^{167}Er(^{16}O,4nγ) 1983Dr05

History			
Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Coral M. Baglin	NDS 110, 265 (2009)	15-Nov-2008

Target: enriched erbium. Projectile: ^{16}O, E=83 MeV. Measured excit, Eγ, Iγ, $\gamma\gamma$ coin, γ-K x ray coin, $\gamma\gamma$(t), nγ(t), $\gamma(\theta)$.

^{179}Os Levels

E(level)†	J$^\pi$‡	T$_{1/2}$	Comments
0.0&	1/2$^-$		J$^\pi$: Nilsson orbital assignment based on energy systematics of this orbital in ^{177}Os and ^{181}Os.
86.30& *15*	3/2$^-$		
100.3& *3*	5/2$^-$		
145.5@ *3*	7/2$^-$	0.50 μs	T$_{1/2}$: from $\gamma\gamma$(t), gating on transitions above and below the 146 level, and from two-component fits to 86γ and 100γ time spectra In n-γ(t) (1983Dr05).
243.0# *4*	9/2$^+$	0.783 μs *14*	T$_{1/2}$: from n-97.5γ(t) time spectrum (1983Dr05).
273.1@ *4*	9/2$^-$		
286.7# *5*	11/2$^+$		
320.2& *4*	9/2$^-$		
345.1# *4*	13/2$^+$		
424.5@ *4*	11/2$^-$		
500.1# *5*	15/2$^+$		
589.5# *5*	17/2$^+$		
594.2@ *4*	13/2$^-$		
641.4& *5*	13/2$^-$		
781.3@ *5*	15/2$^-$		
856.0# *5*	19/2$^+$		
955.4# *5*	21/2$^+$		
980.9@ *5*	17/2$^-$		
1041.8& *6*	17/2$^-$		
1194.3@ *5*	19/2$^-$		
1317.9# *5*	23/2$^+$		
1417.7@ *5*	21/2$^-$		
1427.6# *5*	25/2$^+$		
1503.1& *7*	21/2$^-$		
1654.4@ *5*	23/2$^-$		
1851.5# *6*	27/2$^+$		
1899.5@ *6*	25/2$^-$		
1985.6# *6*	29/2$^+$		
2011.2& *7*	25/2$^-$		
2160.1@ *6*	27/2$^-$		
2417.9@ *6*	29/2$^-$		
2431.3# *6*	31/2$^+$		
2564.2& *8*	29/2$^-$		
2604.2# *7*	33/2$^+$		
2709.3@ *6*	31/2$^-$		
2998.6@ *7*	33/2$^-$		
3046.1# *7*	35/2$^+$		

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^{167}Er(^{16}O,4nγ) 1983Dr05 (continued)

^{179}Os Levels (continued)

E(level)†	Jπ‡	E(level)†	Jπ‡	E(level)†	Jπ‡	E(level)†	Jπ‡
3151.8& *9*	(33/2⁻)	3616.5@ *8*	37/2⁻	3932.0@ *8*	(39/2⁻)	5143.3?# *9*	(47/2⁺)
3259.2# *7*	37/2⁺	3699.5# *8*	39/2⁺	4398.1# *8*	(43/2⁺)	5259.7?# *9*	(49/2⁺)
3301.1@ *7*	35/2⁻	3919.7# *8*	(41/2⁺)	4563.2# *9*	(45/2⁺)		

† Calculated by evaluator from a least-squares fit to γ-ray energies assuming $\Delta E=0.15$ keV for $E\gamma\leq 100$ keV, and $\Delta E=0.3$ keV for all other $E\gamma$ data.

‡ Authors′ assignments, based on $\gamma(\theta)$ and γ decay patterns, and on deduced rotational structure.

Band(A): 9/2[624] Coriolis-mixed band. Coriolis-mixed configuration; assignment based on energy systematics of this band in ^{177}Os, ^{181}Os, and ^{183}Os. B(E1)(W.u.)=0.14×10^{-6} for 97.5γ compared with B(E1)(W.u.)=0.4×10^{-6} for the equivalent γ ray in ^{181}Os.

@ Band(B): 7/2[514] band. Nilsson orbital assigned by analogy with ^{181}Os. $T_{1/2}$ of this level is consistent with the degree of K-forbiddenness of the transition to the $J^\pi=(5/2^-)$ member of the 1/2[521] g.s. rotational band.

& Band(C): 1/2[521] g.s. band. Nilsson orbital assignment based on energy systematics of this orbital in ^{177}Os and ^{181}Os.

$\gamma(^{179}Os)$

E_γ†	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.‡	δ	α[a]	Comments
(43.7)		286.7	11/2⁺	243.0	9/2⁺				
45.20	≤30&	145.5	7/2⁻	100.3	5/2⁻	M1		9.97	Mult.: from α(exp)≈8.5, derived from intensity balance of delayed γ-ray intensities.
58.4	13.7& *16*	345.1	13/2⁺	286.7	11/2⁺				
86.30	17.1 *12*	86.30	3/2⁻	0.0	1/2⁻	D+Q			A_2=+0.03 *3*, A_4=−0.02 *4*. δ: −5.3 *7* or +0.29 *4* from $\gamma(\theta)$, analyzed In 1993Ba45.
89.40	8.7& *9*	589.5	17/2⁺	500.1	15/2⁺				
97.50	100 *5*	243.0	9/2⁺	145.5	7/2⁻	E1		0.417	Mult.: from α(exp)=0.84 *11*, deduced from transition intensity balance at 243.0 level. A_2=+0.02 *2*, A_4=−0.01 *3*.
99.40	2.4& *16*	955.4	21/2⁺	856.0	19/2⁺				
100.3	20.1& *13*	100.3	5/2⁻	0.0	1/2⁻				
102.10	2.6 *3*	345.1	13/2⁺	243.0	9/2⁺				(A_2=+0.47 *14*).
109.8#	<2.9	1427.6	25/2⁺	1317.9	23/2⁺				
127.6	18.1 *12*	273.1	9/2⁻	145.5	7/2⁻	D+Q			A_2=−0.48 *3*, A_4=+0.13 *4*.
151.3	7.8 *6*	424.5	11/2⁻	273.1	9/2⁻	D+Q			A_2=−0.54 *4*, A_4=+0.06 *8*.
154.9	35.4 *22*	500.1	15/2⁺	345.1	13/2⁺	D+Q	−0.9 *3*		A_2=−0.84 *2*, A_4=+0.07 *3*. δ: from analysis In 1994Ba27 of $\gamma(\theta)$.
169.5	4.7 *6*	594.2	13/2⁻	424.5	11/2⁻	D+Q			A_2=−0.97 *10*, A_4=+0.06 *11*.
187.2	5.4& *6*	781.3	15/2⁻	594.2	13/2⁻				
199.8	5.9& *7*	980.9	17/2⁻	781.3	15/2⁻				
213.4[b]	36[b] *3*	500.1	15/2⁺	286.7	11/2⁺				A_2=+0.24 *2*, A_4=−0.08 *3* for doublet.
213.4[b]	36[b] *3*	1194.3	19/2⁻	980.9	17/2⁻				A_2=+0.24 *2*, A_4=−0.08 *3* for doublet.
219.9	16.2 *13*	320.2	9/2⁻	100.3	5/2⁻				(A_2=+0.35 *4*, A_4=−0.05 *5*).
223.4	3.7& *9*	1417.7	21/2⁻	1194.3	19/2⁻				
236.7	<7&	1654.4	23/2⁻	1417.7	21/2⁻				
244.5	44 *3*	589.5	17/2⁺	345.1	13/2⁺	Q			A_2=+0.25 *2*, A_4=−0.05 *3*.
245.3	<3	1899.5	25/2⁻	1654.4	23/2⁻				

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^{167}Er(^{16}O,4nγ) 1983Dr05 (continued)

γ(^{179}Os) (continued)

E_γ †	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.‡	Comments
260.7#	<2.4	2160.1	27/2$^-$	1899.5	25/2$^-$		
266.5#	13.1 *15*	856.0	19/2$^+$	589.5	17/2$^+$		
279.0	25.9 *15*	424.5	11/2$^-$	145.5	7/2$^-$	Q	A_2=+0.36 *4*, A_4=−0.03 *6*.
321.2[c]	34[c] *3*	594.2	13/2$^-$	273.1	9/2$^-$		A_2=+0.24 *4*, A_4=−0.03 *5* for doublet.
321.2[c]	27[c] *3*	641.4	13/2$^-$	320.2	9/2$^-$		A_2=+0.24 *4*, A_4=−0.03 *5* for doublet.
355.9	49@ *3*	856.0	19/2$^+$	500.1	15/2$^+$		(A_2=+0.39 *3*, A_4=−0.02 *5*).
356.8	37@ *2*	781.3	15/2$^-$	424.5	11/2$^-$		(A_2=+0.38 *4*, A_4=−0.06 *6*).
362.6	6.3& *19*	1317.9	23/2$^+$	955.4	21/2$^+$		
365.8	76 *5*	955.4	21/2$^+$	589.5	17/2$^+$	Q	A_2=+0.33 *3*, A_4=−0.07 *5*.
[x]373	≈3@						
386.7	34 *4*	980.9	17/2$^-$	594.2	13/2$^-$		(A_2=+0.26 *2*, A_4=−0.08 *2*).
400.4	19.4& *12*	1041.8	17/2$^-$	641.4	13/2$^-$		
412.9	27.9 *16*	1194.3	19/2$^-$	781.3	15/2$^-$		(A_2=+0.18 *4*, A_4=−0.03 *6*).
424.0	3.4 *4*	1851.5	27/2$^+$	1427.6	25/2$^+$		
436.8	29.7 *18*	1417.7	21/2$^-$	980.9	17/2$^-$	Q	A_2=+0.28 *11*, A_4=−0.05 *9*.
[x]456	<16&						
460.1	25.7@ *15*	1654.4	23/2$^-$	1194.3	19/2$^-$		(A_2=+0.41 *6*, A_4=−0.02 *6*).
461.3	13.2 *21*	1503.1	21/2$^-$	1041.8	17/2$^-$		A_2=+0.33 *4*, A_4=−0.01 *5* for doublet.
461.9	47 *6*	1317.9	23/2$^+$	856.0	19/2$^+$		A_2=+0.33 *4*, A_4=−0.01 *5* for doublet.
472.1	63 *5*	1427.6	25/2$^+$	955.4	21/2$^+$	Q	A_2=+0.32 *2*, A_4=−0.12 *3*.
481.6	30 *2*	1899.5	25/2$^-$	1417.7	21/2$^-$	Q	A_2=+0.31 *2*, A_4=−0.09 *3*.
505.6	20.9 *18*	2160.1	27/2$^-$	1654.4	23/2$^-$		
508.1	13.4& *22*	2011.2	25/2$^-$	1503.1	21/2$^-$		
518.4	13.8& *24*	2417.9	29/2$^-$	1899.5	25/2$^-$		
533.6	24& *5*	1851.5	27/2$^+$	1317.9	23/2$^+$		(A_2=+0.22 *3*, A_4=−0.04 *3*).
[x]543	<6						
549.2	10.4 *7*	2709.3	31/2$^-$	2160.1	27/2$^-$		
553.0	6.9& *15*	2564.2	29/2$^-$	2011.2	25/2$^-$		
558.0	41& *11*	1985.6	29/2$^+$	1427.6	25/2$^+$		(A_2=+0.43 *5*, A_4=−0.04 *7*).
[x]571	≈7						
579.8	20.0 *12*	2431.3	31/2$^+$	1851.5	27/2$^+$		A_2=+0.32 *4*, A_4=−0.09 *5* for 579.8γ+580.7γ doublet.
580.7	13.5 *9*	2998.6	33/2$^-$	2417.9	29/2$^-$		A_2=+0.32 *4*, A_4=−0.09 *5* for 579.8γ+580.7γ doublet.
587.6	9.7& *9*	3151.8	(33/2$^-$)	2564.2	29/2$^-$		
591.8	4.3 *15*	3301.1	35/2$^-$	2709.3	31/2$^-$		
614.8	8.4 *7*	3046.1	35/2$^+$	2431.3	31/2$^+$	(Q)	A_2=+0.31 *7*, A_4=+0.10 *12*.
617.9	8.0 *15*	3616.5	37/2$^-$	2998.6	33/2$^-$		(A_2=+0.46 *4*, A_4=−0.15 *7*).
618.6	27 *3*	2604.2	33/2$^+$	1985.6	29/2$^+$		(A_2=+0.28 *3*, A_4=+0.02 *4*).
630.9	<10&	3932.0	(39/2$^-$)	3301.1	35/2$^-$		
643.5	6.6 *12*	4563.2	(45/2$^+$)	3919.7	(41/2$^+$)		
653.4	6.8 *7*	3699.5	39/2$^+$	3046.1	35/2$^+$	(Q)	A_2=+0.45 *10*, A_4=+0.01 *13*.
655.0	17.6 *19*	3259.2	37/2$^+$	2604.2	33/2$^+$	Q	A_2=+0.37 *4*, A_4=−0.03 *5*.
660.5	7& *3*	3919.7	(41/2$^+$)	3259.2	37/2$^+$		
696.5#	4.1 *24*	5259.7?	(49/2$^+$)	4563.2	(45/2$^+$)		
698.6	<11	4398.1	(43/2$^+$)	3699.5	39/2$^+$		
745.2#	<11	5143.3?	(47/2$^+$)	4398.1	(43/2$^+$)		

† ΔE ranges from 0.15 keV for low-energy γ rays to ΔE=0.3 keV for the less intense high-energy γ rays (1983Dr05). Evaluator assigns ΔE=0.3 keV to all lines for which Eγ>100 keV, and 0.15 keV for Eγ<100 keV.

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^{167}Er(^{16}O,4nγ) 1983Dr05 (continued)

$\gamma(^{179}Os)$ (continued)

‡ Based on $\gamma(\theta)$, except As noted. A_2, A_4 data from 1983Dr05 are given in comments; parentheses indicate that data are uncertain due to low Iγ, difficult background correction or contamination of γ peak, and the evaluator does not make multipolarity assignments based on these.
# Assignment uncertain.
@ Partially resolved from contaminant line.
& Contaminated by impurities in singles. Iγ deduced from $\gamma\gamma$ coin or nγ coin data.
a 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.
b Multiply placed with undivided intensity.
c Multiply placed with intensity suitably divided.
x γ ray not placed in level scheme.

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Level Scheme

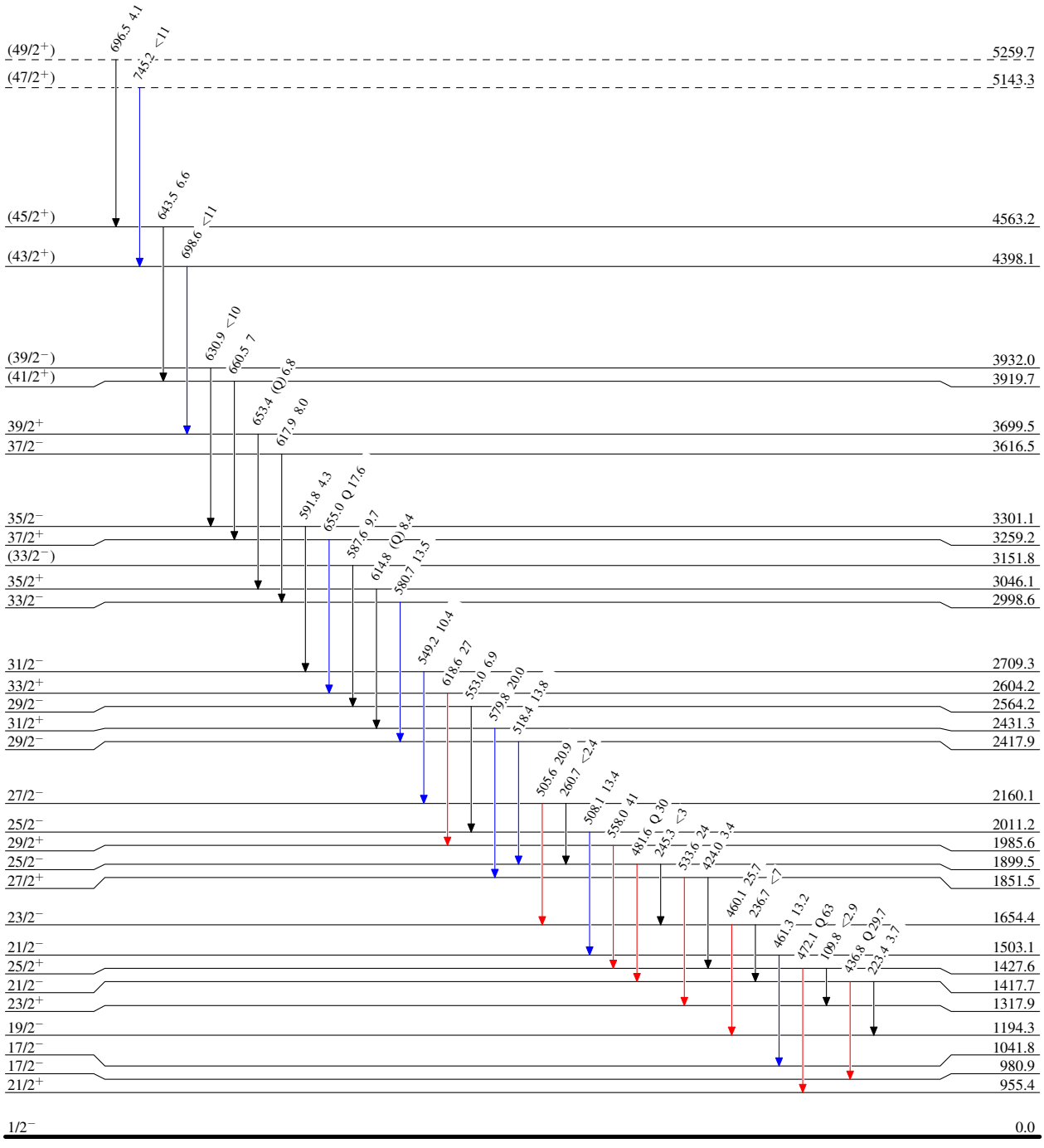
Intensities: Relative I_γ

Legend

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

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

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



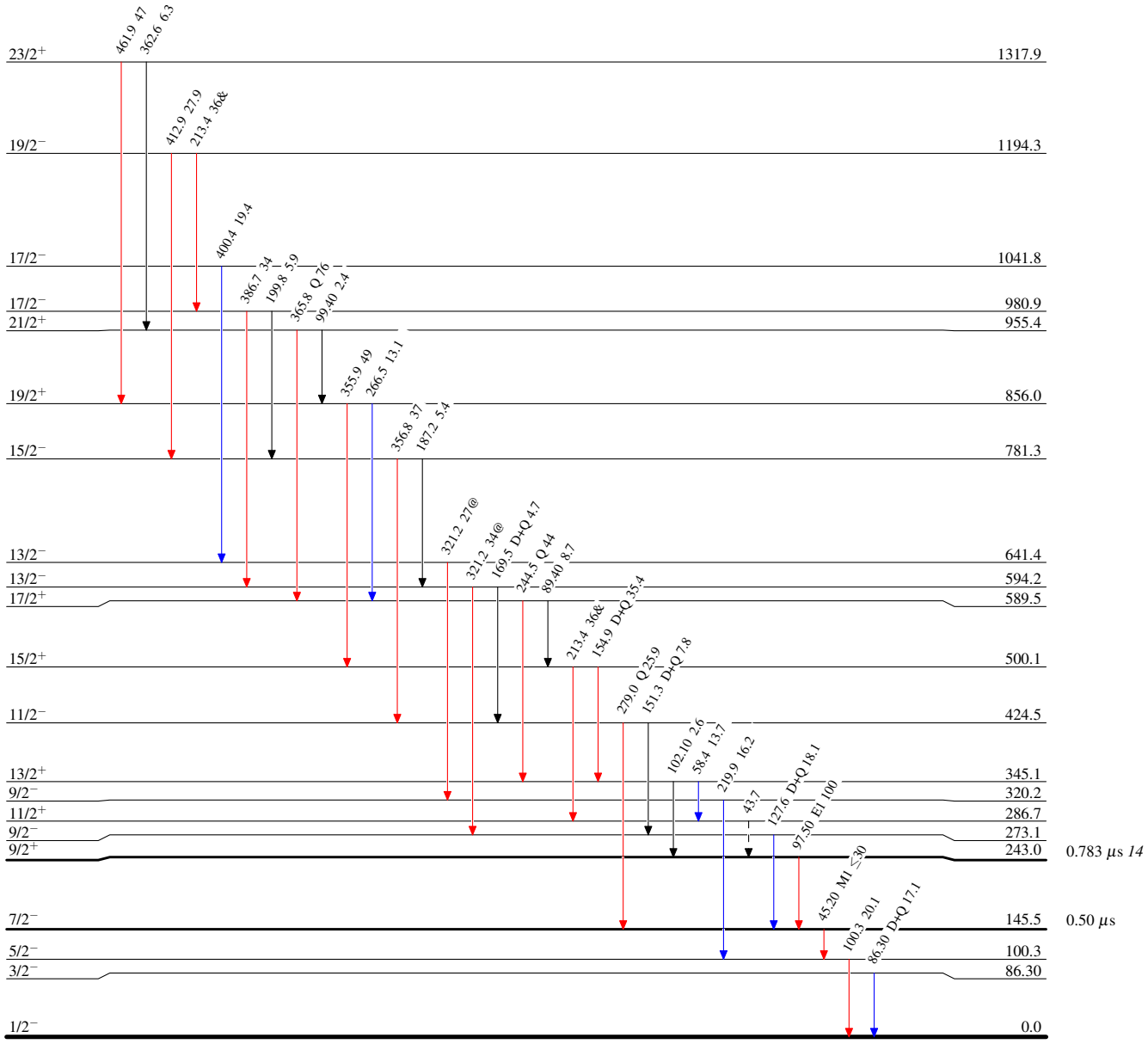
$^{179}_{76}Os_{103}$

^{167}Er(^{16}O,4nγ) 1983Dr05

Level Scheme (continued)

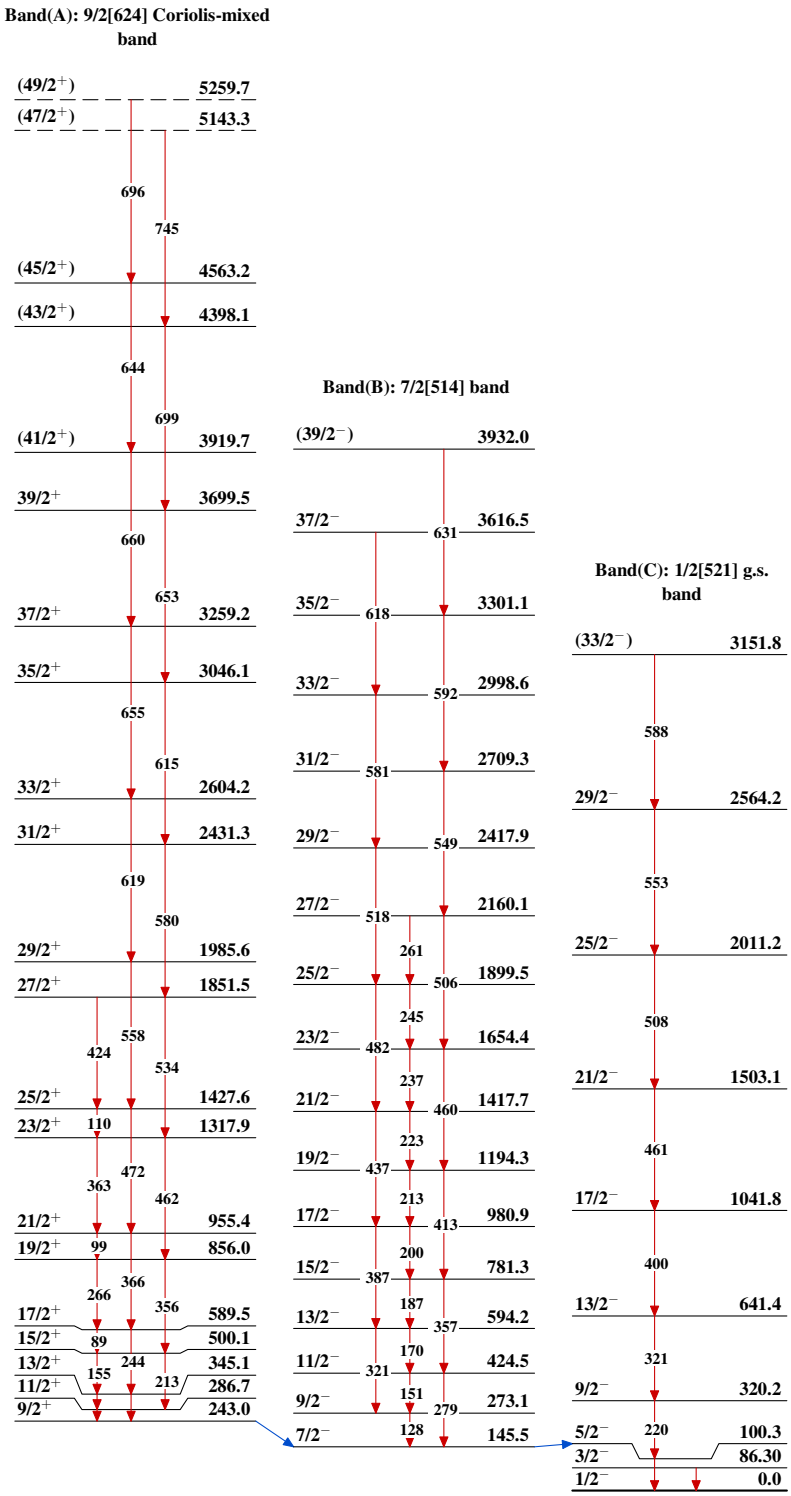
Intensities: Relative I_γ
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided

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)



$^{179}_{76}Os_{103}$

^{167}Er(^{16}O,4nγ) 1983Dr05



$^{179}_{76}Os_{103}$