Coulomb excitation

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	N. Nica	NDS 195,1 (2024)	19-Sep-2023

Additional information 1.

Data from many Coulomb excitation measurements provide B(E2), B(E3), B(E4), half-life and g-factors. Coulomb excitation has been reported with E(p)=1.8-4.5 MeV (1960El07, 1961Go09, 1963El06); E(d)=4.5 MeV (1960El07, 1963El06, 1974ThZG); E(α)=11-20 MeV (1972Er04, 1974Ba81, 1975VeZW, 1981Mc06); E(^{16}O)=14-60 MeV (1963Gr04, 1964De07, 1965Yo04, 1967As03, 1972Do01, 1974Le09, 1974Oe01); E(^{20}Ne)=72 MeV (1974Sa03); E(^{35}Cl)=125 MeV (1974Sa03); E(^{40}Ar)=148 MeV (1978Hu03); E(^{58}Ni)=210 MeV (1999Br43, Coulomb Excitation Transient Field technique); Fe and Kr beams at 4.14 MeV/nucleon (1974Ke04, 1977Ke06); and E(^{136}Xe)=547 and 612 MeV (1979Gu15). Of these, half-life measurements are reported in 1967As03, 1974Ke04, 1977Ke06 and 1979Gu15. Other papers: 1961Gr38, 1967Ku07, 1971OeZY (see 1974Oe01), 1972SaYM (see 1974Sa03), 1973DrZT (see 1974Ke04 and 1977Ke06), 1974BaZW, 1975GrZF, and 1976HuZO and 1976HuZZ (see 1978Hu03).

^{162}Dy Levels

E(level)	J^{π}‡	$T_{1/2}$#	Comments
0@	0^+	stable	
80.66@	2^+	2.18 ns *2*	B(E2)↑=5.35 *8*; g=0.343 *12* $T_{1/2}$: weighted average of: 2.19 ns 3, from 1967Ku07, pulsed-beam techniques; and 2.17 ns 4, from the listed B(E2)↑ and the theoretical α=6.14 (2005KiZW). An estimated uncertainty of 1.4% in this α value has been included the computation. Others: 2.22 ns (1959Bi10); and 2.0 ns *2* (1967As03). B(E2)↑: Weighted average of 5.11 *15* (1960El07) and 5.38 *5* (from matrix element of 1972Er04). Others: 5.1 *4* (1961Go09), 4.68 *35* and 4.80 *35* from ce data (1963Gr04), and 5.2 *3* (1974ThZG). For comparison, the evaluation of 1987Ra01 gives 5.28 *15* which is based on half-life as well as B(E2) measurements. g: From 1999Br43.
265.7@	4^+	0.132 ns *6*	B(E4)↑=0.07 *5*; B(E2)↑=2.68 *13* $T_{1/2}$: From 1978Hu03. B(E2)↑: B(E2)(2^+ to 4^+) weighted average of 2.64 *24* (1974Sa03) and 2.70 *16* (1974ThZG) and B(E4) from 1972Er04. Others: 2.75 *13* [1978Hu03 scaled by evaluator to B(E2)(0^+ to 2^+)=5.35] and 2.93 *20* (from matrix element of 3.83 *12* from 1974Le09).
548.6@	6^+	18.4 ps *10*	B(E2)↑=2.10 *15*; g=+0.364 *18* $T_{1/2}$: From 1978Hu03. B(E2)↑: B(E2)(4^+ to 6^+) weighted average of 2.00 *9* (1974Sa03) and 2.31 *13* [1978Hu03 scaled by evaluator to B(E2)(0^+ to 2^+)=5.35]. g: From 1999Br43. The '+' sign not listed by these authors, but is included by the evaluator, based on the expected similarity with the adjacent even Dy isotopes.
888.2&	2^+	1.97 ps *9*	B(E2)↑=0.122 *5*; g=0.46 *3* B(E2)↑: Weighted average of 0.130 *5* (1974Ba81), 0.105 *8* (1974Oe01), 0.129 *10* (1975VeZW), and 0.118 *6* (1981Mc06). Others: 0.094 *18* (1965Yo04), 0.124 (1968Gr08), 0.153 *11* (1972Do01), and 0.125 *30* (1974ThZG). $T_{1/2}$: computed by the evaluator from B(E2)↑ and the adopted γ branching. g: From 1999Br43.
921.3@	8^+	4.2 ps *2*	B(E2)↑=1.96 *16*; g=+0.381 *20* $T_{1/2}$: Weighted average of 4.1 ps *3* (1977Ke06), 4.6 ps *3* (1978Hu03), and 4.1 ps *2* (1979Gu15). B(E2)↑: B(E2)(6^+ to 8^+) weighted average of 1.85 *10* (1974Sa03) and 2.19 *14* [1978Hu03 scaled by evaluator to B(E2)(0^+ to 2^+)=5.35]. g: From 1999Br43. Plus sign not listed by these authors, but is included by the evaluator, based on the expected similarity with the adjacent even Dy isotopes.
963.0&	3^+		
1061.0&	4^+		
1210.3	3^-		B(E3)↑=0.104 *7*

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Coulomb excitation (continued)

^{162}Dy Levels (continued)

E(level)	J^{π}‡	$T_{1/2}$#	Comments
			B(E3)↑: From 1981Mc06. Others: 0.81 and 0.103 (1974Oe01) and 0.108 *27* (1974ThZG); and 0.094 deduced from (d,d′) inelastic scattering (1968Gr08).
1324.6&	6^+		
1357.4	3^-		B(E3)↑=0.033 *11* B(E3)↑: From 1974ThZG. Others: 0.051 (1974Oe01) and <0.015 (1981Mc06); and 0.027 deduced from (d,d′) inelastic scattering (1968Gr08).
1375.4†@	10^+	1.57 ps *10*	B(E2)↑=2.65 *21*; g=+0.36 *4* $T_{1/2}$: From 1977Ke06. Other: 1.46 ps *7* (1979Gu15). B(E2)↑: B(E2)(8^+ to 10^+) weighted average of 2.53 *34* (1974Sa03) and 2.68 *27* [1978Hu03 scaled by evaluator to B(E2)(0^+ to 2^+)=5.35]. g: From 1999Br43, who report g=0.364 *35*. Plus sign not listed by these authors, but is included by the evaluator, based on the expected similarity with the adjacent even Dy isotopes.
1390.5	5^-		
1453	2^+		B(E2)↑<0.0024 B(E2)↑: From 1981Mc06.
1903.1†@	12^+	0.81 ps *8*	B(E2)↑=2.1 *3* $T_{1/2}$: Weighted average of 0.93 ps *6* (1977Ke06) and 0.76 ps *4* (1979Gu15). B(E2)↑: B(E2)(10^+ to 12^+) weighted average of 3.6 *14* (1974Sa03) and 2.11 *26* [1978Hu03 scaled by evaluator to B(E2)(0^+ to 2^+)=5.35].
2495†@	14^+	0.45 ps *5*	$T_{1/2}$: From 1979Gu15.
3144†@	16^+		
3837†@	18^+		

† Above the 8^+ member of the g.s. band, the level energies for the band members differ systematically from those reported in later studies. This seems to arise from the energies of the deexciting γ′s, which are systematically higher than those from the subsequent studies.
‡ From ^{162}Dy Adopted Levels.
# From direct measurements following Coulomb excitation only. See ^{162}Dy Adopted Levels for a summary of all half-life data.
@ Band(A): $K^{\pi}=0^+$ ground-state band.
& Band(B): $K^{\pi}=2^+$ γ-vibrational band.

γ(^{162}Dy)

Iγ normalization: Additional information 2.

E_{γ}†	E_i(level)	J_i^{π}	E_f	J_f^{π}	Comments
80.66	80.66	2^+	0	0^+	E_{γ}: nominal value from the adopted values. Used for computing $T_{1/2}$ for this level.
185.0	265.7	4^+	80.66	2^+	
247@	1210.3	3^-	963.0	3^+	
282.86‡ *6*	548.6	6^+	265.7	4^+	
321.9	1210.3	3^-	888.2	2^+	
329.4	1390.5	5^-	1061.0	4^+	
372.75‡ *8*	921.3	8^+	548.6	6^+	
453.85‡ *9*	1375.4	10^+	921.3	8^+	
528.0‡ *20*	1903.1	12^+	1375.4	10^+	
592#	2495	14^+	1903.1	12^+	
649#	3144	16^+	2495	14^+	

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Coulomb excitation (continued)

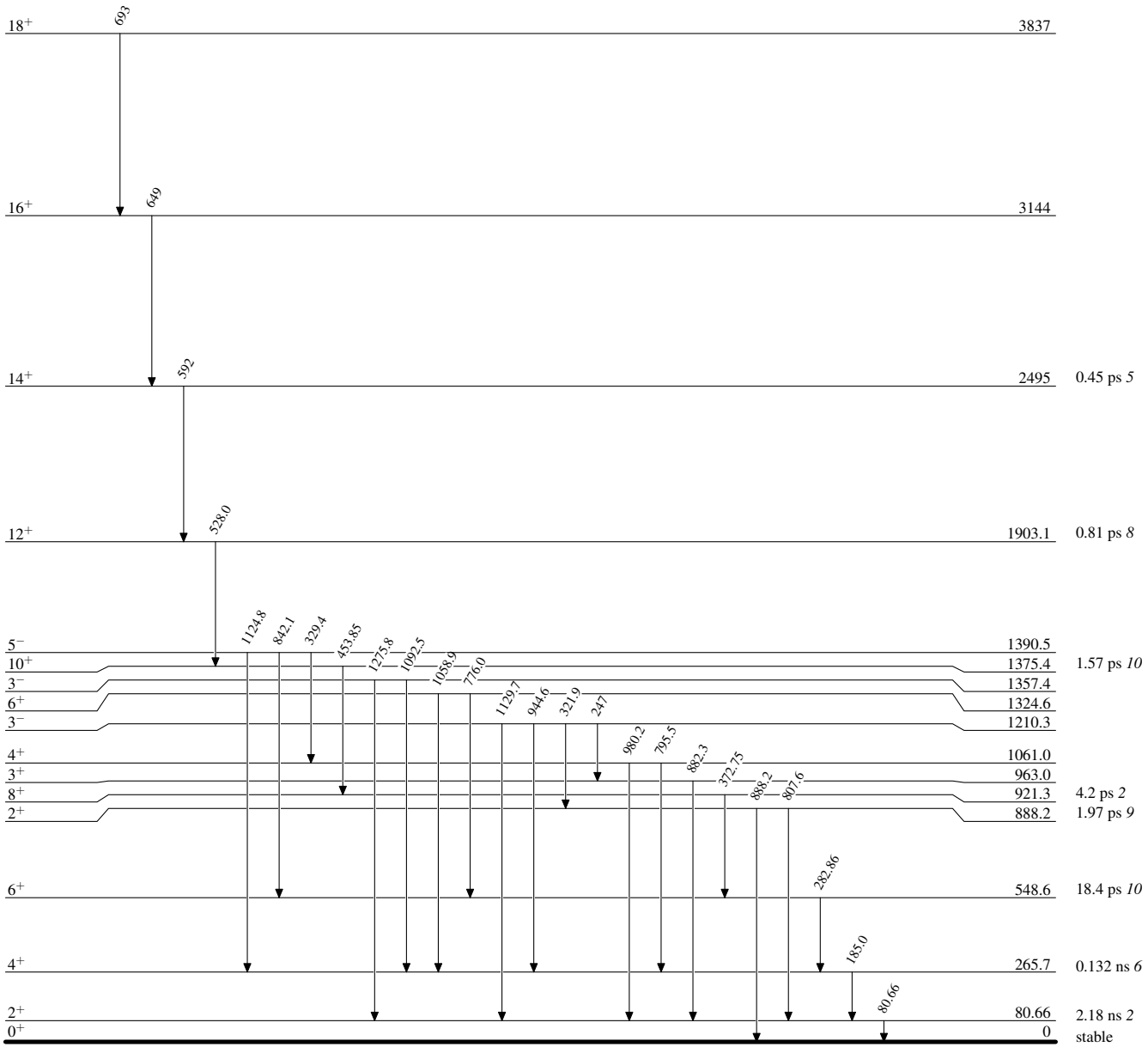
$\gamma(^{162}Dy)$ (continued)

E_γ [†]	E_i(level)	J_i^π	E_f	J_f^π	E_γ [†]	E_i(level)	J_i^π	E_f	J_f^π
693[#]	3837	18^+	3144	16^+	944.6	1210.3	3^-	265.7	4^+
776.0	1324.6	6^+	548.6	6^+	980.2	1061.0	4^+	80.66	2^+
795.5	1061.0	4^+	265.7	4^+	1058.9	1324.6	6^+	265.7	4^+
807.6	888.2	2^+	80.66	2^+	1092.5	1357.4	3^-	265.7	4^+
842.1	1390.5	5^-	548.6	6^+	1124.8	1390.5	5^-	265.7	4^+
882.3[@]	963.0	3^+	80.66	2^+	1129.7	1210.3	3^-	80.66	2^+
888.2	888.2	2^+	0	0^+	1275.8	1357.4	3^-	80.66	2^+

† From 1974Oe01, unless otherwise noted.
‡ From 1974Sa03.
# From 1979Gu15.
@ From 1981Mc06.

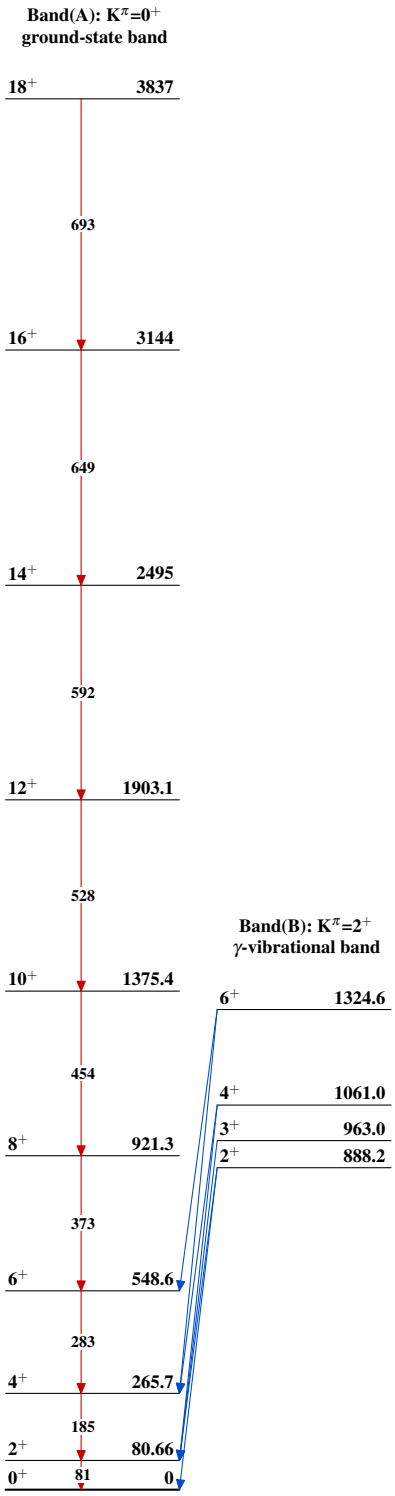
Coulomb excitation

Level Scheme



$^{162}_{66}Dy_{96}$

Coulomb excitation



$^{162}_{66}Dy_{96}$