^{160}Dy(α,3nγ) 1970Hj02

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

Additional information 1.

1970Hj02: ^{160}Dy(α,3nγ) on enriched (68.5%) target with 38-MeV α. γ's measured at four angles; determined excitation functions and γ(t) for γ's from 143-keV level. 41 γ's placed in bands with J$^{\pi}$'s to 29/2$^+$, 21/2$^-$, 17/2$^-$ and 11/2$^-$.

1969Ha12: E$_\gamma$, I$_\gamma$, angular distributions for 5 γ's; see 1970Hj02 by the same authors.

1969HjZZ: Laboratory annual report; see 1970Hj02 for the same results.

1973BeWC: Conference paper summary. Dy(α,xnγ) and measured γ singles, $\gamma\gamma$ coincidences, γ(t), and $\gamma(\theta)$, but only data are E$_\gamma$ for 6 γ's in positive-parity band.

1974BeXW: In laboratory annual report; same results as 1973BeWC.

^{161}Er Levels

E(level)[†]	J$^{\pi}$[‡]	T$_{1/2}$[#@]	Comments
0[&]	3/2$^-$		
59.5[a]	5/2$^-$		
143.8[&]	7/2$^-$		
172.5?[b]	5/2$^-$		Existence of this level is known from the ε-decay studies.
189.3[c]	9/2$^+$	70 ns *20*	T$_{1/2}$: from 1970Hj02, γ(t).
249.8[a]	9/2$^-$		
266.2?[b]	7/2$^-$		Existence of this level is known from the ε-decay studies.
267.5[c]	13/2$^+$		
296.5[d]	11/2$^+$		
388.7[&]	11/2$^-$		
389.7?[b]	9/2$^-$		Existence of this level is known from the ε-decay studies.
396.6[e]	11/2$^-$		
466.0[c]	17/2$^+$		
508.7[d]	15/2$^+$		
531.1[a]	13/2$^-$		
578.6[f]	13/2$^-$		
748.9?[&]	15/2$^-$		E(level): Subsequent studies place the 15/2$^-$ band member elsewhere in the level scheme.
782.6[e]	15/2$^-$		
783.5[c]	21/2$^+$		
848.8[d]	19/2$^+$		
923.8?[a]	17/2$^-$		E(level): Subsequent studies place the 17/2$^-$ band member elsewhere in the level scheme.
1007.4[f]	17/2$^-$		
1208.6[c]	25/2$^+$		
1248.6[e]	19/2$^-$		
1308.4?[d]	23/2$^+$		E(level): Subsequent studies place the 23/2$^+$ band member elsewhere in the level scheme.
1509.6?[f]	21/2$^-$		
1727.2?[c]	29/2$^+$		

† Level energies computed from a least-squares fit to the listed γ energies, assuming equal weights for all of the γ's. No uncertainties are listed for the computed level energies.

‡ From ^{161}Er Adopted Levels. For the higher-spin states, they are based on the customary considerations of rotational-band structure in such studies and the deduced mults.

Value is from in-beam studies only. See ^{161}Er Adopted Levels for results from other studies.

@ Most observed levels have lifetimes of <10 ns (1970Hj02); these limits are not given with the individual levels.

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^{160}Dy(α,3nγ) 1970Hj02 (continued)

^{161}Er Levels (continued)

[&] Band(A): $K^{\pi}=3/2^-$, 3/2[521], band; α=−1/2.
[a] Band(a): $K^{\pi}=3/2^-$, 3/2[521], band; α=+1/2.
[b] Band(B): $K^{\pi}=5/2^-$, 5/2[523], band.
[c] Band(C): Coriolis-mixed +π band, α=+1/2.
[d] Band(c): Coriolis-mixed +π band, α=−1/2.
[e] Band(D): $K^{\pi}=11/2^-$, 11/2[505], band, α=−1/2.
[f] Band(d): $K^{\pi}=11/2^-$, 11/2[505], band, α=+1/2.

γ(^{161}Er)

E_γ[†]	I_γ[#]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[@]	Comments
45.6		189.3	9/2+	143.8	7/2−		
59.5	10 *4*	59.5	5/2−	0	3/2−		
78.1[‡] *2*	18.2	267.5	13/2+	189.3	9/2+		
84.4	39.8	143.8	7/2−	59.5	5/2−		
94.3[a]	2.0	266.2?	7/2−	172.5?	5/2−		
99.7	5.7	396.6	11/2−	296.5	11/2+		
106.1	4.9	249.8	9/2−	143.8	7/2−		
107.3	1.2	296.5	11/2+	189.3	9/2+		
112.7[a]	1.2	172.5?	5/2−	59.5	5/2−		
121.5[a]	4.0	266.2?	7/2−	143.8	7/2−		
123.5[a]	2.0	389.7?	9/2−	266.2?	7/2−		
129.0	4.0	396.6	11/2−	267.5	13/2+		
139.3	3.2	388.7	11/2−	249.8	9/2−		
142.5	2.4	531.1	13/2−	388.7	11/2−		
143.8	13.8	143.8	7/2−	0	3/2−		
146.8	8.9	396.6	11/2−	249.8	9/2−		
173.0[a]	2.4	172.5?	5/2−	0	3/2−		
182.1	14.2	578.6	13/2−	396.6	11/2−	D	A_2=−0.74 *12*
190.3	7.7	249.8	9/2−	59.5	5/2−		
198.6[‡] *2*	100	466.0	17/2+	267.5	13/2+	Q	
204.1	13.5	782.6	15/2−	578.6	13/2−	D	A_2=−0.68 *21*
207.9	8.1	396.6	11/2−	189.3	9/2+		
212.0	21.0	508.7	15/2+	296.5	11/2+	(Q)	Mult.: from A_2=0.37 *17* (1970Hj02), but for a triplet peak.
224.8	11.4	1007.4	17/2−	782.6	15/2−	D	A_2=−0.29 *8*
241.2[&]	9.3[&]	508.7	15/2+	267.5	13/2+	(D)	Mult.: from A2=−0.69 15 (1970Hj02), but for a doublet peak.
241.2[&]	6.9[&]	1248.6	19/2−	1007.4	17/2−	(D)	Mult.: from A2=−0.69 15 (1970Hj02), but for a doublet peak.
244.7	14.6	388.7	11/2−	143.8	7/2−		
252.7	2.8	396.6	11/2−	143.8	7/2−		
259.5[a]	3.2	1509.6?	21/2−	1248.6	19/2−	D	A_2=−0.83 *60*
281.2	15.8	531.1	13/2−	249.8	9/2−	Q	A_2=0.43 *7*
317.5[‡] *2*	81.8	783.5	21/2+	466.0	17/2+	Q	A_2=0.37 *3*
340.0	27.1	848.8	19/2+	508.7	15/2+	Q	A_2=0.48 *6*
360.2[a]	10.9	748.9?	15/2−	388.7	11/2−	Q	A_2=0.47 *20*
382.8	10.5	848.8	19/2+	466.0	17/2+	D	A_2=−0.23 *20*
385.9	4.5	782.6	15/2−	396.6	11/2−	(Q)	A_2=0.12 *20*
392.3[a]	4.5	923.8?	17/2−	531.1	13/2−	(Q)	A_2=0.80 *50*
425.1[‡] *2*	51.1	1208.6	25/2+	783.5	21/2+	Q	A_2=0.38 *4*
428.1[a]	9.3	1007.4	17/2−	578.6	13/2−		
459.7[a]	9.7	1308.4?	23/2+	848.8	19/2+	Q	A_2=0.42 *14*
466.9[a]	3.7	1248.6	19/2−	782.6	15/2−		
502.4[a]	8.1	1509.6?	21/2−	1007.4	17/2−		

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^{160}Dy(α,3nγ) 1970Hj02 (continued)

γ(^{161}Er) (continued)

E_γ[†]	I_γ[#]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[@]	Comments
518.5[‡a] 4	24.3	1727.2?	29/2+	1208.6	25/2+	Q	A_2=0.25 7
523.2[a]	5.7	1308.4?	23/2+	783.5	21/2+		

† From 1970Hj02, unless noted otherwise. No uncertainties are reported, except for five γ′s reported by 1969Ha12. 1970Hj02 refer to the study by 1969Hj01 in which, under similar conditions, ΔEγ values of 0.5 keV are given.

‡ Value from 1969Ha12.

\# From 1970Hj02, at E(α)=38 MeV. In many cases these values are from decomposition of complex peaks where the other component is from another reaction.

@ From the γ(θ) results of 1970Hj02. Assignment is Q if A_2 is positive and A_4 is negative, and D (dipole) if A_2 is negative. Mult=Q is regarded as indicating E2 rather than M2.

& Multiply placed with intensity suitably divided.

a Placement of transition in the level scheme is uncertain.

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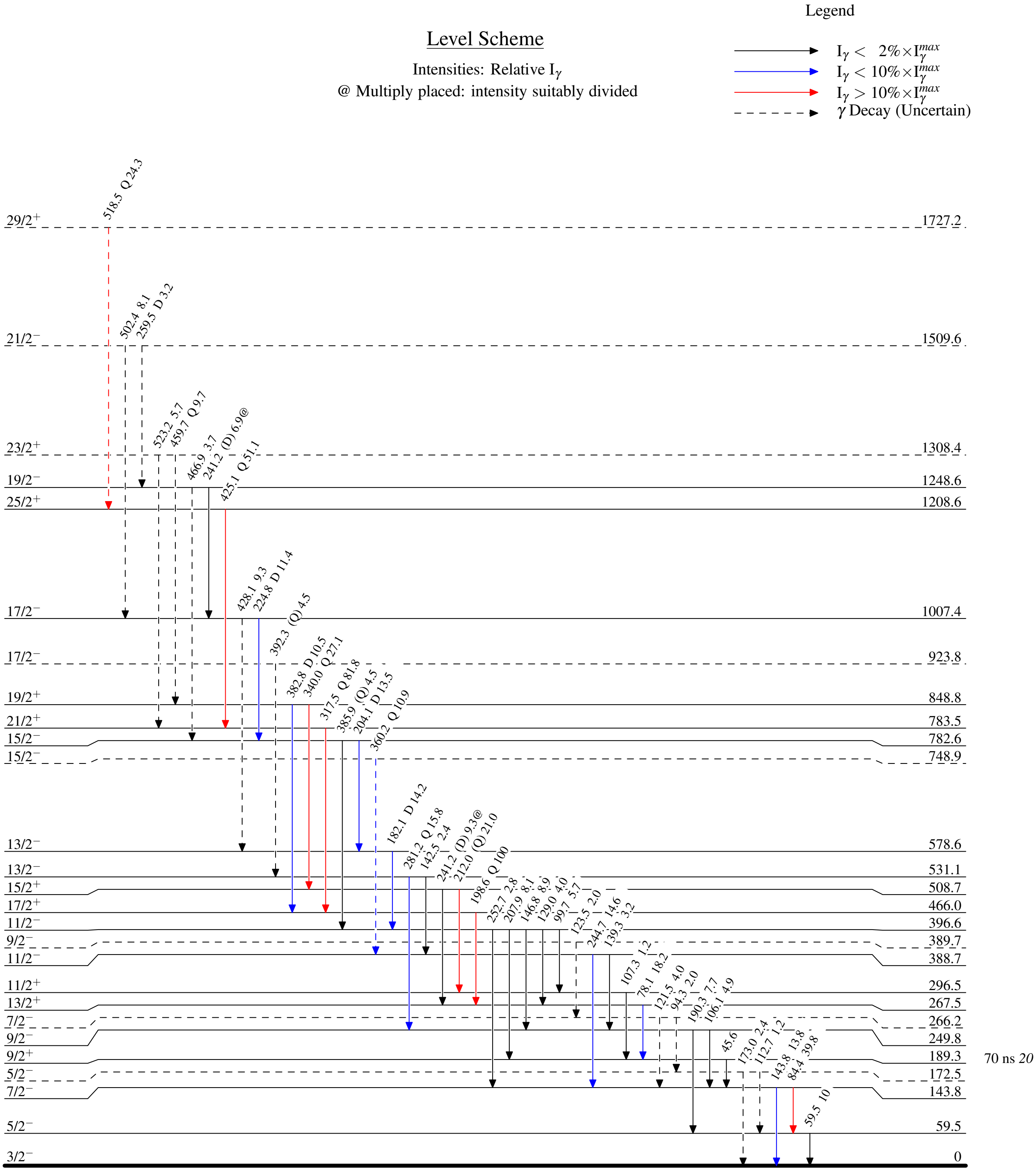
Level Scheme

Intensities: Relative I_γ

@ Multiply placed: intensity suitably divided



$^{161}_{68}Er_{93}$

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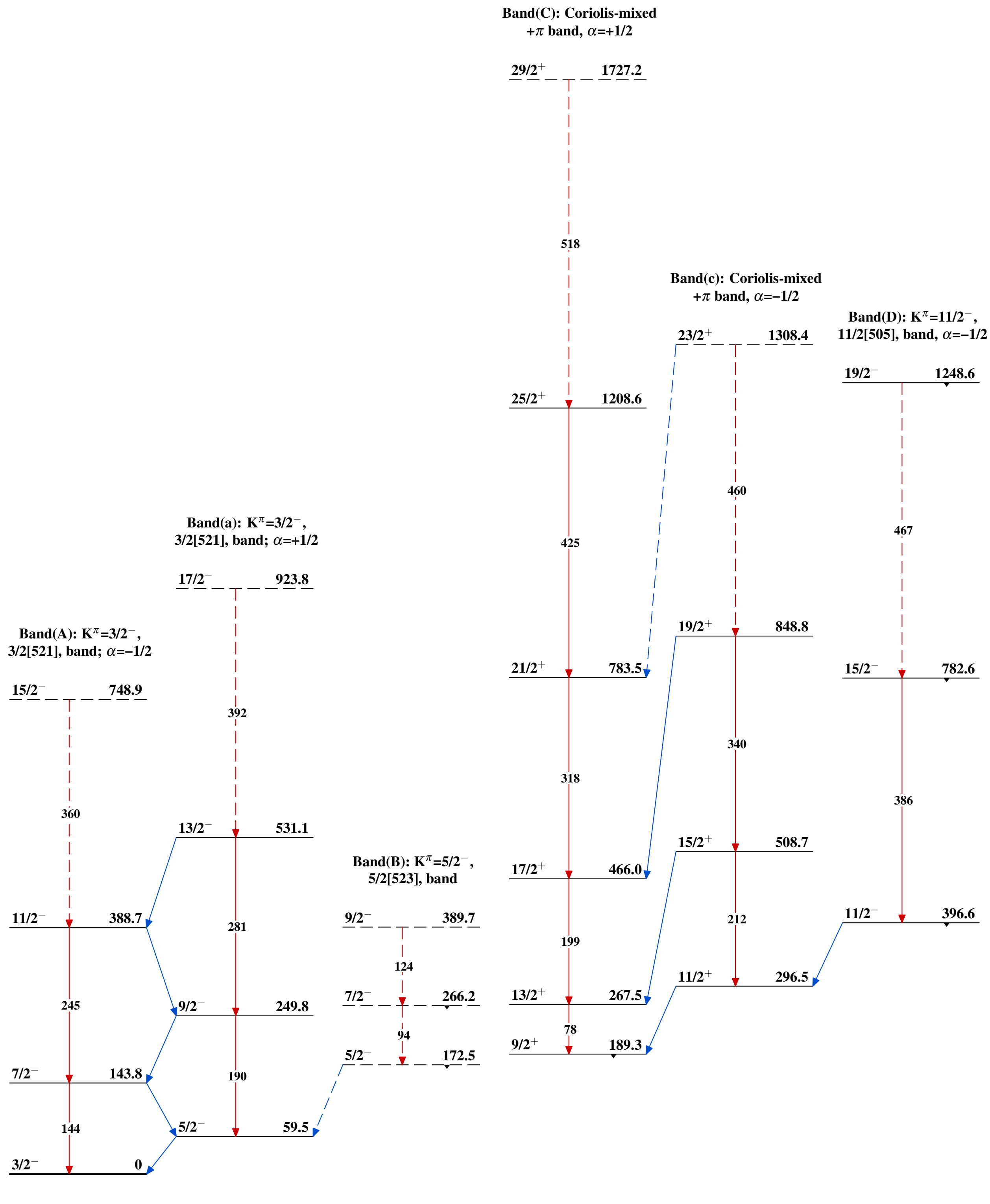

$^{161}_{68}Er_{93}$

^{160}Dy(α,3nγ) 1970Hj02 (continued)