^{164}Dy(^{16}O,4nγ) 1978Dr04,2000Io03,2002Io01

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	M. S. Basunia	NDS 107, 791 (2006)	15-Sep-2005

Other: 1976Wa16.

1978Dr04: Target: 98.4% enriched ^{164}Dy. Projectile: ^{16}O, E=83 MeV. Measured Eγ, Iγ, $\gamma\gamma$ coin, ^{16}O-$\gamma(\theta)$, γ(t). Detectors: Ge(Li).

2000Io03: Target: 95.6% enriched ^{164}Dy. Projectile: ^{16}O, E=83 MeV. Two planar Ge detector and two Ge detector of 25% efficiency. Measured: g factor and $T_{1/2}$ of the 14^+ state isomeric level at 3746 keV level.

2002Io01: Target: 95.6% enriched ^{164}Dy. Projectile: ^{16}O, E=83 MeV, ^{16}O beam was pulsed with a width of 1.5 ns, 800 ns repetation period, and a suppression of the continuous beam in-between the beam bursts. Two planar Ge detector and two Ge detector of 25% efficiency. Measured: quadrupole moment of the 14^+ state isomeric level at 3746 keV level.

^{176}W Levels

E(level)[†]	J$^\pi$[‡]	$T_{1/2}$	Comments
0.0[#]	0^+		
109.1[#] *1*	2^+		
349.3[#] *1*	4^+		
700.5[#] *2*	6^+		
1141.2[#] *2*	8^+		
1303.3[@] *2*	(4^-)		
1401.9[&] *2*	(5^-)		
1577.4[@] *2*	(6^-)		
1650.0[#] *2*	10^+		
1658.7 *2*			
1674.6[&] *2*	$7^{(-)}$		
1926.7 *3*			
1926.8?[@] *3*	(8^-)		
2009.4[&] *2*	$9^{(-)}$		
2208.1[#] *3*	12^+		
2310.0[@] *3*	(10^-)		
2411.5[&] *3*	$11^{(-)}$		
2756.2[@] *4*	(12^-)		
2804.3[#] *4*	14^+		
2883.9[&] *3*	$13^{(-)}$		
3278.9[@] *4*	(14^-)		
3424.6[&] *5*	(15^-)		
3429.8[#] *5*	16^+		
3746	14^+	41 ns *1*	μ=+6.65 *21*; Q=+5.99 *+66−82* E(level): From 2000Io03 and 2002Io01. J$^\pi$: From Adopted Levels. $T_{1/2}$: From summed time spectrum for the 240, 351, 440 and 558 keV γ-rays (2000Io03). μ: From g factor=+0.475 *15*, observing γ precession in external magnetic field (2000Io03). The diamagnetic and Knight shift corrections were not applied, as those were small (about 1%). Q: Observing the time-dependent quadrupole interaction pattern of the decay radiation from the isomer (2002Io01).
3849.4[@] *5*	(16^-)		
4004.9[#] *6*	18^+		
4025.6[&] *5*	(17^-)		

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^{164}Dy(^{16}O,4nγ) 1978Dr04,2000Io03,2002Io01 (continued)

^{176}W Levels (continued)

E(level)[†]	Jπ[‡]
4617[#]	(20$^+$)
5304[#]	(22$^+$)
6057[#]	(24$^+$)

† Deduced by evaluator from a least-squares fit of γ-ray energies.
‡ From γ-ray multipolarities deduced from ^{16}O-$\gamma(\theta)$, decay patterns, and rotational structure.
# $K^\pi=0^+$ g.s. rotational band.
@ $K^\pi=(4^-)$ band.
& $K^\pi=(5^-)$ band.

$\gamma(^{176}W)$

A γ ray with $T_{1/2}\approx100$ ns populates the 2208 ($J^\pi=(12^+)$) level. Placement of this transition in the level scheme is unknown.

E_γ	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.[†]	α[#]	Comments
109.1 *1*	42 *2*	109.1	2$^+$	0.0	0$^+$			
240.2 *1*	100	349.3	4$^+$	109.1	2$^+$	E2	0.171	A_2=+0.277 *10*, A_4=−0.076 *11*.
268.0 *1*	≈2.5[‡]	1926.7		1658.7				E_γ: Contaminated by activity in singles.
272.7 *1*	≈1[‡]	1674.6	7$^{(-)}$	1401.9	(5$^-$)			
274.1 *1*	5.5 *20*	1577.4	(6$^-$)	1303.3	(4$^-$)			
334.9 *2*	3.7 *4*	2009.4	9$^{(-)}$	1674.6	7$^{(-)}$	E2	0.0620	A_2=+0.30 *4*, A_4=−0.10 *4*.
349.3 *2*	9 *2*	1926.8?	(8$^-$)	1577.4	(6$^-$)			E_γ: Partially resolved from 351.2γ.
351.2 *1*	91 *5*	700.5	6$^+$	349.3	4$^+$	E2	0.0541	A_2=+0.283 *10*, A_4=−0.064 *11*.
383.2 *2*	5.5 *5*	2310.0	(10$^-$)	1926.8?	(8$^-$)	E2	0.0424	A_2=+0.32 *8*, A_4=−0.06 *7*.
402.0 *2*	4.8 *5*	2411.5	11$^{(-)}$	2009.4	9$^{(-)}$	E2	0.0372	A_2=+0.35 *5*, A_4=−0.09 *4*.
440.7 *1*	68.0 *34*	1141.2	8$^+$	700.5	6$^+$	E2	0.0291	A_2=+0.267 *10*, A_4=−0.072 *11*.
446.2 *2*	5.5[‡] *15*	2756.2	(12$^-$)	2310.0	(10$^-$)			E_γ: Contaminated by ^{175}W lines and unassigned ^{176}W line.
472.4 *2*	8.9 *7*	2883.9	13$^{(-)}$	2411.5	11$^{(-)}$	E2	0.0244	A_2=+0.27 *3*, A_4=−0.09 *3*.
508.8 *1*	48 *5*	1650.0	10$^+$	1141.2	8$^+$			
522.7 *2*	3 *1*	3278.9	(14$^-$)	2756.2	(12$^-$)			
533.4 *2*	3.5 *4*	1674.6	7$^{(-)}$	1141.2	8$^+$	(D)		A_2=−0.04 *4*, A_4=−0.02 *5*.
540.7 *3*	9[‡] *2*	3424.6	(15$^-$)	2883.9	13$^{(-)}$	E2	0.0175	A_2=+0.27 *4*, A_4=−0.06 *4*. E_γ: Contaminated by ^{175}W lines in singles.
558.1 *2*	27.5 *14*	2208.1	12$^+$	1650.0	10$^+$	E2	0.0163	A_2=+0.29 *1*, A_4=−0.058 *11*.
570.5 *3*	2.5 *8*	3849.4	(16$^-$)	3278.9	(14$^-$)			
575.1 *3*	3[‡] *1*	4004.9	18$^+$	3429.8	16$^+$			E_γ: Contaminated by unassigned ^{176}W line.
596.2 *2*	20.1 *15*	2804.3	14$^+$	2208.1	12$^+$	E2	0.0139	A_2=+0.291 *10*, A_4=−0.058 *11*.
601.0 *3*	4.8 *6*	4025.6	(17$^-$)	3424.6	(15$^-$)	E2	0.0137	A_2=+0.24 *7*, A_4=−0.09 *8*.
612		4617	(20$^+$)	4004.9	18$^+$			
625.5 *3*	7.8 *8*	3429.8	16$^+$	2804.3	14$^+$	E2	0.0124	A_2=+0.246 *19*, A_4=−0.040 *21*.
687		5304	(22$^+$)	4617	(20$^+$)			
701.5 *3*		1401.9	(5$^-$)	700.5	6$^+$	D		A_2=−0.26 *7*, A_4=+0.09 *8*.
753		6057	(24$^+$)	5304	(22$^+$)			
761.5 *3*	2.5[‡] *8*	2411.5	11$^{(-)}$	1650.0	10$^+$			E_γ: Contaminated by Coulomb excitation in singles.
785.8[@] *5*	≈1	1926.8?	(8$^-$)	1141.2	8$^+$			

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^{164}Dy(^{16}O,4nγ) 1978Dr04,2000Io03,2002Io01 (continued)

$\gamma(^{176}W)$ (continued)

E_γ	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.[†]	Comments
868.1 *2*	3.8 *5*	2009.4	$9^{(-)}$	1141.2	8^+	D	A_2=−0.14 *7*, A_4=+0.04 *8*.
876.8 *2*	6.4 *5*	1577.4	(6^-)	700.5	6^+		A_2=+0.24 *6*, A_4=+0.05 *6*.
954.1 *2*		1303.3	(4^-)	349.3	4^+		A_2=+0.27 *4*, A_4=+0.02 *5*.
958.1 *2*	2.2 *5*	1658.7		700.5	6^+		
974.1 *3*	3.0 *5*	1674.6	$7^{(-)}$	700.5	6^+	D	A_2=−0.18 *5*, A_4=+0.05 *5*.
1226.3 *3*	5.6[‡] *10*	1926.7		700.5	6^+		

[†] From ^{16}O-$\gamma(\theta)$.
[‡] From coincidence measurements.
[#] 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.
[@] Placement of transition in the level scheme is uncertain.

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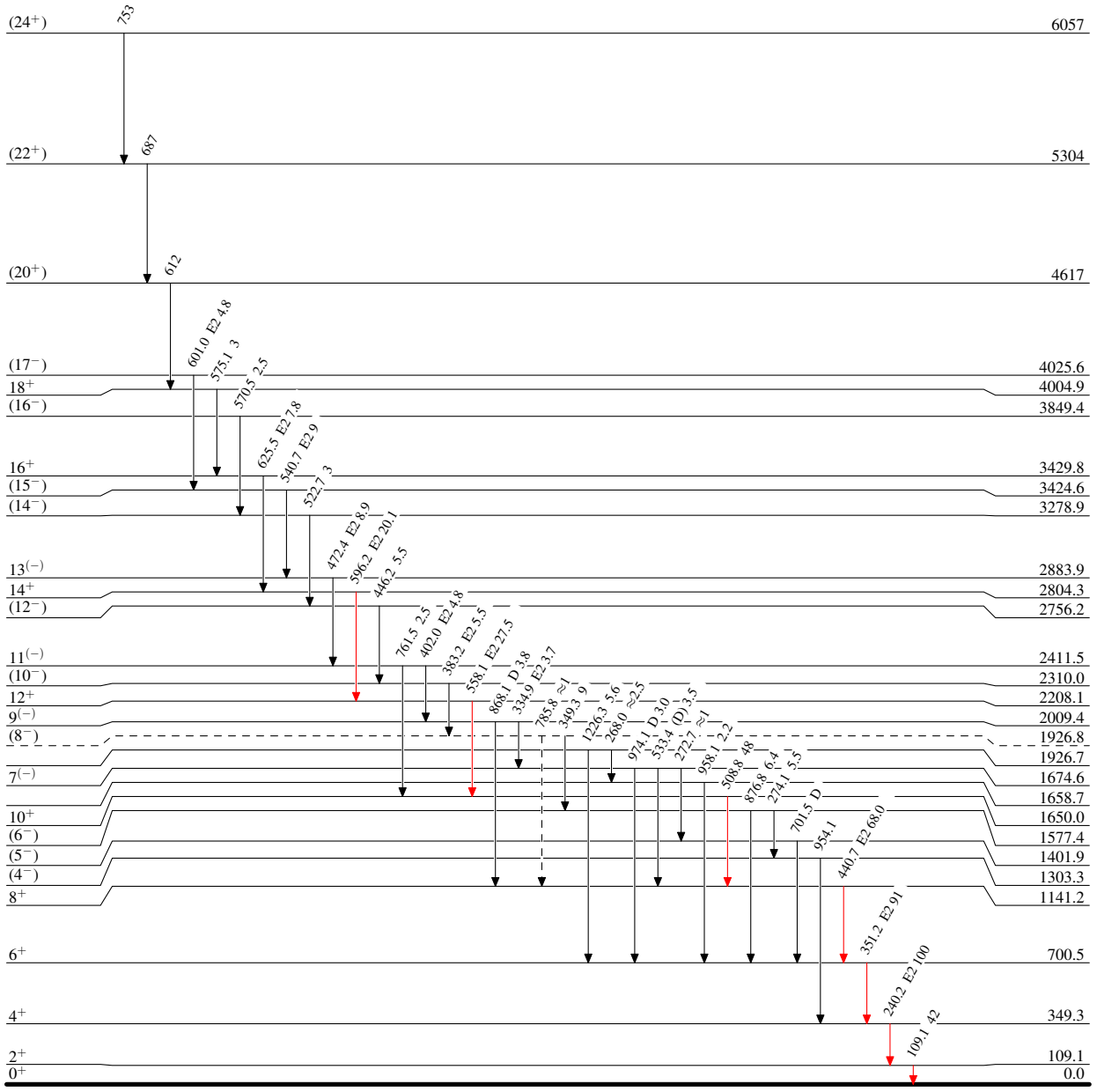
Legend

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

Level Scheme

Intensities: Relative I_γ



$^{176}_{74}W_{102}$