

Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	J. Tuli	ENSDF	15-Aug-2015

Q(β⁻)=-7170 19; S(n)=8266 20; S(p)=3201 42; Q(α)=5055 6 [2012Wa38](#)

Identification: comparison of α-intensity yield curves for ¹⁶⁴Er(¹⁶O,xn) with theoretical curve shapes suggests x=6, 7, and 8 for three of the products; ¹⁷³Os as 7n product was confirmed by presence of 123.7γ (¹⁷³Hf decay) and 172.2γ (¹⁷³Ta decay) in the corresponding γ-ray yield peak ([1971Bo06](#)).

¹⁷³Os Levels

Cross Reference (XREF) Flags

- A ¹⁷³Ir ε decay (2.20 s)
- B ¹⁷³Ir ε decay (9.0 s)
- C ¹⁷⁷Pt α decay
- D (HL,xnγ)

E(level) †	J ^π ‡	T _{1/2}	XREF	Comments
0.0 [#]	5/2 ⁻	22.4 s 9	ABCD	%ε+%β ⁺ =99.6 2; %α=0.4 2 (1995Hi02) %α from 1995Hi02 . %α=0.021 9 (1971Bo06). J ^π : Favored α decay from 5/2 ⁻ ¹⁷⁷ Pt. 5/2 ⁻ 5/2[523] Nilsson state assigned, as for the neighboring N=97 isotones ¹⁷¹ W, ¹⁶⁹ Hf, and ¹⁶⁷ Yb. T _{1/2} : from α(t), γ-K x ray(t) (1995Hi02). Other: 22.4 s α(t) (2002Du22); 16 s 5 (1971Bo06).
91.6 [@] 1	7/2 ⁻		ABCD	J ^π : α(HF)=3.7 from 5/2 ⁻ ¹⁷⁷ Pt.
141.2 ^{&} 2	(9/2 ⁺)	>28 ns	AB D	T _{1/2} : estimate from prompt γγ-timing width in ¹⁷³ Ir ε decay (2.20 s), ¹⁷³ Ir ε decay (9.0 s).
141.2+x ^{&}	(13/2 ⁺)		D	J ^π : 13/2 ⁺ 5/2[642] Nilsson state assignment from systematics for N=97 isotones and features of band structure. x<60 keV, estimated by 1990Ba29 .
169.8 5			D	
187.5+x ^a 3	(11/2 ⁺)		D	
219.6 [#] 1	9/2 ⁻		A D	
310 1	(9/2 ⁻)		D	
373.9+x ^{&} 3	(17/2 ⁺)		D	
388.0 [@] 1	11/2 ⁻		A D	
406.1+x ^a 3	(15/2 ⁺)		D	
456.5 2			D	
535.1 [#] 1	13/2 ⁻		D	
721.8 [@] 2	15/2 ⁻		D	
757.2			D	
764.1+x ^{&} 3	(21/2 ⁺)		D	
769.7+x ^a 3	(19/2 ⁺)		D	
890.5 [#] 2	17/2 ⁻		D	
1094.3 [@] 2	19/2 ⁻		D	
1215.4+x ^a 3	(23/2 ⁺)		D	
1249.2+x ^{&} 3	(25/2 ⁺)		D	
1290.9 [#] 2	21/2 ⁻		D	
1519.5 [@] 2	23/2 ⁻		D	
1717.9+x ^a 3	(27/2 ⁺)		D	
1740.1 [#] 2	25/2 ⁻		D	

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued) ^{173}Os Levels (continued)

E(level) [†]	J ^π [‡]	XREF	E(level) [†]	J ^π [‡]	XREF	E(level) [†]	J ^π [‡]	XREF
1785.7+x ^{&} 3	(29/2 ⁺)	D	3444? 1		D	5023.6 [@] 3	(47/2 ⁻)	D
1997.1 [@] 2	27/2 ⁻	D	3536.9+x ^a 3	(39/2 ⁺)	D	5042.2+x ^{&} 4	(49/2 ⁺)	D
2235.1 [#] 3	29/2 ⁻	D	3616.2+x ^{&} 4	(41/2 ⁺)	D	5315.9 [#] 3	(49/2 ⁻)	D
2264.8		D	3683.5 [@] 3	39/2 ⁻	D	5725 [@] 1	(51/2 ⁻)	D
2272.4+x ^a 3	(31/2 ⁺)	D	3751? 1		D	5782.1+x ^a 6	(51/2 ⁺)	D
2359.2+x ^{&} 3	(33/2 ⁺)	D	3950.4 [#] 3	41/2 ⁻	D	5824.8+x ^{&} 4	(53/2 ⁺)	D
2523.3 [@] 3	31/2 ⁻	D	4064? 2		D	6018.6 [#] 3	(53/2 ⁻)	D
2769.3 [#] 3	33/2 ⁻	D	4243.8+x ^a 3	(43/2 ⁺)	D	6436 [@] 2	(55/2 ⁻)	D
2878.8+x ^a 3	(35/2 ⁺)	D	4305.4+x ^{&} 3	(45/2 ⁺)	D	6605+x ^a 1	(55/2 ⁺)	D
2919? 1		D	4335.2 [@] 3	43/2 ⁻	D	6645+x ^{&} 1	(57/2 ⁺)	D
2969.0+x ^{&} 3	(37/2 ⁺)	D	4418? 2		D	6754 [#] 1	(57/2 ⁻)	D
3087.5 [@] 3	35/2 ⁻	D	4618.6 [#] 3	45/2 ⁻	D	7166 [@] 2	(59/2 ⁻)	D
3148? 1		D	4727? 2		D	7496+x ^{&} 2	(61/2 ⁺)	D
3336.8 [#] 3	37/2 ⁻	D	4994.6+x ^a 3	(47/2 ⁺)	D	7541 [#] 2	(61/2 ⁻)	D

[†] From least-squares fit of levels and gammas in (HI,xn γ).

[‡] From γ -ray multiplicities, coincidence data, and analysis of rotational structure in (HI,xn γ).

Band(A): 5/2(523) band, $\alpha=+1/2$.

@ Band(B): 5/2(523) band, $\alpha=-1/2$.

& Band(C): 5/2(642) band, $\alpha=+1/2$.

^a Band(D): 5/2(642) band, $\alpha=-1/2$.

Adopted Levels, Gammas (continued)

$\gamma(^{173}\text{Os})$

All γ -ray properties are from (HI,xn γ), except where noted.

$E_i(\text{level})$	J_i^π	E_γ	I_γ^\dagger	E_f	J_f^π	Mult.	δ	α^\ddagger	Comments
91.6	7/2 ⁻	91.6 1	100	0.0	5/2 ⁻	M1+E2	0.30 16	7.35 11	δ : from $\alpha(\text{K})\text{exp}=5.7 4$ in ¹⁷³ Ir ϵ decay (2.20 s) (1992Sc16). B(E1)(W.u.) $<4.3\times 10^{-5}$
141.2	(9/2 ⁺)	49.6 2	100	91.6	7/2 ⁻	E1		0.518	
219.6	9/2 ⁻	128.0 1	100 7	91.6	7/2 ⁻	M1+E2		2.3 6	E_γ : from ¹⁷³ Ir ϵ decay (2.20 s), ¹⁷³ Ir ϵ decay (9.0 s). $\delta=-2.7 +11-27$ or $-0.16 +17-21$. α : brackets combined range for M1 and E2.
		219.6 1	66 6	0.0	5/2 ⁻	E2		0.246	
310	(9/2 ⁻)	218 [#] 1	<75	91.6	7/2 ⁻				
		310 1	100 25	0.0	5/2 ⁻				
373.9+x	(17/2 ⁺)	232.7 1	100	141.2+x	(13/2 ⁺)	E2		0.204	
388.0	11/2 ⁻	168.4 1	35.8 23	219.6	9/2 ⁻	M1+E2	-0.63 +13-52	1.12 20	
		218.2 5	11.9 14	169.8					
		296.4 1	100 7	91.6	7/2 ⁻	E2		0.0956	
406.1+x	(15/2 ⁺)	218.6 1	72 5	187.5+x	(11/2 ⁺)	E2		0.250	
		264.9 1	100 6	141.2+x	(13/2 ⁺)	M1		0.375	
535.1	13/2 ⁻	147.0 5	5.3 11	388.0	11/2 ⁻	M1		1.93	
		225 1	9.4 15	310	(9/2 ⁻)	E2		0.227	
		315.5 1	100 4	219.6	9/2 ⁻	E2		0.0795	
721.8	15/2 ⁻	186.7 5	5.5 13	535.1	13/2 ⁻				
		265.3 1	12.6 11	456.5					
		333.8 1	100 5	388.0	11/2 ⁻	E2		0.0675	
764.1+x	(21/2 ⁺)	390.2 1	100	373.9+x	(17/2 ⁺)	E2		0.0436	
769.7+x	(19/2 ⁺)	363.6 1	100 6	406.1+x	(15/2 ⁺)	E2		0.0530	
		395.8 1	41 4	373.9+x	(17/2 ⁺)	(M1)		0.127	
890.5	17/2 ⁻	133.3		757.2					
		168.6 5	2.8 6	721.8	15/2 ⁻				
		355.4 1	100 3	535.1	13/2 ⁻	E2		0.0565	
1094.3	19/2 ⁻	203.6 5	3.4 10	890.5	17/2 ⁻				
		372.5 1	100 5	721.8	15/2 ⁻	E2		0.0495	
1215.4+x	(23/2 ⁺)	445.6 1	100 7	769.7+x	(19/2 ⁺)	E2		0.0306	
		451.4 1	18.6 24	764.1+x	(21/2 ⁺)	M1		0.0896	
1249.2+x	(25/2 ⁺)	485.1 1	100	764.1+x	(21/2 ⁺)	E2		0.0247	
1290.9	21/2 ⁻	400.4 1	100	890.5	17/2 ⁻	E2		0.0407	
1519.5	23/2 ⁻	425.2 1	100	1094.3	19/2 ⁻	E2		0.0346	
1717.9+x	(27/2 ⁺)	468.6 1	14.5 16	1249.2+x	(25/2 ⁺)	M1		0.0813	
		502.6 1	100 7	1215.4+x	(23/2 ⁺)	E2		0.0227	
1740.1	25/2 ⁻	449.2 1	100	1290.9	21/2 ⁻	E2		0.0300	
1785.7+x	(29/2 ⁺)	536.5 1	100	1249.2+x	(25/2 ⁺)	E2		0.0193	
1997.1	27/2 ⁻	477.6 1	100	1519.5	23/2 ⁻	E2		0.0257	
2235.1	29/2 ⁻	495.0 1	100	1740.1	25/2 ⁻	E2		0.0235	

Adopted Levels, Gammas (continued)

$\gamma(^{173}\text{Os})$ (continued)

<u>E_i(level)</u>	<u>J^{π}_i</u>	<u>E_{γ}</u>	<u>I_{γ}</u> [†]	<u>E_f</u>	<u>J^{π}_f</u>	<u>Mult.</u>	<u>α^{\ddagger}</u>
2264.8		524.7	100	1740.1	25/2 ⁻		
2272.4+x	(31/2 ⁺)	486.8 5	12 4	1785.7+x	(29/2 ⁺)		
		554.5 1	100 9	1717.9+x	(27/2 ⁺)	E2	0.0179
2359.2+x	(33/2 ⁺)	573.4 1	100	1785.7+x	(29/2 ⁺)	E2	0.0165
2523.3	31/2 ⁻	526.2 1	100	1997.1	27/2 ⁻	E2	0.0203
2769.3	33/2 ⁻	534.2 1	100	2235.1	29/2 ⁻	E2	0.0195
2878.8+x	(35/2 ⁺)	519.2 5	11 4	2359.2+x	(33/2 ⁺)	M1	0.0624
		606.4 1	100 9	2272.4+x	(31/2 ⁺)	E2	0.0145
2919?		684 [#] 1	100	2235.1	29/2 ⁻		
2969.0+x	(37/2 ⁺)	609.8 1	100	2359.2+x	(33/2 ⁺)	E2	0.0143
3087.5	35/2 ⁻	564.2 1	100	2523.3	31/2 ⁻	E2	0.0172
3148?		625 [#] 1	100	2523.3	31/2 ⁻		
3336.8	37/2 ⁻	567.5 1	100	2769.3	33/2 ⁻	E2	0.0169
3444?		525 [#] 1	91 9	2919?			
		675 [#] 1	100 9	2769.3	33/2 ⁻		
3536.9+x	(39/2 ⁺)	658.1 1	100	2878.8+x	(35/2 ⁺)	E2	0.0121
3616.2+x	(41/2 ⁺)	647.2 1	100	2969.0+x	(37/2 ⁺)	E2	0.0125
3683.5	39/2 ⁻	596.0 1	100	3087.5	35/2 ⁻	E2	0.0151
3751?		603 [#] 1	100 13	3148?			
		664 [#] 1	46 7	3087.5	35/2 ⁻		
3950.4	41/2 ⁻	613.6 1	100	3336.8	37/2 ⁻	E2	0.0141
4064?		620 [#] 1	100	3444?			
4243.8+x	(43/2 ⁺)	706.9 1	100	3536.9+x	(39/2 ⁺)	(E2)	0.0103
4305.4+x	(45/2 ⁺)	689.2 1	100	3616.2+x	(41/2 ⁺)	E2	0.0109
4335.2	43/2 ⁻	651.7 1	100	3683.5	39/2 ⁻	E2	0.0123
4418?		667 [#] 1	100	3751?			
4618.6	45/2 ⁻	668.2 1	100	3950.4	41/2 ⁻	E2	0.0117
4727?		663 [#] 1	100	4064?			
4994.6+x	(47/2 ⁺)	750.8 1	100	4243.8+x	(43/2 ⁺)	(E2)	0.00906
5023.6	(47/2 ⁻)	688.4 1	100	4335.2	43/2 ⁻		
5042.2+x	(49/2 ⁺)	736.8 1	100	4305.4+x	(45/2 ⁺)	E2	0.00943
5315.9	(49/2 ⁻)	697.3 1	100	4618.6	45/2 ⁻	(E2)	0.0106
5725	(51/2 ⁻)	701 1	100	5023.6	(47/2 ⁻)	E2	0.0105
5782.1+x	(51/2 ⁺)	787.5 5	100	4994.6+x	(47/2 ⁺)		
5824.8+x	(53/2 ⁺)	782.6 1	100	5042.2+x	(49/2 ⁺)		
6018.6	(53/2 ⁻)	702.7 1	100	5315.9	(49/2 ⁻)		
6436	(55/2 ⁻)	711 1	100	5725	(51/2 ⁻)		
6605+x	(55/2 ⁺)	823 1	100	5782.1+x	(51/2 ⁺)		
6645+x	(57/2 ⁺)	820 1	100	5824.8+x	(53/2 ⁺)	(E2)	0.00752
6754	(57/2 ⁻)	735 1	100	6018.6	(53/2 ⁻)		
7166	(59/2 ⁻)	730 1	100	6436	(55/2 ⁻)		

Adopted Levels, Gammas (continued)

$\gamma(^{173}\text{Os})$ (continued)

<u>$E_i(\text{level})$</u>	<u>J_i^π</u>	<u>E_γ</u>	<u>I_γ^\dagger</u>	<u>E_f</u>	<u>J_f^π</u>
7496+x	(61/2 ⁺)	851 1	100	6645+x	(57/2 ⁺)
7541	(61/2 ⁻)	787 1	100	6754	(57/2 ⁻)

[†] Relative photon branching from each level.

[‡] Total theoretical internal conversion coefficients, calculated using the BrIcc code ([2008Ki07](#)) with Frozen orbital approximation based on γ -ray energies, assigned multiplicities, and mixing ratios, unless otherwise specified.

[#] Placement of transition in the level scheme is uncertain.

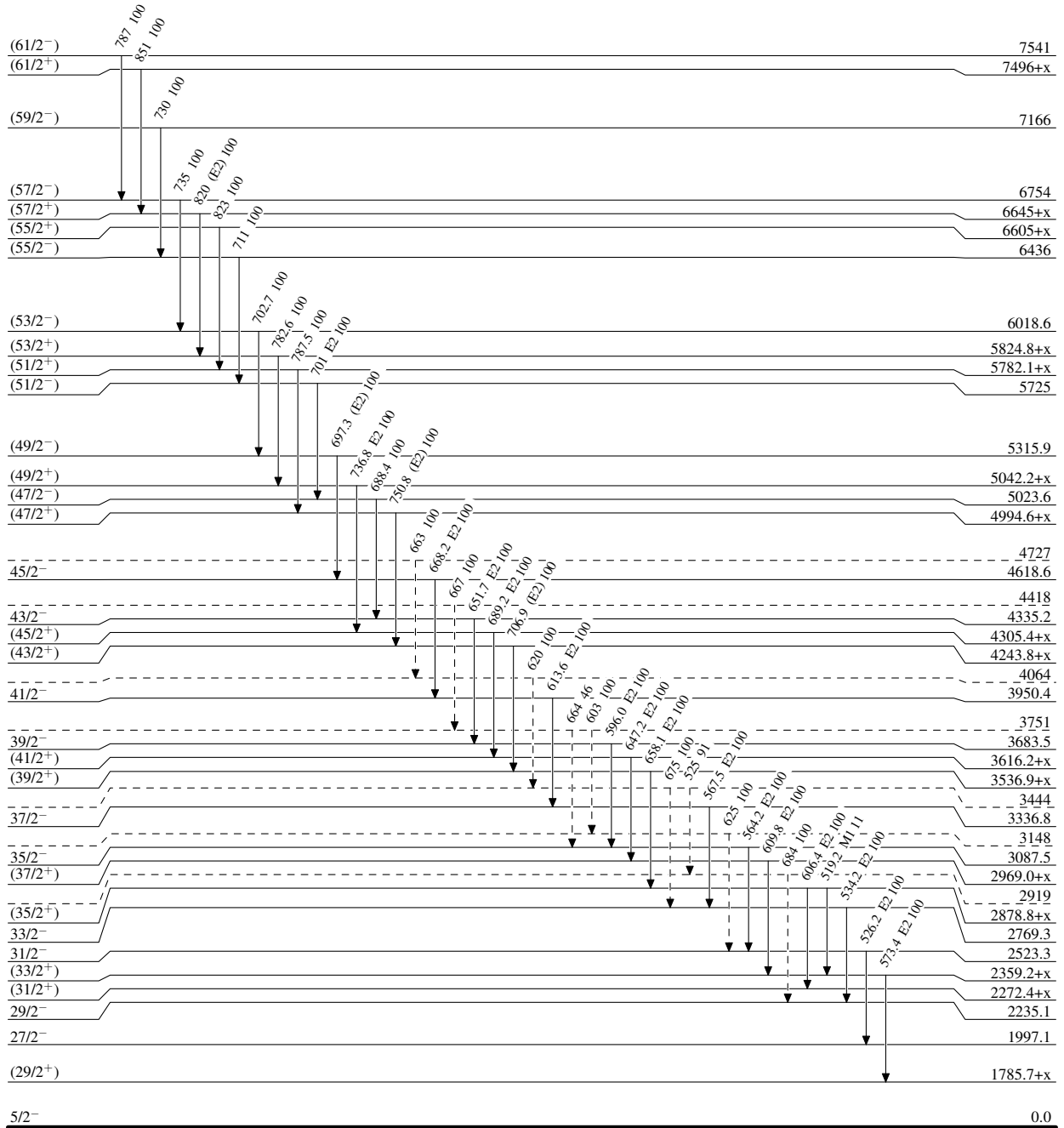
Adopted Levels, Gammas

Legend

Level Scheme

Intensities: Relative photon branching from each level

-----▶ γ Decay (Uncertain)

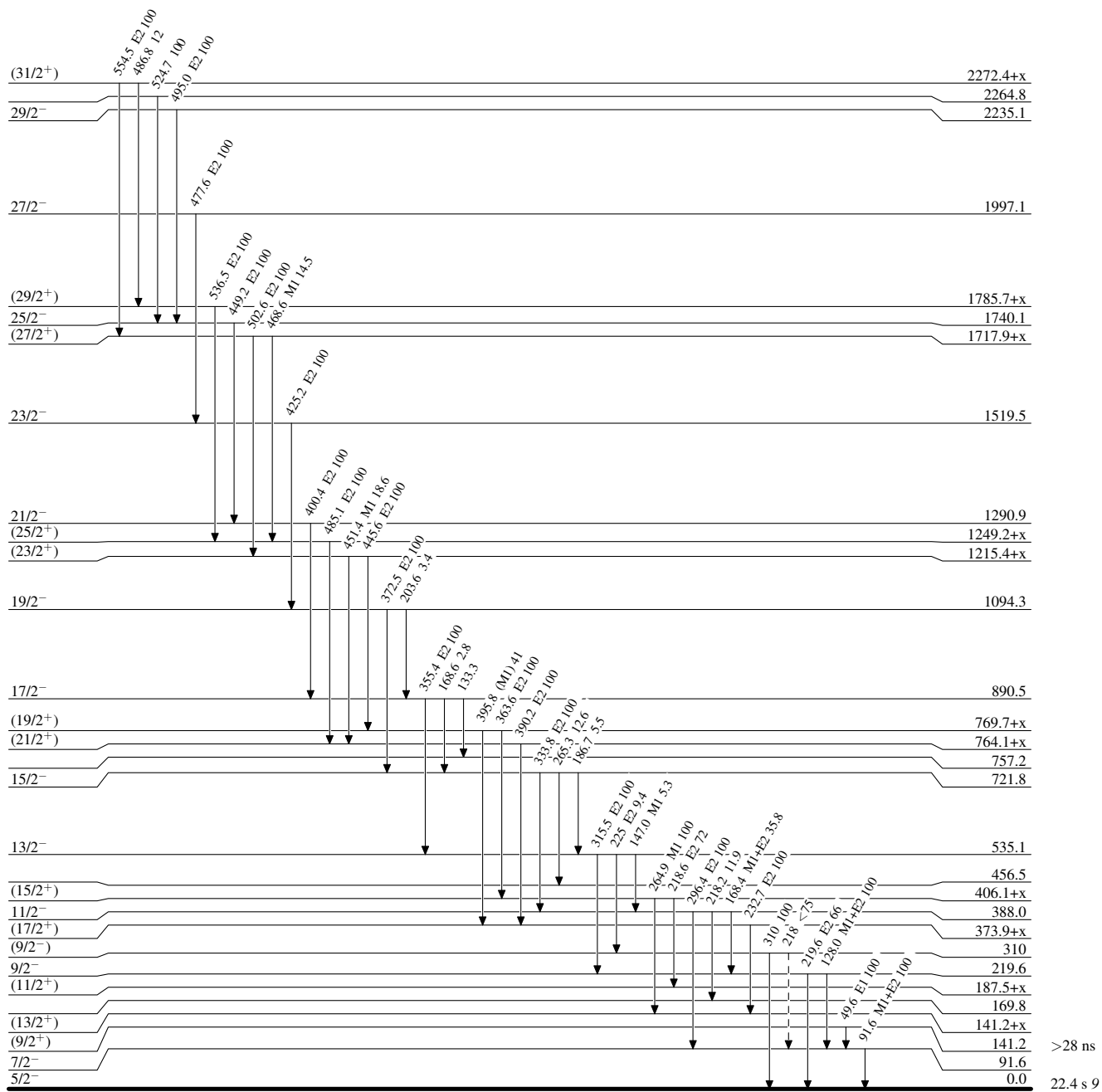


Adopted Levels, Gammas

Legend

Level Scheme (continued)

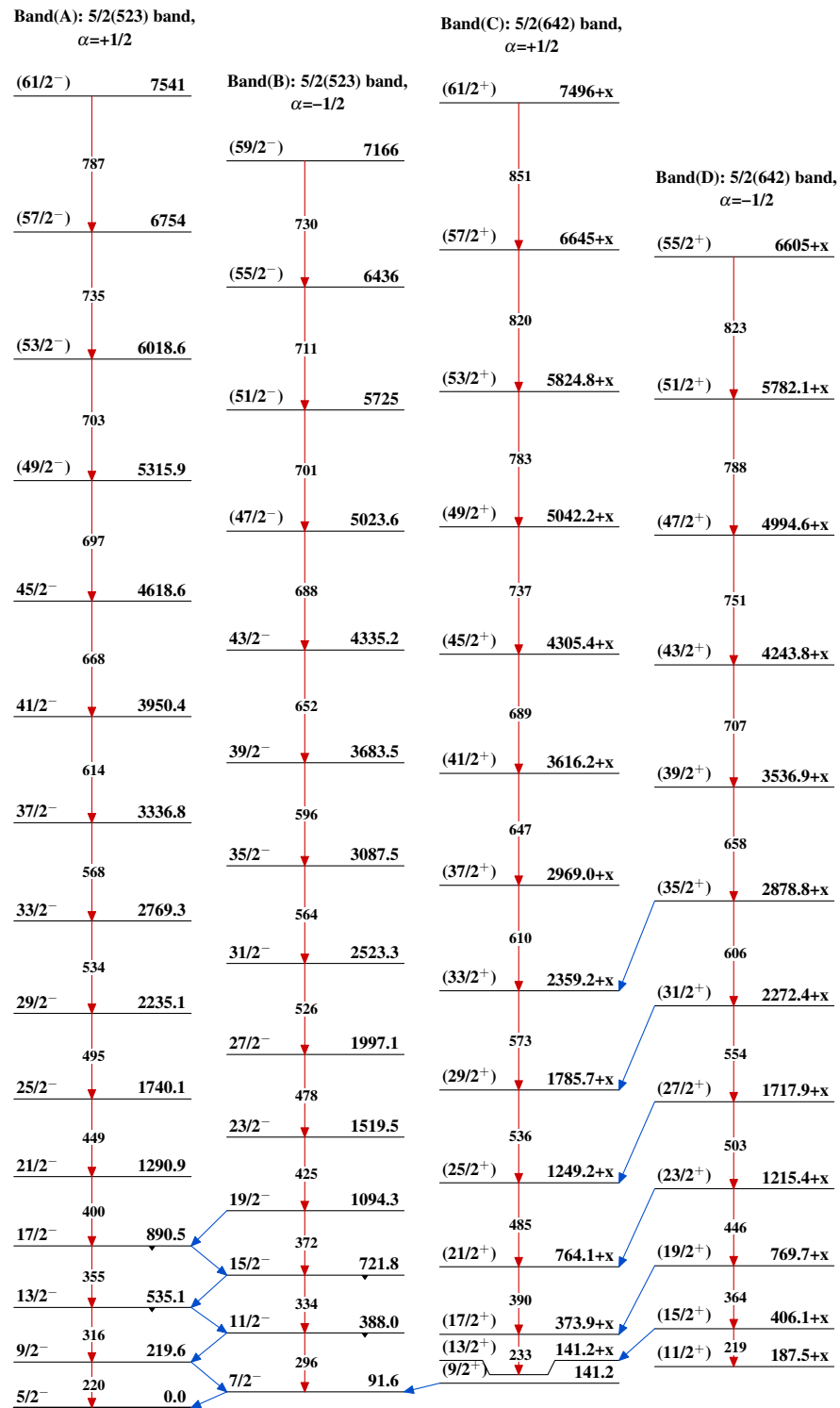
Intensities: Relative photon branching from each level

-----▶ γ Decay (Uncertain) $^{173}_{76}\text{Os}_{97}$

>28 ns

22.4 s 9

Adopted Levels, Gammas

 $^{173}_{76}\text{Os}_{97}$