x]477.7	22						
[x]481.5	15						
482.9	62	1601.5	27/2+	1118.2	23/2+		
[x]539.2	10						
541.2	37	2233.9	33/2+	1692.7	29/2+	Q	A_2=0.25 *7*
[x]547.3	14						
[x]556.5	14						
559.4	33	2161.1	31/2+	1601.5	27/2+	Q	A_2=0.36 *6*

Continued on next page (footnotes at end of table)

^{160}Gd(α,3nγ) 1972Hj01 (continued)

γ(^{161}Dy) (continued)

E_γ[†]	I_γ[#@]	E_i(level)
[x]567.7	6	
[x]590.8	14	

† The uncertainties are reported to be typically of the order of 0.3 keV above 250 keV and as small as 0.1 keV below this energy, for well-defined peaks.

‡ Probably a composite peak (1972Hj01).

Relative values at E(α)=35 MeV, found to be the optimum bombarding energy for this study.

@ Uncertainties are reported to be of the order of 10%, for well-defined peaks.

& Assigned by the evaluator from the $\gamma(\theta)$ data. The mult is given as Q if $A_2 \geq 0.25$ and as D if $A_2 < 0.10$. No assignment is made if the $\gamma(\theta)$ result includes more than one G.

a Data suggest γ is Q with ΔJ=2, but J^π indicates ΔJ=1.

b Placement of transition in the level scheme is uncertain.

x γ ray not placed in level scheme.

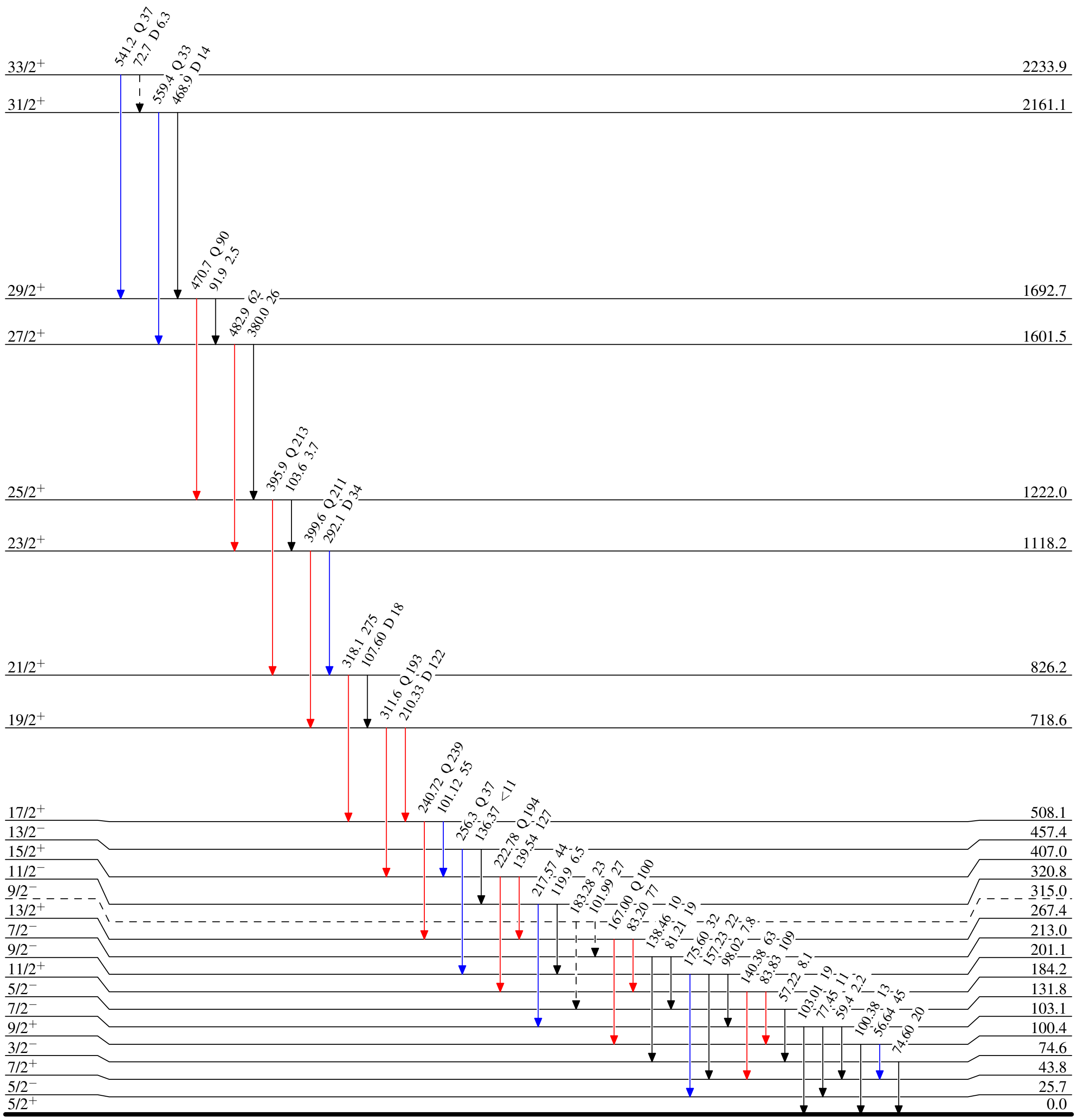
^{160}Gd(α,3nγ) 1972Hj01

Level Scheme

Intensities: Relative I_γ

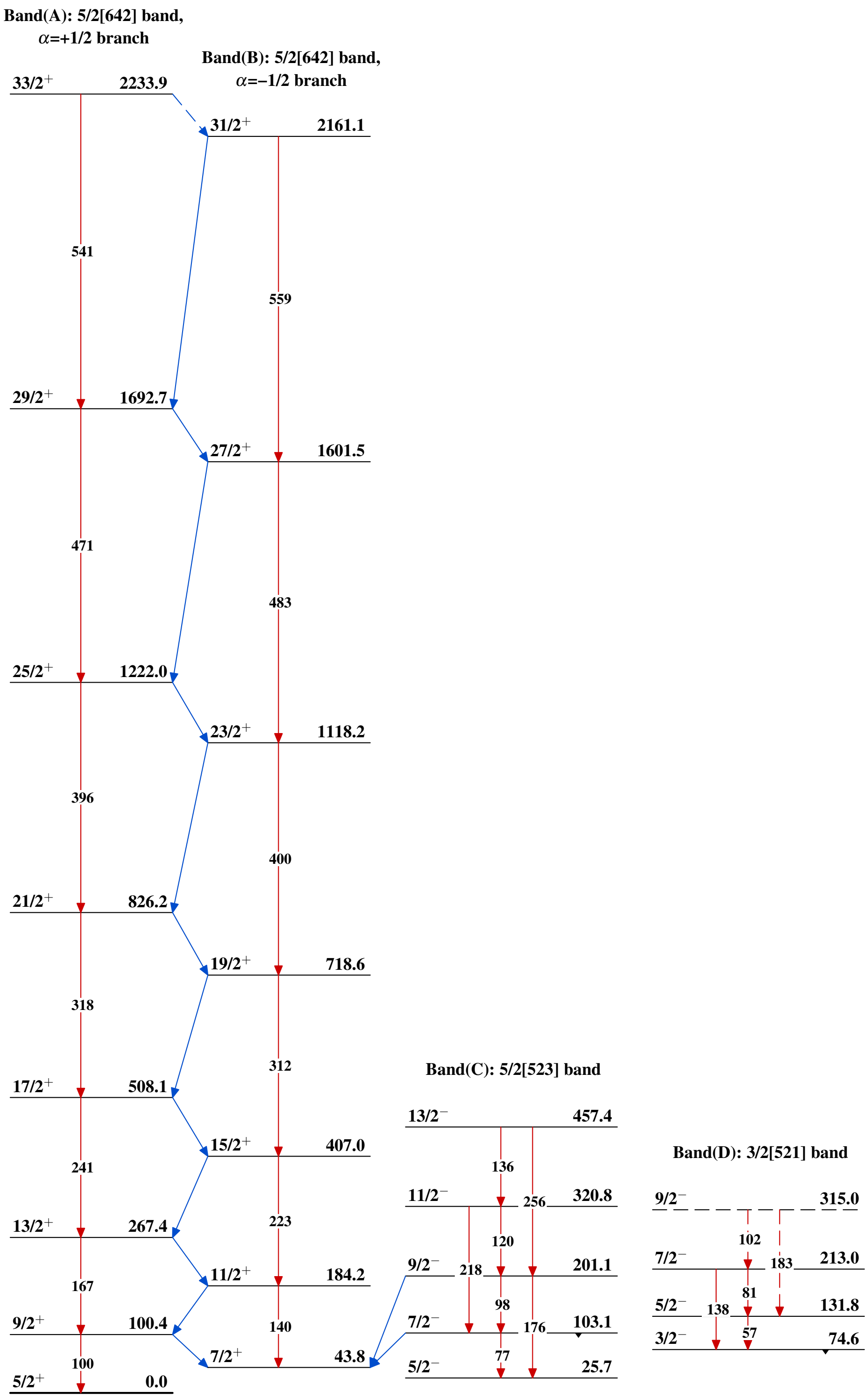
Legend

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



$^{161}_{66}Dy_{95}$

$^{160}Gd(\alpha,3n\gamma)$ 1972Hj01



$^{161}_{66}Dy_{95}$