^{163}Dy(n,γ) E=res 1983Wa08

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh and Jun Chen[#]	NDS 147, 1 (2018)	30-Nov-2017

E=2 keV, 24 keV. Some data from E=1.713 eV, 16.2 eV, 205 eV resonances.
$J^\pi(^{163}Dy\ g.s.)=5/2^-$.

1983Wa08: E=2, 24 keV. Includes some data for E=1.713 eV, 2^- resonance also. Average-resonance capture (ARC) spectroscopy. Measured Eγ and Iγ of primary γ rays. Interpretation with IBA model.

1970HaYE: E=1.95 keV. Measured primary Eγ, Iγ.

1972Da28: E=16.2 eV, 19.7 eV, 50.3 eV, 66.1 eV, 94.1 eV, 106 eV, 126 eV and 205 eV. Measured Iγ for 7581γ, 7411γ, 6892γ, 6827γ, and 6740γ.

1966Vo04: E=1.7 eV, 2^- resonance. Measured primary and secondary γ, $\gamma\gamma$. Primary γ-ray (multiplet) peaks were reported at 5750, 5900 and 6900 and secondary γ-ray peaks at 770, 1760 and 1900.

1964Ka30: E=1.71 eV. Measured secondary γ with Eγ(Iγ): 75 (9.3), 120 (0.7), 180 (6.3), 220 (2.2), 275 (1.7), 295 (1.7), 420 (1.7), 480 (2.0), 675 (2.3), 740 (3.5).

Other: 1999Mi27 (E≈60 keV).

^{164}Dy Levels

E(level)[‡]	J$^\pi$[#]	Comments
0.0	0^+	
73.3 *4*	2^+	J$^\pi$: $2^+,3^+$ (ARC); R(2 keV/24 keV)=1.00 *7*.
242.3 *4*	4^+	J$^\pi$: $2^+,3^+,4^+$ (ARC); R(2 keV/24 keV)=1.23 *16*.
761.9 *4*	2^+	J$^\pi$: $2^+,3^+$ (ARC); R(2 keV/24 keV)=0.80 *7*.
828.1 *4*	3^+	J$^\pi$: $2^+,3^+$ (ARC); R(2 keV/24 keV)=1.42 *13*.
915.8 *4*	4^+	J$^\pi$: $4^+,(1^+,2^+,3^+)$ (ARC). Population from a 3^- resonance (1972Da28) rules out 1^+. R(2 keV/24 keV)=1.12 *13*.
976.8 *5*	2^-	J$^\pi$: $2^-,3^-,4^-$ (ARC); R(2 keV/24 keV)=0.36 *6*.
1038.9 *5*	3^-	J$^\pi$: $2^-,3^-$ (ARC); R(2 keV/24 keV)=0.24 *3*.
1123.1 *5*	4^-	J$^\pi$: $2^-,4^-$, $(1^-,3^-)$ (ARC); R(2 keV/24 keV)=0.37 *6*.
1225.9 *7*	$(5)^-$	J$^\pi$: 5^- (ARC).
1588.2 *5*	$(4)^-$	J$^\pi$: $2^-,4^-,(1^-,3^-)$ (ARC); R(2 keV/24 keV)=0.55 *11*.
1674.5 *9*	1^-	J$^\pi$: $1^-,4^-,(2^-)$ (ARC); R(2 keV/24 keV)=0.32 *10*.
1716.0 *4*	$(2,3)^+$	J$^\pi$: $2^+,3^+$ (ARC). 4^+ is ruled out by population from 2^-, 1.71 eV resonance. R(2 keV/24 keV)=1.48 *16*.
1740?[†] *3*	$(1,2^+)$	
1757.8 *6*	$(3)^-$	J$^\pi$: $2^-,3^-,4^-,(1^-)$ (ARC); R(2 keV/24 keV)=0.27 *8*.
1778?[†] *3*	0^+	
1796.5 *4*	$(2)^+$	J$^\pi$: $2^+,3^+$ (ARC). 4^+ is ruled out by population from 2^-, 1.71 eV resonance. R(2 keV/24 keV)=1.3 *3*.
1809.1 *9*	(1^-)	J$^\pi$: $1^-,(4^-)$ (ARC); R(2 keV/24 keV)=0.44 *16*.
1840.8 *7*		J$^\pi$: $2^-,1^+,(3^-)$ (ARC); R(2 keV/24 keV)=0.94 *27*.
1845.8 *10*	$^-$	J$^\pi$: $2^-,3^-,4^-$ (ARC); R(2 keV/24 keV)=0.30 *8*.
1852.4 *4*	$^+$	J$^\pi$: $4^+,(1^+,2^+,3^+)$ (ARC); R(2 keV/24 keV)=1.8 *3*.
1891.7 *4*	$^+$	J$^\pi$: $4^+,(1^+,2^+,3^+)$ (ARC); R(2 keV/24 keV)=1.54 *24*.
1909.8 *6*	$^-$	J$^\pi$: $2^-,3^-$ (ARC); R(2 keV/24 keV)=0.40 *8*.
1921.0 *4*	$^+$	J$^\pi$: $2^+,3^+$ (ARC). 4^+ is ruled out by population from 2^-, 1.71 eV resonance. R(2 keV/24 keV)=1.06 *15*.
1933.0 *4*	$^+$	J$^\pi$: $2^+,3^+$ (ARC). 4^+ is ruled out by population from 2^-, 1.71 eV resonance. R(2 keV/24 keV)=1.21 *19*.
1949.3 *6*		J$^\pi$: $2^-,3^-,1^+,(4^-)$ (ARC); R(2 keV/24 keV)=0.52 *12*.
1978.6 *4*	$^+$	E(level),J$^\pi$: reduced γ-intensities indicate an unresolved doublet of J$^\pi$=$2^+,3^+$ and $2^+,3^+,4^+$ (ARC). R(2 keV/24 keV)=0.87 *8*.
1985.3 *7*	$^-$	J$^\pi$: $3^-,(2^-)$ (ARC); R(2 keV/24 keV)=0.34 *6*.
2049.1 *5*	$^+$	J$^\pi$: $2^+,3^+,(4^+)$ (ARC); R(2 keV/24 keV)=0.79 *20*.
2053.3 *5*	$^+$	J$^\pi$: $2^+,3^+,(4^+)$ (ARC); R(2 keV/24 keV)=0.87 *23*.
2077.9 *5*	$^+$	J$^\pi$: $2^+,3^+$ (ARC); R(2 keV/24 keV)=0.61 *9*.
2101.5 *5*	$^+$	J$^\pi$: $1^+,2^+,3^+,4^+$ (ARC); R(2 keV/24 keV)=1.5 *5*.
2112.8 *5*	$^+$	J$^\pi$: $2^+,3^+,4^+,(1^+)$ (ARC); R(2 keV/24 keV)=1.11 *19*.

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^{163}Dy(n,γ) E=res 1983Wa08 (continued)

^{164}Dy Levels (continued)

E(level)‡	Jπ#	Comments
2123.7 *5*	+	Jπ: 2+,3+,(4+) (ARC); R(2 keV/24 keV)=0.86 *14*.
2152.3 *6*	+	Jπ: 2+,3+,(4+) (ARC); R(2 keV/24 keV)=0.82 *16*.
2196† *3*	(+)	
2209† *3*	(+)	
2251† *3*	(+)	
2263† *3*	(+)	
2307† *3*	(+)	
2351† *3*	(+)	
2393† *3*	(+)	
2413† *3*	(+)	
2431† *3*	(+)	
2438 *3*	(+)	
2444† *3*	(+)	
2461† *3*	(+)	
2472† *3*		
2496† *3*		
2518† *3*		
2534† *3*		
2555† *3*		
2571† *3*		
2585† *3*		
2596† *3*		
2711† *3*		
2731† *3*		
2738† *3*		
2753† *3*		
2786† *3*		
2792† *3*		
2801† *3*		
2824† *3*		
2888† *3*		
2920† *3*		
2947† *3*		
2993† *3*		
3004† *3*		
3076† *3*		
3114† *3*		
3126† *3*		
(7660)	(2−,3−)	E(level): S(n)+E(n), where S(n)=7658.11 *7* (2017Wa10), E(n)=2 keV. Jπ: dominant s-wave capture in 5/2−.
(7682)	(1+,2,3,4+)	E(level): S(n)+E(n) keV, where S(n)=7658.11 *7* (2017Wa10), E(n)=24 keV. Jπ: s- or p-wave capture in 5/2−.

† From 1970HaYE.
‡ From Eγ data.

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^{163}Dy(n,γ) E=res 1983Wa08 (continued)

^{164}Dy Levels (continued)

[#] Spins are from Adopted Levels. The parity assignments and those given under comments are from 1983Wa08 (also 1970HaYE), based on the average resonance capture (ARC) data coupled with the empirical reduced intensity ratios to final states of known J^π values, defined by: R=[(Iγ(2 keV)/Eγ^5)/(Iγ(24 keV)/Eγ^5)] (1983Wa08).

γ(^{164}Dy)

E_γ [†]	Iγ/Eγ^5 [†]	E_i(level)	J_i^π	E_f	J_f^π
4534[‡] *3*		(7660)	(2$^-$,3$^-$)	3126	
4546[‡] *3*		(7660)	(2$^-$,3$^-$)	3114	
4584[‡] *3*		(7660)	(2$^-$,3$^-$)	3076	
4656[‡] *3*		(7660)	(2$^-$,3$^-$)	3004	
4668[‡] *3*		(7660)	(2$^-$,3$^-$)	2993	
4714[‡] *3*		(7660)	(2$^-$,3$^-$)	2947	
4740[‡] *3*		(7660)	(2$^-$,3$^-$)	2920	
4773[‡] *3*		(7660)	(2$^-$,3$^-$)	2888	
4836[‡] *3*		(7660)	(2$^-$,3$^-$)	2824	
4859[‡] *3*		(7660)	(2$^-$,3$^-$)	2801	
4868[‡] *3*		(7660)	(2$^-$,3$^-$)	2792	
4874[‡] *3*		(7660)	(2$^-$,3$^-$)	2786	
4907[‡] *3*		(7660)	(2$^-$,3$^-$)	2753	
4922[‡] *3*		(7660)	(2$^-$,3$^-$)	2738	
4929[‡] *3*		(7660)	(2$^-$,3$^-$)	2731	
4949[‡] *3*		(7660)	(2$^-$,3$^-$)	2711	
5065[‡] *3*		(7660)	(2$^-$,3$^-$)	2596	
5075[‡] *3*		(7660)	(2$^-$,3$^-$)	2585	
5090[‡] *3*		(7660)	(2$^-$,3$^-$)	2571	
5105[‡] *3*		(7660)	(2$^-$,3$^-$)	2555	
5127[‡] *3*		(7660)	(2$^-$,3$^-$)	2534	
5142[‡] *3*		(7660)	(2$^-$,3$^-$)	2518	
5164[‡] *3*		(7660)	(2$^-$,3$^-$)	2496	
5188[‡] *3*		(7660)	(2$^-$,3$^-$)	2472	
5200[‡] *3*	70	(7660)	(2$^-$,3$^-$)	2461	(+)
5216[‡] *3*	98	(7660)	(2$^-$,3$^-$)	2444	(+)
5222 *3*	90	(7660)	(2$^-$,3$^-$)	2438	(+)
5229[‡] *3*	70	(7660)	(2$^-$,3$^-$)	2431	(+)
5248[‡] *3*	61	(7660)	(2$^-$,3$^-$)	2413	(+)
5267[‡] *3*	60	(7660)	(2$^-$,3$^-$)	2393	(+)
5310[‡@] *3*	190	(7660)	(2$^-$,3$^-$)	2351	(+)
5355[‡] *3*	150	(7660)	(2$^-$,3$^-$)	2307	(+)
5397[‡] *3*	69	(7660)	(2$^-$,3$^-$)	2263	(+)
5410[‡] *3*	81	(7660)	(2$^-$,3$^-$)	2251	(+)
5452[‡] *3*	110	(7660)	(2$^-$,3$^-$)	2209	(+)
5464[‡] *3*	70	(7660)	(2$^-$,3$^-$)	2196	(+)
5507.2 *6*	87 *12*	(7660)	(2$^-$,3$^-$)	2152.3	+
5528.6 *7*	106 *14*	(7682)	(1$^+$,2,3,4$^+$)	2152.3	+
5535.8 *5*	82 *8*	(7660)	(2$^-$,3$^-$)	2123.7	+
5546.7 *5*	90 *8*	(7660)	(2$^-$,3$^-$)	2112.8	+

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^{163}Dy(n,γ) E=res 1983Wa08 (continued)

γ(^{164}Dy) (continued)

E_γ[†]	$I\gamma/E\gamma^5$[†]	E_i(level)	J_i^π	E_f	J_f^π
5558.0 *5*	81 *8*	(7660)	$(2^-,3^-)$	2101.5	$^+$
5559.1 *6*	95 *13*	(7682)	$(1^+,2,3,4^+)$	2123.7	$^+$
5569.0 *6*	81 *12*	(7682)	$(1^+,2,3,4^+)$	2112.8	$^+$
5581.5 *12*	54 *18*	(7682)	$(1^+,2,3,4^+)$	2101.5	$^+$
5581.6 *5*	84 *8*	(7660)	$(2^-,3^-)$	2077.9	$^+$
5603.0 *5*	137 *14*	(7682)	$(1^+,2,3,4^+)$	2077.9	$^+$
5606.2 *5*	107 *10*	(7660)	$(2^-,3^-)$	2053.3	$^+$
5610.4 *5*	106 *11*	(7660)	$(2^-,3^-)$	2049.1	$^+$
5628.5 *9*	123 *31*	(7682)	$(1^+,2,3,4^+)$	2053.3	$^+$
5631.9 *8*	134 *31*	(7682)	$(1^+,2,3,4^+)$	2049.1	$^+$
5674.2 *7*	27 *4*	(7660)	$(2^-,3^-)$	1985.3	$^-$
5680.9 *4*	186 *11*	(7660)	$(2^-,3^-)$	1978.6	$^+$
5696.3 *6*	80 *9*	(7682)	$(1^+,2,3,4^+)$	1985.3	$^-$
5703.2 *4*	214 *15*	(7682)	$(1^+,2,3,4^+)$	1978.6	$^+$
5710.1 *6*	26 *4*	(7660)	$(2^-,3^-)$	1949.3	
5726.5 *4*	105 *10*	(7660)	$(2^-,3^-)$	1933.0	$^+$
5733.0 *8*	50 *9*	(7682)	$(1^+,2,3,4^+)$	1949.3	
5738.4 *4*	84 *7*	(7660)	$(2^-,3^-)$	1921.0	$^+$
5748.7 *6*	87 *11*	(7682)	$(1^+,2,3,4^+)$	1933.0	$^+$
5749.7 *6*	29 *4*	(7660)	$(2^-,3^-)$	1909.8	$^-$
5761.1 *6*	79 *9*	(7682)	$(1^+,2,3,4^+)$	1921.0	$^+$
5767.8 *4*	80 *6*	(7660)	$(2^-,3^-)$	1891.7	$^+$
5771.9 *6*	72 *10*	(7682)	$(1^+,2,3,4^+)$	1909.8	$^-$
5790.5 *7*	52 *7*	(7682)	$(1^+,2,3,4^+)$	1891.7	$^+$
5807.1 *4*	90 *7*	(7660)	$(2^-,3^-)$	1852.4	$^+$
5813.7 *10*	18 *4*	(7660)	$(2^-,3^-)$	1845.8	$^-$
5818.7 *7*	33 *4*	(7660)	$(2^-,3^-)$	1840.8	
5829.5 *8*	51 *8*	(7682)	$(1^+,2,3,4^+)$	1852.4	$^+$
5835.8 *9*	61 *9*	(7682)	$(1^+,2,3,4^+)$	1845.8	$^-$
5841.0 *11*	35 *9*	(7682)	$(1^+,2,3,4^+)$	1840.8	
5850.4 *9*	12 *3*	(7660)	$(2^-,3^-)$	1809.1	(1^-)
5863.0 *4*	117 *7*	(7660)	$(2^-,3^-)$	1796.5	$(2)^+$
5871.7 *9*	27 *7*	(7682)	$(1^+,2,3,4^+)$	1809.1	(1^-)
5882[#&] *3*	76[#]	(7660)	$(2^-,3^-)$	1778?	0^+
5884.7 *5*	91 *20*	(7682)	$(1^+,2,3,4^+)$	1796.5	$(2)^+$
5901.6 *6*	21 *3*	(7660)	$(2^-,3^-)$	1757.8	$(3)^-$
5920[#&] *3*	26[#]	(7660)	$(2^-,3^-)$	1740?	$(1,2^+)$
5923.7 *9*	77 *19*	(7682)	$(1^+,2,3,4^+)$	1757.8	$(3)^-$
5943.5 *4*	118 *7*	(7660)	$(2^-,3^-)$	1716.0	$(2,3)^+$
5965.6 *5*	80 *7*	(7682)	$(1^+,2,3,4^+)$	1716.0	$(2,3)^+$
5985.0 *9*	11 *3*	(7660)	$(2^-,3^-)$	1674.5	1^-
6007.5 *7*	34 *6*	(7682)	$(1^+,2,3,4^+)$	1674.5	1^-
6071.3 *5*	23 *3*	(7660)	$(2^-,3^-)$	1588.2	$(4)^-$
6093.7 *6*	42 *6*	(7682)	$(1^+,2,3,4^+)$	1588.2	$(4)^-$
6455.8 *7*	24 *4*	(7682)	$(1^+,2,3,4^+)$	1225.9	$(5)^-$
6536.4 *5*	16 *2*	(7660)	$(2^-,3^-)$	1123.1	4^-
6559.1 *5*	43 *4*	(7682)	$(1^+,2,3,4^+)$	1123.1	4^-
6620.6 *5*	17 *2*	(7660)	$(2^-,3^-)$	1038.9	3^-
6642.9 *5*	71 *6*	(7682)	$(1^+,2,3,4^+)$	1038.9	3^-
6682.6 *4*	21 *3*	(7660)	$(2^-,3^-)$	976.8	2^-
6704.9 *5*	59 *5*	(7682)	$(1^+,2,3,4^+)$	976.8	2^-
6743.7 *4*	74 *5*	(7660)	$(2^-,3^-)$	915.8	4^+
6766.2 *5*	66 *6*	(7682)	$(1^+,2,3,4^+)$	915.8	4^+
6831.4 *4*	138 *7*	(7660)	$(2^-,3^-)$	828.1	3^+
6853.6 *4*	97 *7*	(7682)	$(1^+,2,3,4^+)$	828.1	3^+

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^{163}Dy(n,γ) E=res 1983Wa08 (continued)

$\gamma(^{164}Dy)$ (continued)

E_γ [†]	Iγ/Eγ^5 [†]	E_i(level)	J_i^π	E_f	J_f^π
6897.6 *4*	112 *8*	(7660)	$(2^-,3^-)$	761.9	2^+
6920.0 *4*	140 *7*	(7682)	$(1^+,2,3,4^+)$	761.9	2^+
7417.2 *4*	95 *10*	(7660)	$(2^-,3^-)$	242.3	4^+
7439.3 *4*	77 *6*	(7682)	$(1^+,2,3,4^+)$	242.3	4^+
7586.1 *4*	100 *5*	(7660)	$(2^-,3^-)$	73.3	2^+
7608.3 *4*	100 *6*	(7682)	$(1^+,2,3,4^+)$	73.3	2^+

† From 1983Wa08 unless otherwise stated. See 1972Da28 for intensities/100 neutrons of 7581γ, 7411γ, 6892γ, 6827γ and 6740γ from the following resonances: 16.2 eV, 19.7 eV, 50.3 eV, 66.1 eV, 94.1 eV, 106 eV, 126 eV and 205 eV.
‡ From 1970HaYE. Reduced intensity for some of the transitions is available.
# γ reported by 1970HaYE only. This γ is considered as uncertain since it is not confirmed by 1983Wa08.
@ Probable doublet.
& Placement of transition in the level scheme is uncertain.

^{163}Dy(n,γ) E=res 1983Wa08

Level Scheme

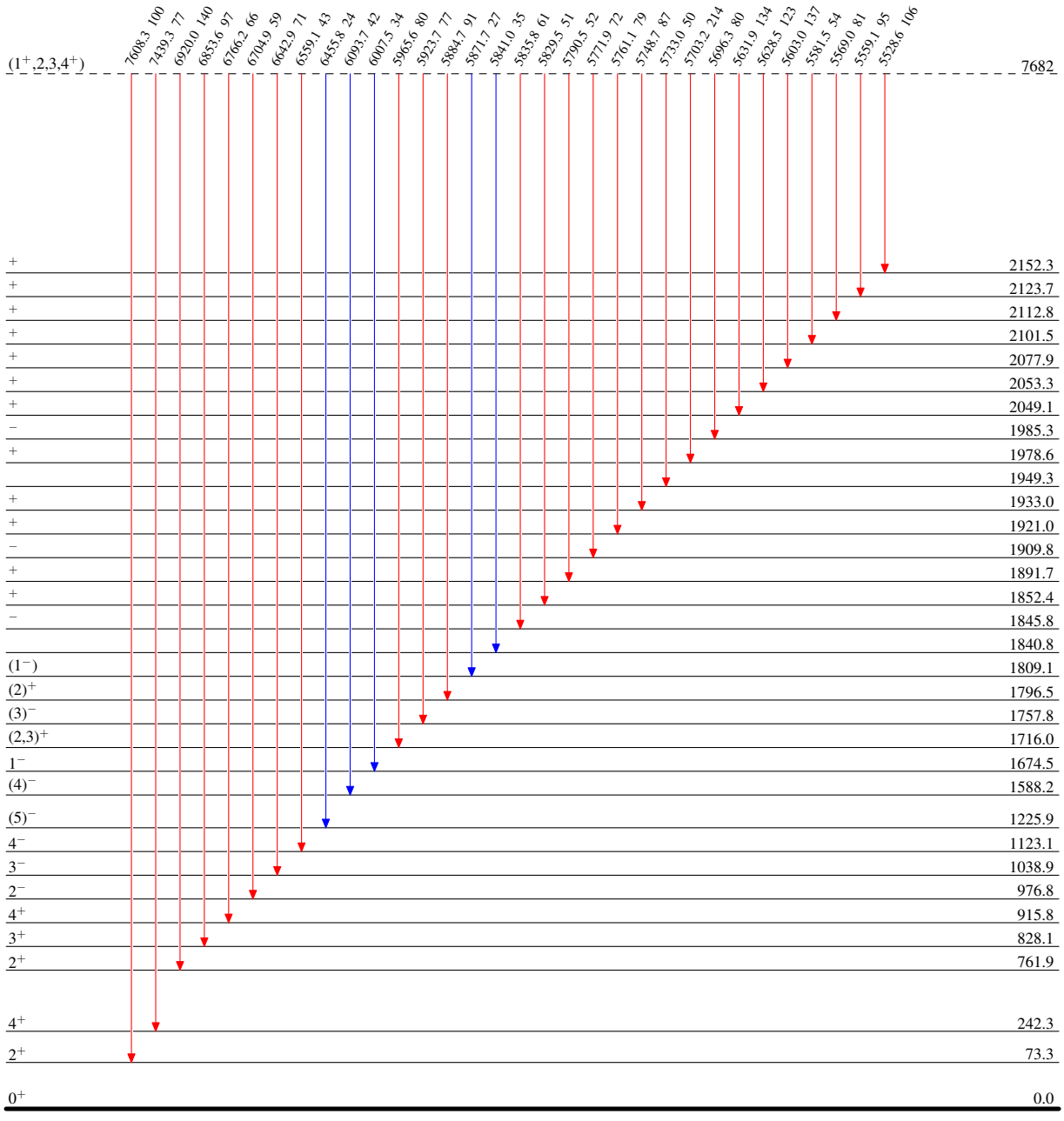
Intensities: Relative I_γ

Legend

$I_\gamma < 2\% \times I_\gamma^{max}$

$I_\gamma < 10\% \times I_\gamma^{max}$

$I_\gamma > 10\% \times I_\gamma^{max}$



$^{164}_{66}Dy_{98}$

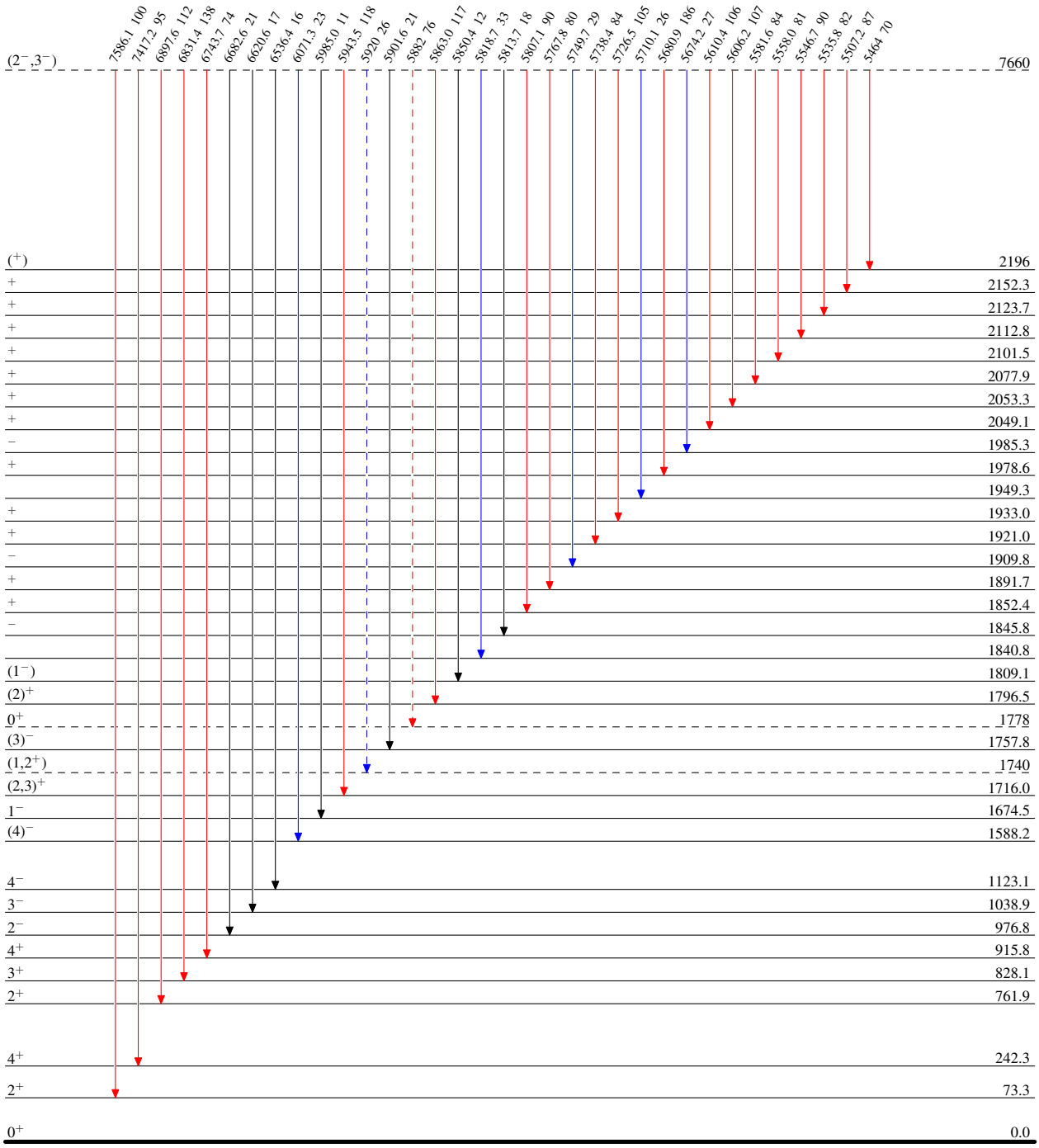
^{163}Dy(n,γ) E=res 1983Wa08

Level Scheme (continued)

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)



$^{164}_{66}Dy_{98}$

^{163}Dy(n,γ) E=res 1983Wa08

Level Scheme (continued)

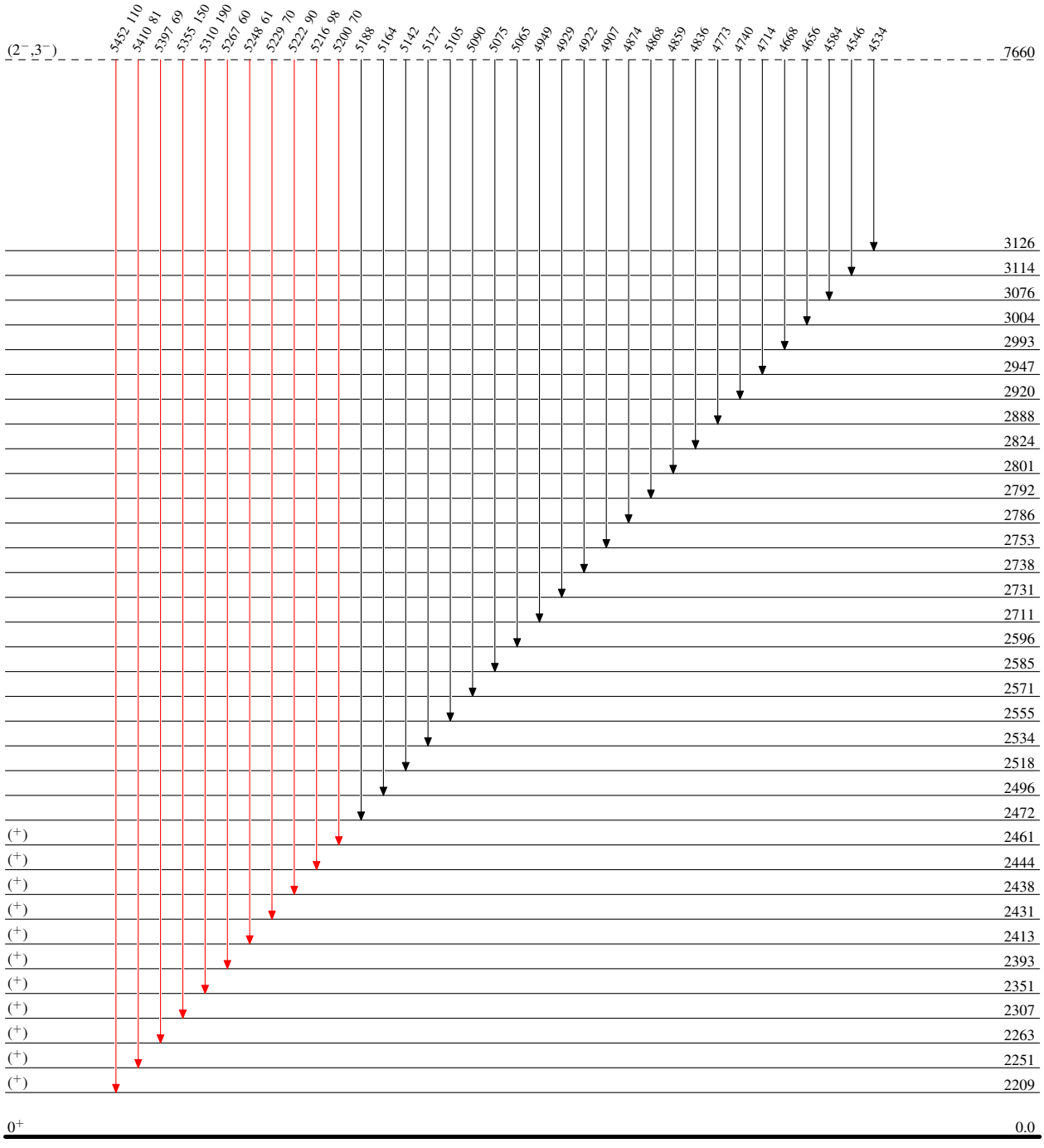
Intensities: Relative I_γ

Legend

$I_\gamma < 2\% \times I_\gamma^{max}$

$I_\gamma < 10\% \times I_\gamma^{max}$

$I_\gamma > 10\% \times I_\gamma^{max}$



$^{164}_{66}Dy_{98}$