^{164}Dy(α,2nγ) 1985Fi04

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Coral M. Baglin	NDS 109, 1103 (2008)	1-Mar-2008

Others: 1966Mo01, 1976Da10, 1976We24.
1976We24: E(α)=24 MeV; measured Eγ, Iγ, $\gamma\gamma$-coin, $\gamma(\theta)$,Ge(Li). 1976Da10: E(α)=27.5 MeV; measured Eγ, I$\gamma(\theta)$, γ-coin,Ge(Li). 1985Fi04: E(α)=24 MeV; measured Eγ, Iγ, $\gamma\gamma$-coin, I(ce),Ge(Li) and HPGE detectors, mini-orange spectrometer.

^{166}Er Levels

E(level)†	Jπ‡	E(level)†	Jπ‡	E(level)†	Jπ‡	E(level)†	Jπ‡
0.0#	0^+	1375.86@ *12*	7^+	1786.66& *13*	6^-	2245.96b *16*	(9^-)
80.37# *8*	2^+	1458&	$(2)^-$	1827.22c *15*	6^-	2328.17b *16*	(9^-)
264.79# *10*	4^+	1460a	0^+	1846.18# *17*	12^+	2388.98# *20*	14^+
545.22# *11*	6^+	1514b	3^-	1897.03a *15*	(6^+)	2426.5& *4*	(10^-)
785.83@ *8*	2^+	1528a	(2^+)	1963.68@ *14*	10^+	2428.38?@ *17*	(12^+)
859.23@ *11*	3^+	1555.38@ *12*	8^+	1992.36b *16*	$(7)^-$	2479.39?a *17*	(10^+)
910.86# *13*	8^+	1596.2&	(4^-)	2072.99& *14*	$(8)^-$	2654.03?@ *18*	(13^+)
956.22@ *10*	4^+	1665.11b *13*	$5^{(-)}$	2091.96b *16*	$(7)^-$	2656.49?a *20*	(12^+)
1074.92@ *11*	5^+	1673.50a *14*	(4^+)	2144.46c *15*	(8^-)	2879.68?@ *20*	(14^+)
1215.86@ *11*	6^+	1692.21b *15*	$5^{(-)}$	2189.33?@ *15*	(11^+)	2967.0# *6*	16^+
1349.18# *14*	10^+	1751.07@ *14*	9^+	2194.26a *16*	(8^+)		

† From least-squares fit to Eγ.
‡ From Adopted Levels.
# Band(A): $K^\pi=0^+$ g.s. band.
@ Band(B): $K^\pi=2^+$ γ-vibrational band.
& Band(C): $K^\pi=(2^-)$ band. In Adopted Levels, the 1787 level is assigned, instead, to a $K^\pi=4^-$ band which is strongly mixed with this $K^\pi=2^-$ band.
a Band(D): $K^\pi=(0^+)$ band.
b Band(E): $K^\pi=(2^-,5^-)$ band. In Adopted Levels, the 1514, 1692 and 2246 levels are assigned, instead, to the $K^\pi=(2^-)$ band based on the 1458 level, and the 1665 and 2328 levels are assigned to a $K^\pi=(4)^-$ band (based on a 1572 level that 1985Fi04 do not observe) which mixes strongly with the 2^- band. Different or No band assignments are adopted for the 1992 AND2091 levels.
c Band(F): $K^\pi=(5^-)$ band (1985Fi04). Band not adopted. In Adopted Levels, the 1827 and 2144 levels are assigned, respectively, to $K^\pi=2^-$ and 4^- bands, which are strongly Coriolis mixed. (The latter band is based on a 1572 level which 1985Fi04 do not OBSERVE.).

^{164}Dy(α,2nγ) 1985Fi04 (continued)

$\gamma(^{166}Er)$

E_γ[†]	I_γ[†]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	δ[#]	α[&]	Comments
80.3 *1*	3 *1*	80.37	2^+	0.0	0^+	E2[@]		6.87	A_2=+0.20 *3*, A_4=−0.01 *3* (1976We24).
141.4 *1*	<1	1215.86	6^+	1074.92	5^+				
160.0 *1*	<1	1375.86	7^+	1215.86	6^+				
170.4 *1*	<1	956.22	4^+	785.83	2^+				
179.3 *1*	<1	1555.38	8^+	1375.86	7^+				
184.6 *1*	120 *12*	264.79	4^+	80.37	2^+	E2[@]		0.329	A_2=+0.27 *1*, A_4=−0.028 *11* (1976We24).
215.6 *1*	1.70 *17*	1074.92	5^+	859.23	3^+				
259.5 *1*	2.2 *2*	1215.86	6^+	956.22	4^+				A_2=+0.09 *18*, A_4=−0.22 *23* (1976We24).
280.4 *1*	100 *10*	545.22	6^+	264.79	4^+	E2[@]		0.0849	A_2=+0.32 *4*, A_4=−0.05 *5* (1976We24).
286.2 *1*	<1	2072.99	$(8)^-$	1786.66	6^-				
300.7 *1*	4.7 *5*	1375.86	7^+	1074.92	5^+				A_2=+0.40 *8*, A_4=−0.13 *9* (1976We24).
339.7 *1*	5.1 *6*	1555.38	8^+	1215.86	6^+				A_2=+0.14 *7*, A_4=+0.24 *18* (1976We24).
352.0[b] *5*	<1	2426.5	(10^-)	2072.99	$(8)^-$				
365.6 *1*	50 *5*	910.86	8^+	545.22	6^+	E2		0.0385	α(K)exp=0.033 *3* A_2=+0.43 *4*, A_4=+0.05 *4* (1976We24).
375.2 *1*	6.1 *6*	1751.07	9^+	1375.86	7^+	E2		0.0358	α(K)exp=0.0276 *13* A_2=+0.39 *8*, A_4=+0.09 *9* (1976We24).
401.9 *1*	<1	1751.07	9^+	1349.18	10^+				
408.5 *1*	3.3 *3*	1963.68	10^+	1555.38	8^+				A_2=+0.48 *12*, A_4=+0.12 *13* (1976We24).
410.7 *1*	<1	1786.66	6^-	1375.86	7^+				
438.2[a] *1*	22.5[a] *23*	1349.18	10^+	910.86	8^+				A_2=+0.36 *4*, A_4=−0.07 *5* (1976We24) for multiply-placed G.
438.2[ab] *1*	22.5[a] *3*	2189.33?	(11^+)	1751.07	9^+				
451.3[b] *1*	<1	2879.68?	(14^+)	2428.38?	(12^+)				
464.7[a] *1*	1.80[a] *18*	1375.86	7^+	910.86	8^+				A_2=+0.22 *14*, A_4=+0.14 *17* (1976We24) imply D+Q, δ=−3.1 *+9−15* but transition is multiply-placed.
464.7[ab] *1*	1.80[a] *18*	2428.38?	(12^+)	1963.68	10^+				
464.7[ab] *1*	1.80[a] *18*	2654.03?	(13^+)	2189.33?	(11^+)				
497.0 *1*	7.0 *7*	1846.18	12^+	1349.18	10^+	E2		0.01670	α(K)exp=0.0130 *10* A_2=+0.23 *6*, A_4=−0.064 *8* (1976We24).
529.8 *1*	2.60 *26*	1074.92	5^+	545.22	6^+	E2+M1	−5.0 *25*	0.0148 *16*	α(K)exp=0.0124 *10* A_2=+0.10 *14*, A_4=+0.37 *18* (1976We24).
542.8 *1*	1.50 *15*	2388.98	14^+	1846.18	12^+	E2		0.01335	α(K)exp=0.0145 *10*
578.0 *5*	<1	2967.0	16^+	2388.98	14^+	E2		0.01143	α(K)exp=0.011 *3*
594.4 *1*	<1	859.23	3^+	264.79	4^+	E2+M1		0.017 *6*	α(K)exp=0.0138 *16*
614.3 *1*	<1	1963.68	10^+	1349.18	10^+	E2			α(K)exp=0.0073 *8*
644.6 *1*	3.9 *4*	1555.38	8^+	910.86	8^+	E2+M1		0.014 *5*	α(K)exp=0.0061 *6* δ: A_2=+0.06 *11*, A_4=−0.06 *14* (1976We24); δ=−0.75 *20* or +1.6 *+10−6*.
670.6 *1*	8.5 *9*	1215.86	6^+	545.22	6^+	E2+M1		0.012 *5*	α(K)exp=0.0056 *5* A_2=−0.15 *7*, A_4=−0.14 *9* (1976We24).

$^{166}_{68}Er_{98}$-2

$\gamma(^{166}Er)$ (continued)

E_γ[†]	I_γ[†]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	δ[#]	α[&]	Comments
									δ: −1.2 *+4−8* or −6 + infinity −3 from $\gamma(\theta)$; α(K)exp<α(K)(E2) and <α(K)(M1).
677.0[b] *5*	<1	2426.5	(10$^-$)	1751.07	9$^+$				
691.4 *1*	5.4 *5*	956.22	4$^+$	264.79	4$^+$	E2+M1		0.011 *4*	α(K)exp=0.00900 *19*
697.2 *1*	1.60 *16*	2072.99	(8)$^-$	1375.86	7$^+$	E1			α(K)exp=0.0029 *10*
705.4 *1*	3.0 *3*	785.83	2$^+$	80.37	2$^+$	E2(+M1)		0.011 *4*	α(K)exp=0.0064 *6*
711.7 *1*	2.30 *23*	1786.66	6$^-$	1074.92	5$^+$	E1			α(K)exp=0.0039 *4*
752.3 *1*	2.10 *21*	1827.22	6$^-$	1074.92	5$^+$	E1			α(K)exp=0.0048 *8*
768.6 *1*	1.40 *14*	2144.46	(8$^-$)	1375.86	7$^+$				
778.8 *1*	10.0 *10*	859.23	3$^+$	80.37	2$^+$	E2+M1	<−7	0.009 *3*	α(K)exp=0.0051 *3* A_2=+0.02 *8*; A_4=+0.06 *11* (1976We24).
785.9 *1*	3.2 *3*	785.83	2$^+$	0.0	0$^+$	E2			α(K)exp=0.0053 *3* A_2=−0.31 *22*, A_4=+0.03 *4* (1976We24); inconsistent with stretched Q required by level scheme.
810.3[a] *1*	15.6[a] *16*	1074.92	5$^+$	264.79	4$^+$	(E2+M1)		0.008 *3*	α(K)exp=0.0054 *4*; A_2=−0.017 *38*, A_4=+0.18 *5*, δ=−84 *+57−INFINITY*Y (1976We24) implies mult=(E2+M1), δ<−27 for multiply-placed G. Based on adopted branching from 1075 level, most or all of I(810.3γ) is attributable to this placement.
810.3[ab] *1*	15.6[a] *16*	2656.49?	(12$^+$)	1846.18	12$^+$				see comment on 810γ from 1075 level.
830.6 *1*	11.5 *12*	1375.86	7$^+$	545.22	6$^+$	E2+M1	<−20		α(K)exp=0.0054 *4* A_2=−0.09 *5*, A_4=+0.30 *6*, δ=−37 *+17−INFINITY*Y (1976We24).
840.2[a] *1*	5.5[a] *6*	1751.07	9$^+$	910.86	8$^+$	(E2+M1)		0.0072 *23*	α(K)exp=0.0043 *4* δ: A_2=+0.03 *8*, A_4=+0.25 *10* imply δ(D,Q)=−11 *+3−INFINITY*Y (1976We24); however transition May Be doubly-placed.
840.2[ab] *1*	5.5[a] *6*	2189.33?	(11$^+$)	1349.18	10$^+$				
875.7 *1*	3.8 *4*	956.22	4$^+$	80.37	2$^+$	E2			α(K)exp=0.0039 *3* A_2=+0.44 *12*, A_4=+0.22 *14* (1976We24).
951.0 *1*	4.2 *4*	1215.86	6$^+$	264.79	4$^+$	E2			α(K)exp=0.0032 *4* A_2=+0.17 *16*, A_4=−0.33 *19* (1976We24).
1010.3 *1*	2.10 *20*	1555.38	8$^+$	545.22	6$^+$	E2			α(K)exp=0.0024 *3*
1053.7[b] *1*	1.90 *19*	1963.68	10$^+$	910.86	8$^+$				α(K)exp=0.0010 *4*
1081.5 *1*	1.60 *16*	1992.36	(7)$^-$	910.86	8$^+$	E1			α(K)exp=0.0013 *5*
1119.7 *1*	1.10 *11*	1665.11	5$^{(-)}$	545.22	6$^+$				
1130.2[b] *1*	<1	2479.39?	(10$^+$)	1349.18	10$^+$				
1147.0 *1*	<1	1692.21	5$^{(-)}$	545.22	6$^+$				
1181.1 *1*	6 *1*	2091.96	(7)$^-$	910.86	8$^+$	E1			α(K)exp=0.00038 *10*
1283.4 *1*	2.1 *4*	2194.26	(8$^+$)	910.86	8$^+$				
1335.1 *1*	<1	2245.96	(9$^-$)	910.86	8$^+$				
1351.8 *1*	1.50 *15*	1897.03	(6$^+$)	545.22	6$^+$				
1400.5 *1*	2.30 *23*	1665.11	5$^{(-)}$	264.79	4$^+$				
1408.7 *1*	<1	1673.50	(4$^+$)	264.79	4$^+$				
1417.3 *1*	1.40 *14*	2328.17	(9$^-$)	910.86	8$^+$				

^{164}Dy(α,2nγ) 1985Fi04 (continued)

$\gamma(^{166}Er)$ (continued)

E_γ †	I_γ †	E_i(level)	J_i^π	E_f	J_f^π
1427.0 *5*	<5	1692.21	$5^{(-)}$	264.79	4^+
1447.0 *5*	<5	1992.36	$(7)^-$	545.22	6^+

† From 1985Fi04.
‡ From α(K)exp. 1985Fi04 used α(K)(280.4γ)=0.064 to normalize their intensity scales; α(K)exp values shown here have been recalculated using α(K)(280.4γ)=0.0612 (E2 theory).
# From $\gamma(\theta)$ In 1976We24.
@ Q from $\gamma(\theta)$ (1976We24); not M2 from RUL and adopted level half-life.
& Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.
a Multiply placed with undivided intensity.
b Placement of transition in the level scheme is uncertain.

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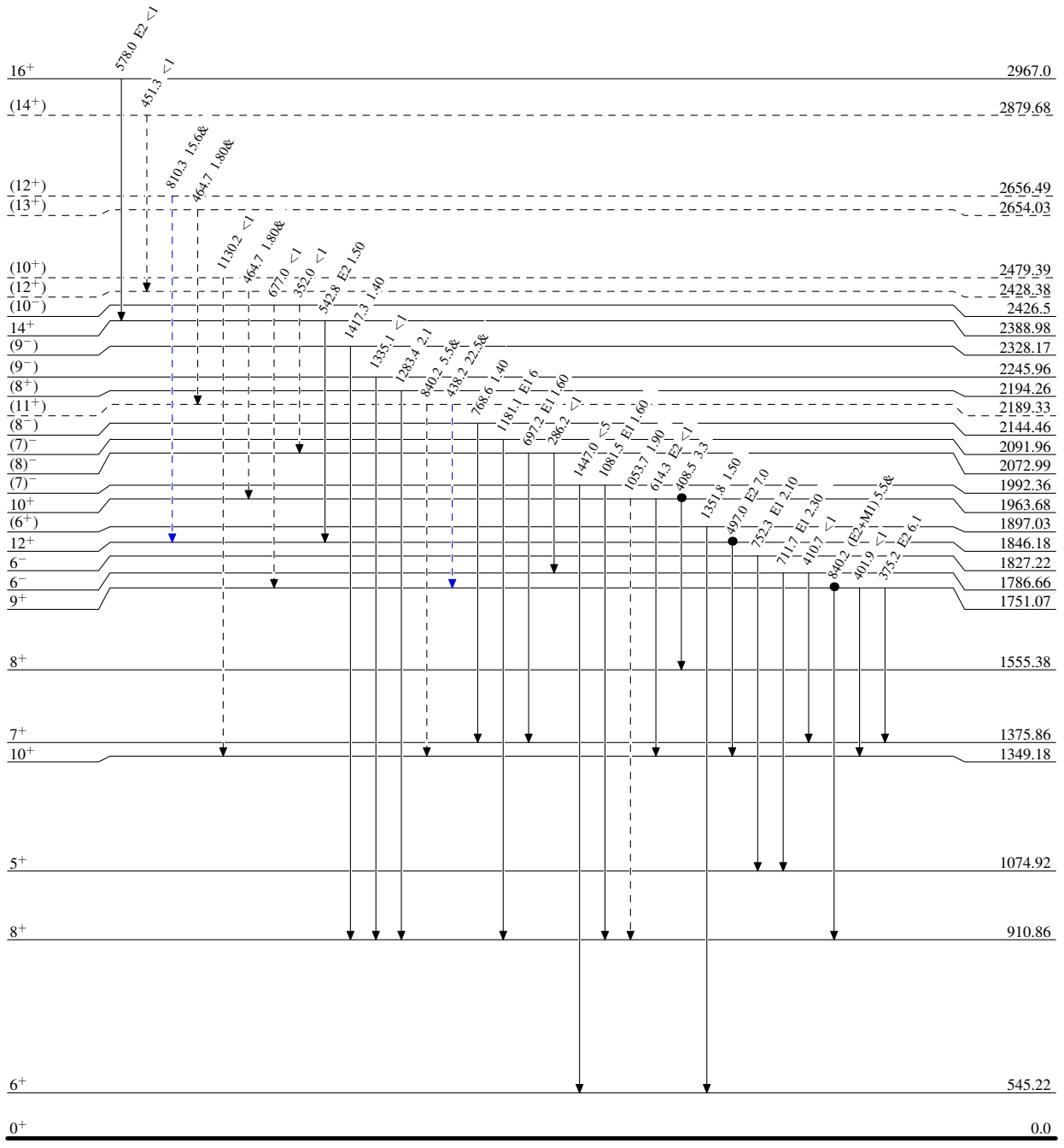
^{164}Dy(α,2nγ) 1985Fi04

Level Scheme

Intensities: Relative I_γ
& Multiply placed: undivided intensity given

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)
- Coincidence



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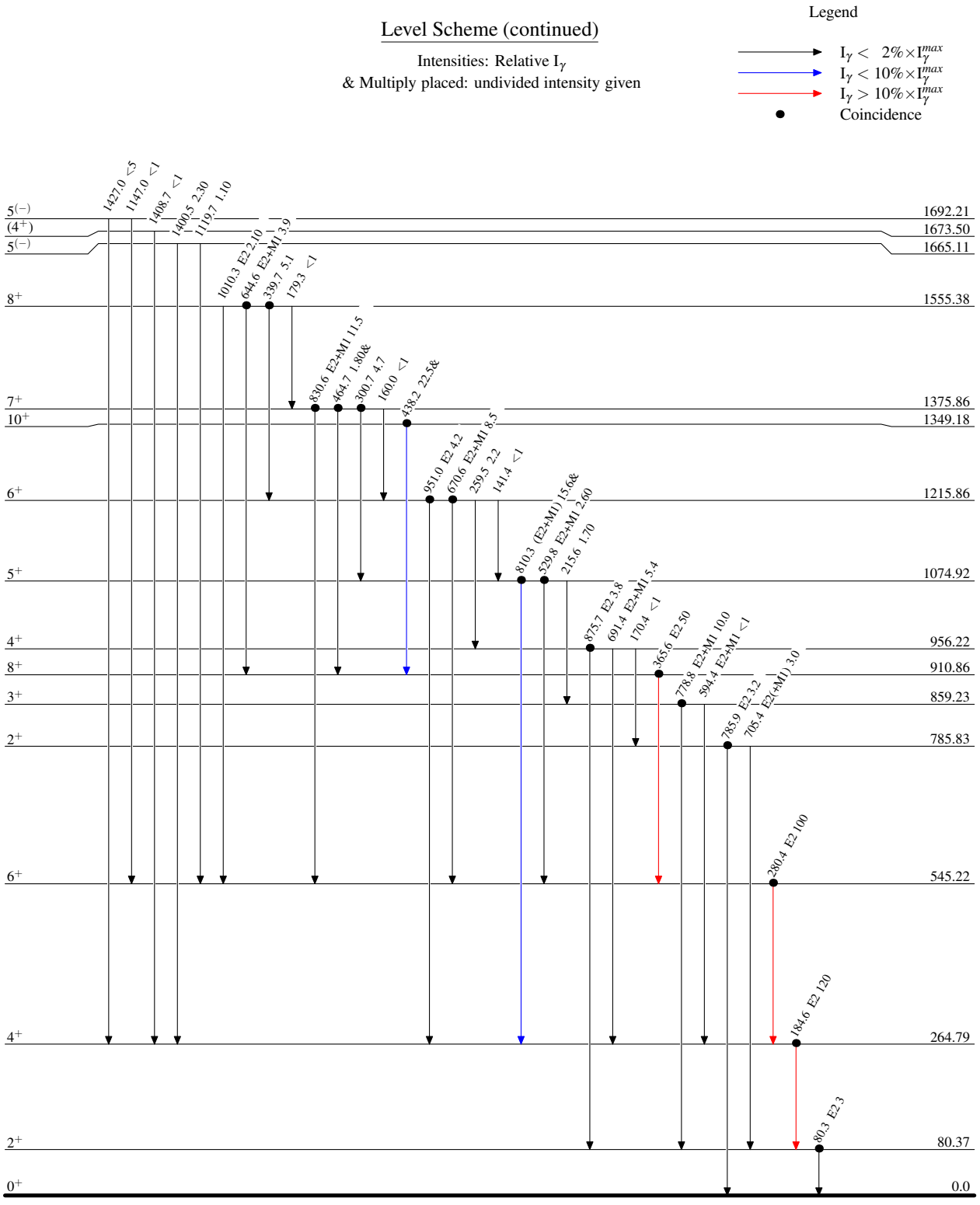
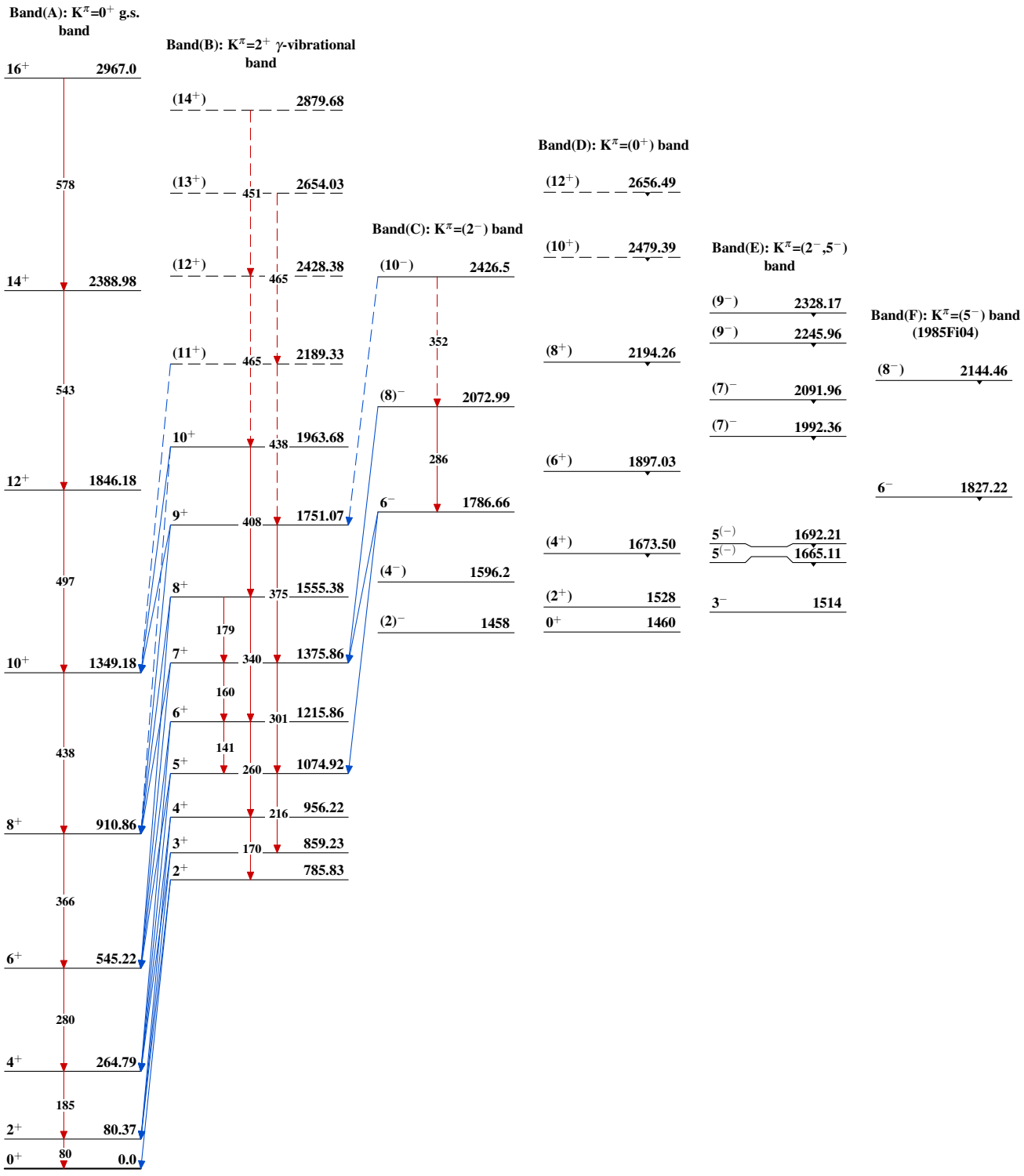
^{164}Dy(α,2nγ) 1985Fi04

Level Scheme (continued)

Intensities: Relative I_γ
& Multiply placed: undivided intensity given



^{164}Dy(α,2nγ) 1985Fi04



$^{166}_{68}Er_{98}$