^{192}Os(p,3nγ),(d,4nγ) 2000Ga03

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh, [1] and Jun Chen[2]	NDS 169, 1 (2020)	15-Oct-2020

2000Ga03: two measurements were performed: γ-ray and conversion electron measurements. In the measurement of ^{192}Os(p,3nγ), E=18-31 MeV proton beams were produced from the Philips variable-energy cyclotron of the Paul Scherrer Institute (PSI) in Switzerland; targets were 99.0% enriched ^{192}Os metal on kapton foils; γ rays were detected with the Fribourg anti-Compton spectrometers utilizing Ge detectors; measured Eγ, Iγ, $\gamma\gamma$-coin, $\gamma(\theta)$, excitation functions. In the measurement of ^{192}Os(d,4n), E=27.8 MeV deuteron beam from the isochronous cyclotron at the Institut fur Strahlen and Kernphysik (ISKP) of the University of Bonn; conversion electrons were momentum-analyzed with a double-orange iron-free spectrometer and detected with a plastic scintillator and a second smaller orange spectrometer; measured E(ce), I(ce), ce-ce(t). Deduced levels, J, π, half-lives, conversion coefficients, γ-ray multipolarities. Comparisons with two quasiparticle plus rotor model calculations.

See also 1996Ga30 in ^{190}Ir IT decay for studies of isomeric levels in ^{190}Ir populated via the same reactions.

All data are from 2000Ga03, unless otherwise noted.

^{190}Ir Levels

A 90 ns *3* isomer is indicated in (149γ)(beam pulse)(t) decay curve in Fig. 4 of 2000Ga03. Further in delayed $\gamma\gamma$-coin spectrum of Fig. 4 in 2000Ga03 showed a cascade of 82.6γ and 148.7γ, with the latter lying below the 82.6-keV transition. This isomer and decay scheme connected with it are not shown by 2000Ga03. Also note that 82.6-keV transition is assigned as a g.s. transition by the authors with a statement that a major fraction of its intensity remains unplaced.

E(level)[†]	J^{π}[‡]	$T_{1/2}$	Comments
0.0[#]	4^-		J^{π}: from the Adopted Levels, also determined in 1996Ga30.
0+x			
22.46[e] *4*	6^-		
26.1[g] *10*	1^-		
36.154[@] *25*	4^+		
82.594[f] *20*	3^-	6 ns *2*	$T_{1/2}$: centroid-shift method. Configuration=π3/2[402]-ν1/2[510], $K^{\pi}=1^-$ and configuration=π3/2[402]+ν3/2[512] for a doublet (1995Ga04).
83.3[g] *10*	2^-		
138.116[#] *17*	5^-		
144.1 *10*			
148.696+x *20*		90 ns *3*	%IT=100 $T_{1/2}$: (beam pulse)(149γ)(t) (2000Ga03).
168.38[f] *3*	4^-		
170.53[@] *3*	5^+		
171.53[a] *3*	6^+	3.73 ns *5*	$T_{1/2}$: from (ce)ce(t). Other: 3.2 ns *10* from centroid-shift method.
199.0[g] *10*	3^-		
210.3			
227.68 *4*	7^+		
231.3+x			In delayed $\gamma\gamma$-coin spectrum of Fig. 6 in 2000Ga03 showed a cascade of 82.6γ and 148.7γ, with the latter lying below the 82.6-keV transition. This isomer and decay scheme connected with it are not shown by 2000Ga03. Also note that 82.6-keV transition is assigned as a g.s. transition by 2000Ga03 with a statement that a major fraction of its intensity remains unplaced.
232.83[e] *5*	7^-		
287.74[@] *3*	6^+		
314.10? *4*	(4^+)		
317.56[f] *4*	5^-		
332.41[c] *3*	6^+		

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^{192}Os(p,3nγ),(d,4nγ) 2000Ga03 (continued)

^{190}Ir Levels (continued)

E(level)[†]	Jπ[‡]	E(level)[†]	Jπ[‡]	E(level)[†]	Jπ[‡]	E(level)[†]	Jπ[‡]
337.992[#] *18*	6⁻	479.52 *5*		680.9		867.68 *21*	
351.44 *3*	6⁺	501.19[b] *4*	6⁺	693.02 *20*		867.82 *5*	
369.38[a] *3*	7⁺	528.36 *7*		708.55[&] *15*		917.68 *21*	
385.97[b] *4*	5⁺	541.44 *4*	7⁺	719.32 *4*	(8⁺)	942.12[c] *6*	(9⁺)
404.02 *3*	6⁻	542.9[g] *10*	5⁻	722.20[a] *4*	9⁺	948.85[d] *5*	10⁺
415.09 *4*	5⁻	557.12 *11*		727.4 *10*	(6⁻)	966.78 *21*	
431.62 *5*		566.66[#] *8*	7⁻	738.06[e] *5*	9⁻	1005.5[g] *10*	7⁻
440.95[@] *4*	7⁺	574.37 *4*	8⁺	747.07 *15*		1017.15 *5*	
442.78 *4*	(6⁻)	577.49? *5*	(5⁺)	753.82 *5*	(8⁺)	1035.49[e] *8*	10⁻
444.48[d] *4*	8⁺	588.68[c] *4*	7⁺	754.21 *5*	(8⁺)	1045.59[&] *15*	
447.5 *10*	(5⁻)	603.17[f] *4*	6⁻	776.17[b] *5*	7⁺	1099.08 *5*	
448.51[&] *3*	7⁺	655.64[@] *21*	8⁺	799.67 *15*		1101.35[a] *21*	(11⁺)
449.57 *4*	6⁻	657.29 *11*		807.39 *5*		1113.21[b] *5*	(8⁺)
452.43 *21*		661.45 *5*	7⁻	831.56 *6*		1175.79 *9*	
463.62[a] *4*	8⁺	678.59 *4*		834.99[f] *5*	7⁻	1180.98[d] *11*	(11⁺)
475.10[e] *5*	8⁻	680.47[d] *4*	9⁺	851.01[@] *21*	(9⁺)		

[†] From a least-squares fit to γ-ray energies.
[‡] As proposed by 2000Ga03, based on γ(θ) data (to differentiate between ΔJ=0 and ΔJ=1 transitions) and slopes of γ-ray relative excitation function (to distinguish between J+1 to J and J-1 to J transitions) as well as assignments in 1996Ga30 by the same author, unless otherwise noted. When considered in the Adopted Levels, these assignments are placed in parenthesis by evaluators if there is no firm evidence.
[#] Band(A): K^π=(4⁻),ν9/2[505]-π1/2[400].
[@] Band(B): K^π=(4⁺),ν11/2[615]-π3/2[402].
[&] Band(C): Band based on 7⁺.
[a] Band(D): K^π=(6⁺),π1/2[400]+ν11/2[615].
[b] Band(E): K^π=(5⁺),ν11/2[615]-π1/2[400].
[c] Band(F): Band based on 6⁺.
[d] Band(G): K^π=(7⁺),π3/2[402]+ν11/2[615].
[e] Band(H): Band based on 6⁻. Possible configuration=π3/2[402]⊗ν9/2[505].
[f] Band(I): Band based on 3⁻.
[g] Band(J): K^π=(1)⁻,π3/2[402]-ν1/2[510].

γ(^{190}Ir)

Eγ	Iγ[‡]	Ei(level)	J^π_i	Ef	J^π_f	Mult.[#]	Comments
22.45[@]		22.46	6⁻	0.0	4⁻	E2[@]	
26.1[@] *1*		26.1	1⁻	0.0	4⁻	M3[@]	
36.155 *25*	1.41×10² *5*	36.154	4⁺	0.0	4⁻		
[x]46.62 *6*	5.2 *4*						
56.124 *25*	9.8 *5*	227.68	7⁺	171.53	6⁺	D	A_2=−0.49 *20*; A_4=+0.05 *26* Additional information 1.
57.143[†] *22*	12.2 *5*	83.3	2⁻	26.1	1⁻	D	A_2=−0.29 *9*; A_4=−0.04 *12* Eγ: level energy difference=57.228.
[x]69.12 *3*	2.74 *23*						A_2=−0.06 *19*; A_4=+0.2 *3*
82.594 *20*	31.9 *6*	82.594	3⁻	0.0	4⁻	D	A_2=−0.070 *17*; A_4=−0.044 *23*

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^{192}Os(p,3nγ),(d,4nγ) 2000Ga03 (continued)

γ(^{190}Ir) (continued)

E_γ	I_γ‡	E_i(level)	J_i^π	E_f	J_f^π	Mult.#	Comments
							I_γ: 2000Ga03 pointed out that a large fraction of the intensity of this γ ray remains unassigned. One other component is placed above the 148.7+x level, as suggested by γγ-coin spectrum in Fig. 6 of 2000Ga03.
82.6		231.3+x		148.696+x			E_γ: rounded energy for second component of 82.594-keV γ. See also comment for 231.3+x level.
^{x}84.49 *4*	1.22 *15*						A_2=+1.0 *3*; A_4=+0.1 *4*
^{x}85.00 *4*	1.26 *14*						A_2=+1.0 *3*; A_4=−0.5 *4*
85.790 *21*	4.39 *10*	168.38	4^-	82.594	3^-	D	A_2=−0.14 *4*; A_4=−0.07 *6*
^{x}91.566 *22*	1.92 *8*						A_2=−0.09 *10*; A_4=−0.03 *14*
94.257 *22*	2.05 *6*	463.62	8^+	369.38	7^+		A_2=+0.15 *6*; A_4=−0.11 *9*
^{x}100.000 *23*	1.32 *6*						A_2=−0.16 *11*; A_4=−0.03 *15*
^{x}105.12 *4*	0.46 *5*					D	A_2=−0.46 *25*; A_4=−0.3 *4*
^{x}109.841 *22*	2.44 *7*						A_2=+0.09 *5*; A_4=−0.03 *7*
^{x}112.31 *3*	0.92 *5*					D	A_2=−0.21 *14*; A_4=+0.01 *19*
115.246 *25*	3.11 *15*	501.19	6^+	385.97	5^+	D	A_2=−0.36 *9*; A_4=+0.01 *14*
115.73 *3*	4.35 *15*	199.0	3^-	83.3	2^-		A_2=+0.15 *7*; A_4=−0.02 *9*
116.245 *22*	4.11 *19*	287.74	6^+	171.53	6^+	D	A_2=−0.10 *9*; A_4=−0.12 *14* Negative A_2 is inconsistent with 6^+ to 6^+, dipole transition.
117.290† *21*	4.34 *11*	287.74	6^+	170.53	5^+		A_2=+0.09 *4*; A_4=+0.01 *6* E_γ: level energy difference=117.209.
118.132† *20*	5.87 *13*	144.1		26.1	1^-	D	A_2=−0.12 *3*; A_4=−0.04 *4* E_γ: level energy difference=118.061.
^{x}120.427 *23*	1.35 *5*						A_2=−0.09 *8*; A_4=+0.10 *11*
^{x}122.503 *25*	0.91 *5*					D	A_2=−0.20 *13*; A_4=+0.05 *17*
^{x}125.14 *4*	1.13 *14*						A_2=−0.2 *3*; A_4=0.0 *4*
^{x}125.80 *5*	0.61 *9*						A_2=+0.1 *3*; A_4=−0.7 *6*
^{x}127.388 *21*	2.61 *7*					D	A_2=−0.29 *5*; A_4=−0.16 *7*
^{x}131.20 *3*	0.86 *5*					D	A_2=−0.51 *17*; A_4=−0.14 *23*
132.005 *21*	4.77 *11*	449.57	6^-	317.56	5^-	D	A_2=−0.32 *3*; A_4=−0.08 *5*
134.363 *20*	30.0 *6*	170.53	5^+	36.154	4^+	D	A_2=−0.337 *11*; A_4=+0.020 *17*
135.363 *20*	100.0 *19*	171.53	6^+	36.154	4^+		A_2=+0.018 *15*; A_4=−0.062 *21*
138.093 *20*	14.2 *3*	138.116	5^-	0.0	4^-		A_2=+0.039 *23*; A_4=−0.08 *3*
141.694 *21*	8.28 *20*	369.38	7^+	227.68	7^+	D	A_2=−0.07 *4*; A_4=−0.08 *5*
^{x}143.088 *23*	1.41 *7*						A_2=−0.12 *11*; A_4=+0.07 *15*
^{x}144.96 *4*	0.39 *6*					D	A_2=−0.7 *5*; A_4=−0.4 *6*
148.696 *20*	21.0 *4*	148.696+x		0+x		D	A_2=−0.161 *18*; A_4=−0.02 *3* (149γ)(beam pulse)(t) in Fig. 6 of 2000Ga03 shows a decay time of 90 ns *3*, with a prompt and a delayed component for the doublet at 149 keV, the other (prompt) γ (Eγ=149.196) is placed from 317.6 level.
149.196 *21*	9.94 *25*	317.56	5^-	168.38	4^-	D	A_2=−0.12 *4*; A_4=−0.09 *6*
153.203 *20*	7.89 *16*	440.95	7^+	287.74	6^+	D	A_2=−0.378 *23*; A_4=−0.023 *31*
^{x}155.08 *3*	0.80 *19*						
^{x}157.020 *21*	2.69 *9*					D	A_2=−0.13 *7*; A_4=−0.03 *10*
160.904 *20*	15.2 *3*	332.41	6^+	171.53	6^+		A_2=+0.078 *13*; A_4=−0.038 *18*
161.891 *22*	5.57 *17*	332.41	6^+	170.53	5^+	D	A_2=−0.35 *6*; A_4=0.00 *8*
162.6 *1*		566.66	7^-	404.02	6^-		
^{x}164.127 *23*	1.78 *6*					D	A_2=−0.23 *7*; A_4=+0.04 *9*
^{x}166.23 *3*	0.88 *5*						A_2=−0.15 *14*; A_4=+0.05 *19*
^{x}170.667 *24*	1.43 *7*						A_2=+0.06 *11*; A_4=+0.43 *15*
^{x}172.162 *24*	2.95 *15*						A_2=+0.08 *12*; A_4=+0.25 *17*
172.864 *21*	11.52 *25*	199.0	3^-	26.1	1^-		A_2=+0.047 *23*; A_4=+0.06 *4*
^{x}173.46 *5*	1.64 *18*					D	A_2=−0.25 *19*; A_4=−0.04 *32*
^{x}175.115 *21*	8.04 *23*						A_2=+0.30 *5*; A_4=−0.01 *8*

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^{192}Os(p,3nγ),(d,4nγ) 2000Ga03 (continued)

γ(^{190}Ir) (continued)

E_γ	I_γ ‡	E_i(level)	J_i^π	E_f	J_f^π	Mult.#	Comments
x177.51 *5*	5.0 *9*						
179.880 *21*	8.16 *20*	351.44	6+	171.53	6+		A_2=+0.13 *4*; A_4=−0.08 *6*
180.893 *22*	3.18 *11*	351.44	6+	170.53	5+	D	A_2=−0.42 *8*; A_4=+0.03 *10*
x181.745 *21*	5.68 *12*					D	A_2=−0.10 *3*; A_4=−0.05 *4*
x183.92 *6*	0.62 *7*						A_2=−0.3 *3*; A_4=0.0 *4*
x184.74 *3*	2.92 *19*						A_2=−0.18 *12*; A_4=−0.38 *20*
188.062 *21*	3.75 *14*	603.17	6−	415.09	5−		A_2=−0.03 *9*; A_4=−0.31 *12*
189.994 *22*	2.89 *8*	541.44	7+	351.44	6+	D	A_2=−0.43 *5*; A_4=−0.09 *7*
x194.34 *3*	0.88 *7*					D	A_2=−0.44 *20*; A_4=−0.2 *3*
195.361 *24*	1.71 *7*	851.01	(9+)	655.64	8+	D	A_2=−0.28 *9*; A_4=+0.14 *12*
x197.270 *25*	4.52 *15*						A_2=+0.27 *7*; A_4=−0.05 *9*
197.966† *24*	15.7 *3*	369.38	7+	171.53	6+	D	A_2=−0.503 *23*; A_4=+0.08 *3* E_γ: level energy difference=197.850.
198.786& *22*	5.16& *13*	369.38	7+	170.53	5+		A_2=+0.26 *5*; A_4=−0.07 *6* γ(θ) data for doublet.
198.786& *22*	5.16& *13*	431.62		232.83	7−		A_2=+0.26 *5*; A_4=−0.07 *6* γ(θ) data for doublet.
199.853 *21*	9.01 *19*	337.992	6−	138.116	5−	D	A_2=−0.14 *3*; A_4=−0.02 *4*
205.225 *21*	17.3 *5*	227.68	7+	22.46	6−	D	A_2=−0.10 *5*; A_4=+0.02 *7*
x206.88 *4*	2.99 *19*						A_2=−0.10 *14*; A_4=−0.04 *22*
x207.61 *5*	1.76 *12*						A_2=−0.07 *15*; A_4=−0.42 *25*
209.1 *1*		541.44	7+	332.41	6+		
210.294† *21*	27.3 *5*	232.83	7−	22.46	6−	D	A_2=−0.494 *7*; A_4=−0.022 *11* E_γ: level energy difference=210.369.
211.883 *22*	2.40 *10*	661.45	7−	449.57	6−	D	A_2=−0.38 *10*; A_4=−0.18 *15*
214.47 *3*	7.63 *23*	385.97	5+	171.53	6+	D	A_2=−0.19 *6*; A_4=+0.07 *9*
214.7 *2*		655.64	8+	440.95	7+		
215.39 *3*	6.4 *3*	385.97	5+	170.53	5+		A_2=+0.42 *8*; A_4=+0.03 *12*
x215.89 *4*	5.0 *4*					D	A_2=−0.54 *14*; A_4=+0.04 *25*
216.832 *21*	24.6 *4*	444.48	8+	227.68	7+	D	A_2=−0.584 *10*; A_4=−0.046 *14*
219.6 *2*		452.43		232.83	7−		
x222.452 *22*	3.14 *8*						A_2=+0.09 *5*; A_4=−0.08 *7*
x224.386 *21*	9.87 *19*						A_2=+0.04 *3*; A_4=−0.11 *4*
x228.250 *21*	5.98 *12*					D	A_2=−0.18 *3*; A_4=−0.07 *4*
228.7 *1*		566.66	7−	337.992	6−		
229.932† *21*	5.15 *11*	678.59		448.51	7+	D	A_2=−0.09 *3*; A_4=+0.04 *5* E_γ: level energy difference=230.076.
231.823 *23*	2.52 *8*	834.99	7−	603.17	6−	D	A_2=−0.17 *7*; A_4=+0.29 *9*
x233.50 *3*	0.96 *7*					D	A_2=−0.43 *18*; A_4=+0.19 *24*
236.050 *22*	6.40 *14*	680.47	9+	444.48	8+		A_2=−0.62 *4*; A_4=−0.04 *5*
237.196 *23*	2.92 *11*	588.68	7+	351.44	6+	D	A_2=−0.17 *9*; A_4=0.00 *12*
242.195† *21*	11.50 *21*	475.10	8−	232.83	7−	D	A_2=−0.419 *21*; A_4=−0.03 *3* E_γ: level energy difference=242.272.
x244.31 *3*	2.13 *9*						A_2=+0.21 *12*; A_4=+0.17 *16*
246.692& *21*	6.99& *14*	415.09	5−	168.38	4−	D	A_2=−0.14 *3*; A_4=+0.05 *5*
246.692& *21*	6.99& *14*	479.52		232.83	7−	D	A_2=−0.14 *3*; A_4=+0.05 *5* γ(θ) data for doublet.
248.575 *21*	12.43 *22*	447.5	(5−)	199.0	3−		A_2=+0.086 *17*; A_4=−0.001 *25*
251.630 *21*	7.48 *15*	287.74	6+	36.154	4+		A_2=+0.25 *3*; A_4=+0.02 *5*
253.08 *5*	2.18 *20*	754.21	(8+)	501.19	6+		A_2=−0.54 *18*; A_4=−0.3 *3* Negative A_2 is inconsistent with (8+) to 6+, (E2) transition.
x253.46 *5*	2.59 *18*						A_2=+0.75 *17*; A_4=+0.55 *23*
x255.21 *3*	1.15 *7*						A_2=−0.19 *16*

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^{192}Os(p,3nγ),(d,4nγ) 2000Ga03 (continued)

γ(^{190}Ir) (continued)

E_γ	I_γ[‡]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[#]	Comments
256.300 22	4.16 10	588.68	7^+	332.41	6^+	D	A_2=−0.18 5; A_4=+0.01 7
258.684 22	6.95 16	722.20	9^+	463.62	8^+	D	A_2=−0.11 4; A_4=+0.02 6
260.0 2		708.55		448.51	7^+		
^{x}261.253 21	9.43 22					D	A_2=−0.29 4; A_4=0.00 6
262.957 24	9.6 5	738.06	9^-	475.10	8^-	D	A_2=−0.30 10; A_4=+0.09 16
263.39 3	5.6 6	577.49?	(5^+)	314.10?	(4^+)	D	A_2=−0.23 20; A_4=+0.1 3
265.901 22	5.98 14	404.02	6^-	138.116	5^-	D	A_2=−0.26 4; A_4=+0.02 06
268.380 25	4.09 17	948.85	10^+	680.47	9^+	D	A_2=−0.53 11; A_4=−0.22 15
270.808 24	3.72 11	719.32	(8^+)	448.51	7^+	D	A_2=−0.13 7; A_4=−0.04 10
^{x}271.642 24	4.30 12					D	A_2=−0.32 6; A_4=−0.02 9
272.0 2		747.07		475.10	8^-		
274.979 22	7.02 14	776.17	7^+	501.19	6^+	D	A_2=−0.13 3; A_4=−0.02 5
^{x}275.85 3	1.89 11						A_2=+0.06 13; A_4=+0.22 18
276.834[†] 23	4.44 12	448.51	7^+	171.53	6^+	D	A_2=−0.18 6; A_4=0.00 8 E_γ: level energy difference=276.980.
277.949[&] 21	30.1[&] 5	314.10?	(4^+)	36.154	4^+		A_2=+0.058 9; A_4=−0.039 13 γ(θ) data for doublet.
277.949[&] 21	[&]	448.51	7^+	170.53	5^+		
279.901 24	2.30 8	727.4	(6^-)	447.5	(5^-)	D	A_2=−0.39 9; A_4=−0.01 12
285.66 4	1.40 10	603.17	6^-	317.56	5^-	D	A_2=−0.23 19; A_4=−0.18 22
291.88[†] 4	3.6 3	463.62	8^+	171.53	6^+		A_2=+0.08 21; A_4=+0.01 30 E_γ: level energy difference=292.00.
292.4 1		678.59		385.97	5^+		
295.53 5	2.42 24	528.36		232.83	7^-		
^{x}296.48 5	2.36 16						A_2=+0.15 16; A_4=+0.19 23
^{x}299.776 22	20.5 4					D	A_2=−0.76 3; A_4=+0.04 4
^{x}303.87 4	2.54 12					D	A_2=−0.42 13; A_4=+0.03 15
304.66 3	2.13 14	442.78	(6^-)	138.116	5^-	D	A_2=−0.49 18; A_4=−0.32 22
^{x}308.669 25	4.37 13						A_2=+0.16 6; A_4=−0.12 9
309.71 3	2.12 10	754.21	(8^+)	444.48	8^+		A_2=−0.07 11; A_4=−0.20 16
^{x}314.04 3	3.14 10						A_2=−0.11 7; A_4=−0.1 1
^{x}316.34 4	1.57 11						
319.3 1		657.29		337.992	6^-		
324.6 2		799.67		475.10	8^-		
^{x}327.50 7	1.50 19						
330.37 4	3.11 16	831.56		501.19	6^+		
337.037[&] 23	5.91[&] 17	1045.59		708.55			A_2=+0.02 6; A_4=+0.1 1 γ(θ) data for doublet.
337.037[&] 23	5.91[&] 17	1113.21	(8^+)	776.17	7^+		A_2=+0.02 6; A_4=+0.1 1 γ(θ) data for doublet.
338.022 23	6.46 15	337.992	6^-	0.0	4^-		A_2=−0.16 4; A_4=0.00 6 Negative A_2 is inconsistent with 6^- to 4^-, E2 transition.
343.88[†] 3	7.9 3	542.9	5^-	199.0	3^-		A_2=+0.04 7; A_4=−0.23 10 E_γ: level energy difference=343.97.
^{x}345.70 4	1.72 11						
346.679 24	4.43 13	574.37	8^+	227.68	7^+	D	A_2=−0.27 6; A_4=−0.02 9
349.81 4	4.45 22	385.97	5^+	36.154	4^+	D	A_2=−0.21 12; A_4=+0.08 16
352.62[†] 3	3.65 13	722.20	9^+	369.38	7^+		A_2=+0.07 8; A_4=−0.04 11 E_γ: level energy difference=352.82.
353.44 4	1.67 14	942.12	(9^+)	588.68	7^+		A_2=+0.40 20; A_4=+0.04 28 The second placement (2000Ga03) from 722 to 369 level seems incorrect.
362.91 3	3.72 19	807.39		444.48	8^+		A_2=−0.16 13; A_4=−0.39 18
368.40 7	1.93 15	1175.79		807.39			

Continued on next page (footnotes at end of table)

^{192}Os(p,3nγ),(d,4nγ) 2000Ga03 (continued)

γ(^{190}Ir) (continued)

E_γ	I_γ[‡]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[#]	Comments
376.83 *3*	2.94 *18*	1099.08		722.20	9^+		
379.1 *2*		1101.35	(11^+)	722.20	9^+		
391.065[†] *25*	5.01 *12*	678.59		287.74	6^+		A_2=0.00 *5*; A_4=−0.05 *7* E_γ: level energy difference=390.844.
402.835 *23*	8.08 *17*	574.37	8^+	171.53	6^+		A_2=+0.13 *4*; A_4=−0.04 *5*
[x]406.0 *2*							
[x]412.44 *6*	1.64 *15*						
[x]416.976 *23*	8.78 *25*						
[x]417.8 *2*							
419.0 *1*		557.12		138.116	5^-		
423.34 *3*	3.11 *12*	867.82		444.48	8^+	D	A_2=−0.52 *10*; A_4=−0.05 *14*
[x]428.16 *4*	1.97 *15*					D	A_2=−0.50 *20*; A_4=−0.4 *3*
438.0 *2*		807.39		369.38	7^+		
[x]439.94 *5*	3.6 *3*						
442.78 *3*	3.89 *13*	1017.15		574.37	8^+		A_2=−0.06 *8*; A_4=−0.12 *11*
452.734[&†] *23*	12.20[&] *24*	475.10	8^-	22.46	6^-		A_2=+0.05 *3*; A_4=−0.09 *4* E_γ: level energy difference=452.791.
452.734[&] *23*	12.20[&] *24*	680.47	9^+	227.68	7^+		A_2=+0.05 *3*; A_4=−0.09 *4* γ(θ) data for doublet.
462.55 *3*	5.88 *17*	1005.5	7^-	542.9	5^-		A_2=+0.07 *6*; A_4=−0.13 *9*
[x]467.02 *4*	3.72 *16*						
470.6 *1*		680.9		210.3			
473.2 *2*		917.68		444.48	8^+		
480.9 *2*		708.55		227.68	7^+		
500.5 *1*		1180.98	(11^+)	680.47	9^+		
504.4 *2*		948.85	10^+	444.48	8^+		
505.23 *4*	4.60 *18*	738.06	9^-	232.83	7^-		A_2=+0.09 *10*; A_4=−0.29 *13*
514.2 *2*		747.07		232.83	7^-		
522.3 *2*		966.78		444.48	8^+		
526.14 *3*	3.72 *21*	753.82	(8^+)	227.68	7^+	D	A_2=−0.33 *14*; A_4=+0.03 *19*
[x]544.01 *4*	2.27 *15*					D	A_2=−0.47 *17*; A_4=−0.07 *22*
554.9 *2*		693.02		138.116	5^-		
560.39 *6*	1.42 *21*	1035.49	10^-	475.10	8^-		
566.8 *2*		799.67		232.83	7^-		
[x]623.02 *4*	3.94 *19*					D	A_2=−0.37 *12*; A_4=−0.43 *16*
640.0 *2*		867.68		227.68	7^+		

[†] Value from least-squares adjustment deviates from Eγ in 2000Ga03 by more than 2 standard deviations. Level-energy difference is given under comments.
[‡] From values in 2000Ga03 divided by a factor of 10, relative to I(135.6γ)=100.0.
[#] Dipole multipolarity assigned by evaluators based on negative A_2, suggesting ΔJ=1 transition. For ΔJ=0, dipole transitions, positive A_2 is expected, unless the transition has large quadrupole admixture.
[@] From the Adopted Gammas.
[&] Multiply placed with undivided intensity.
[x] γ ray not placed in level scheme.

$^{192}Os(p,3n\gamma),(d,4n\gamma)$ 2000Ga03

Level Scheme

Intensities: Relative I_γ

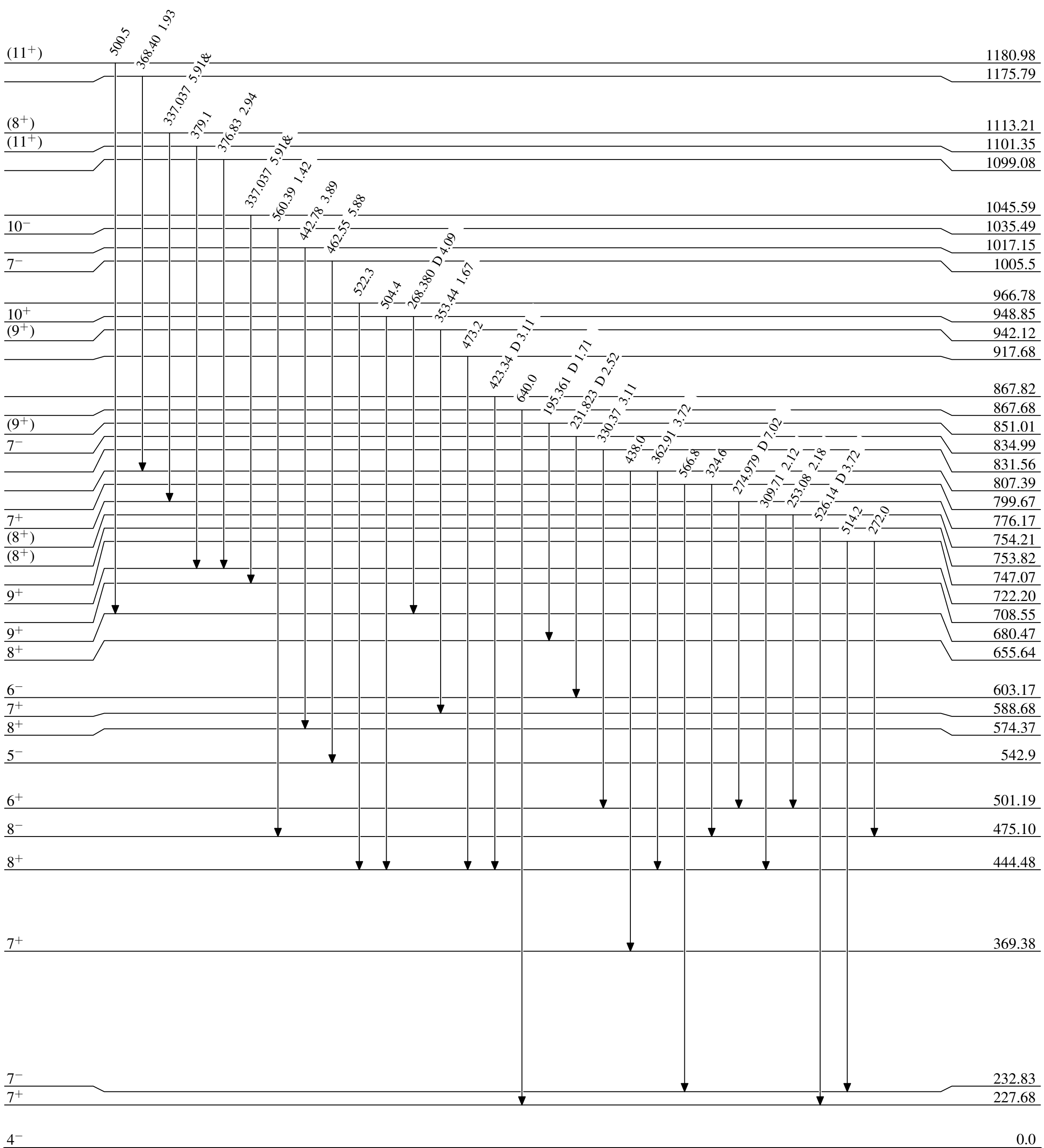
& Multiply placed: undivided intensity given

Legend

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

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

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



$^{190}_{77}Ir_{113}$

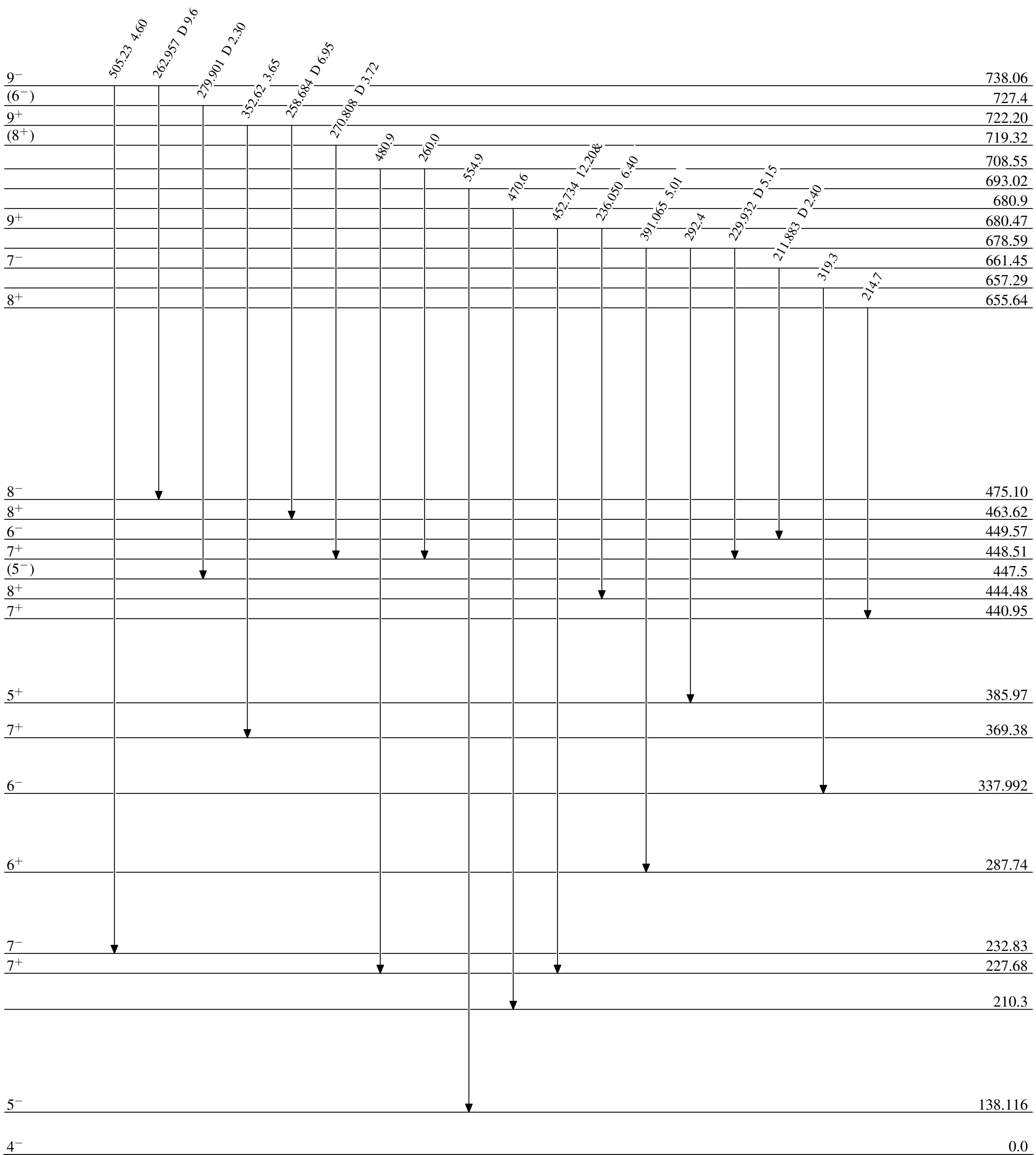
^{192}Os(p,3nγ),(d,4nγ) 2000Ga03

Level Scheme (continued)

Intensities: Relative I_γ
& Multiply placed: undivided intensity given

Legend

- $I_\gamma < 2\% \times I_\gamma^{max}$
- $I_\gamma < 10\% \times I_\gamma^{max}$
- $I_\gamma > 10\% \times I_\gamma^{max}$

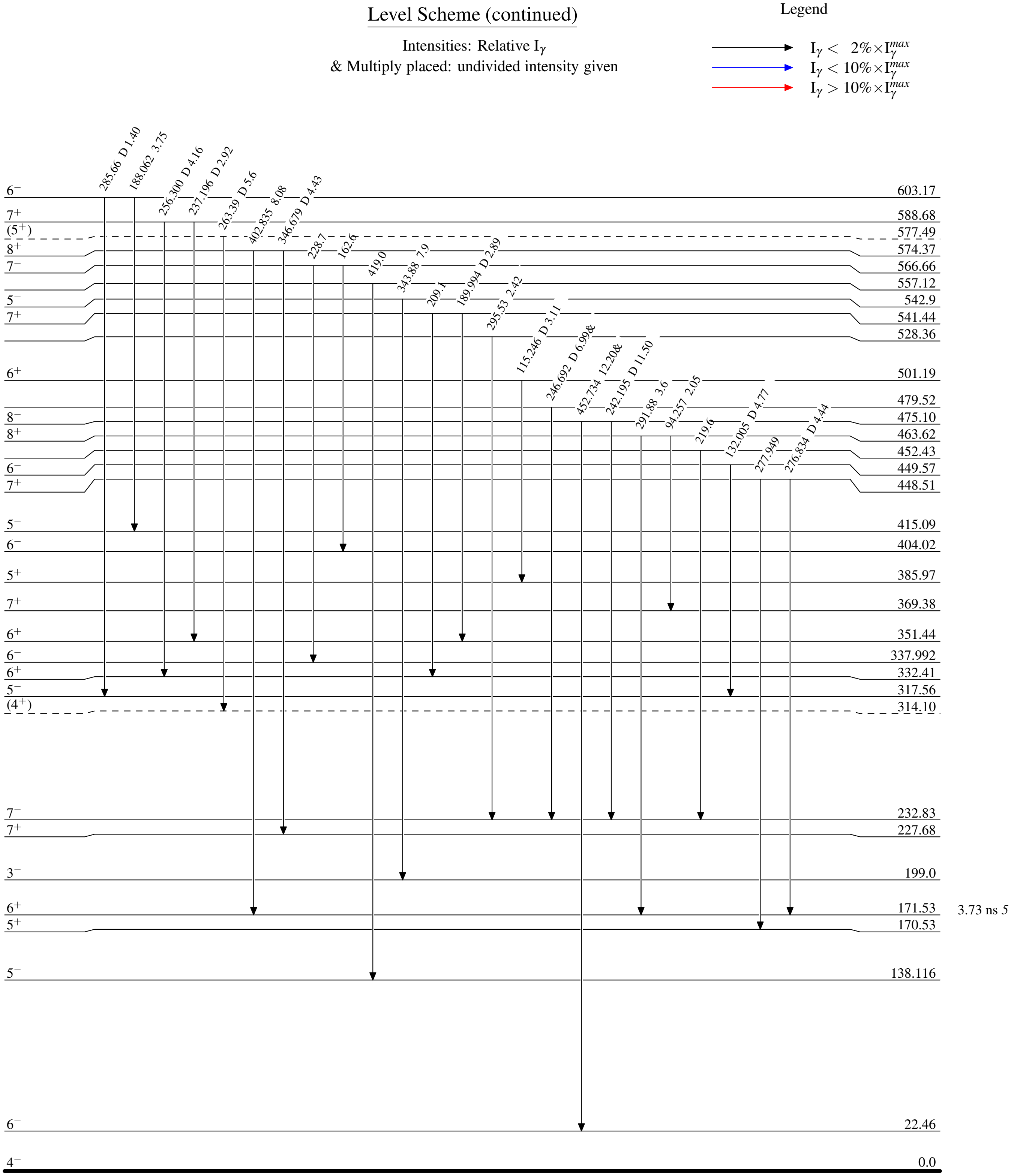


$^{190}_{77}Ir_{113}$

^{192}Os(p,3nγ),(d,4nγ) 2000Ga03

Level Scheme (continued)

Intensities: Relative I_γ
& Multiply placed: undivided intensity given



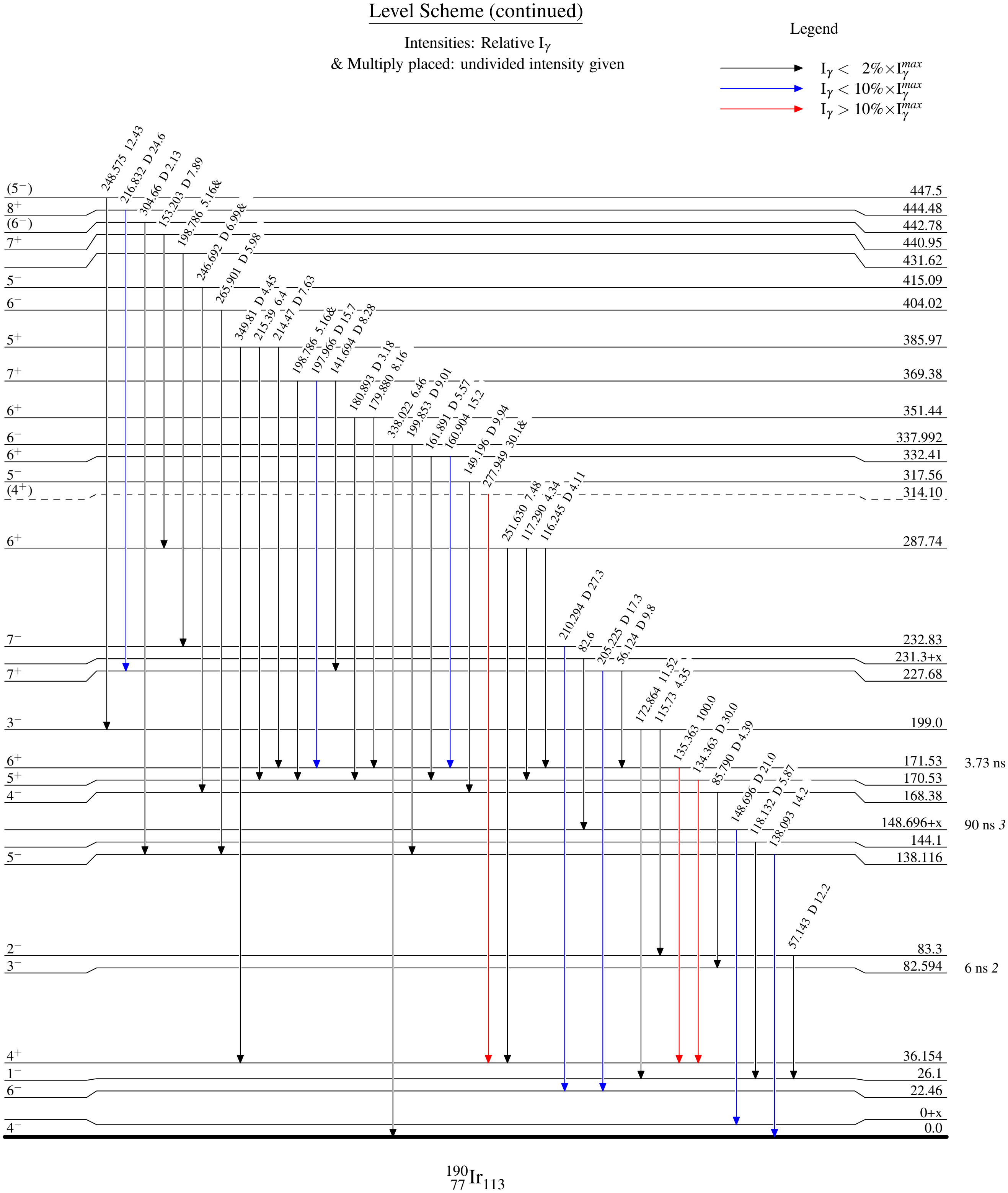
$^{190}_{77}Ir_{113}$

^{192}Os(p,3nγ),(d,4nγ) 2000Ga03

Level Scheme (continued)

Intensities: Relative I_γ

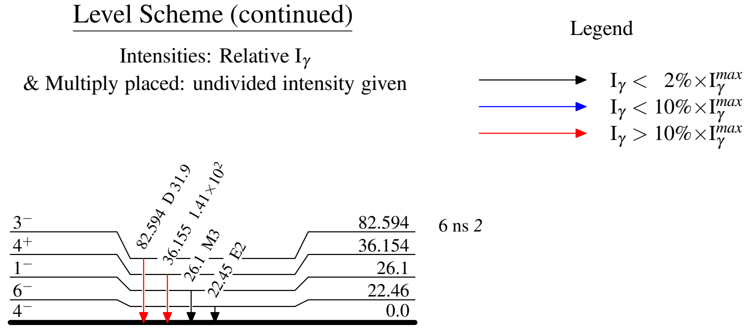
& Multiply placed: undivided intensity given



^{192}Os(p,3nγ),(d,4nγ) 2000Ga03

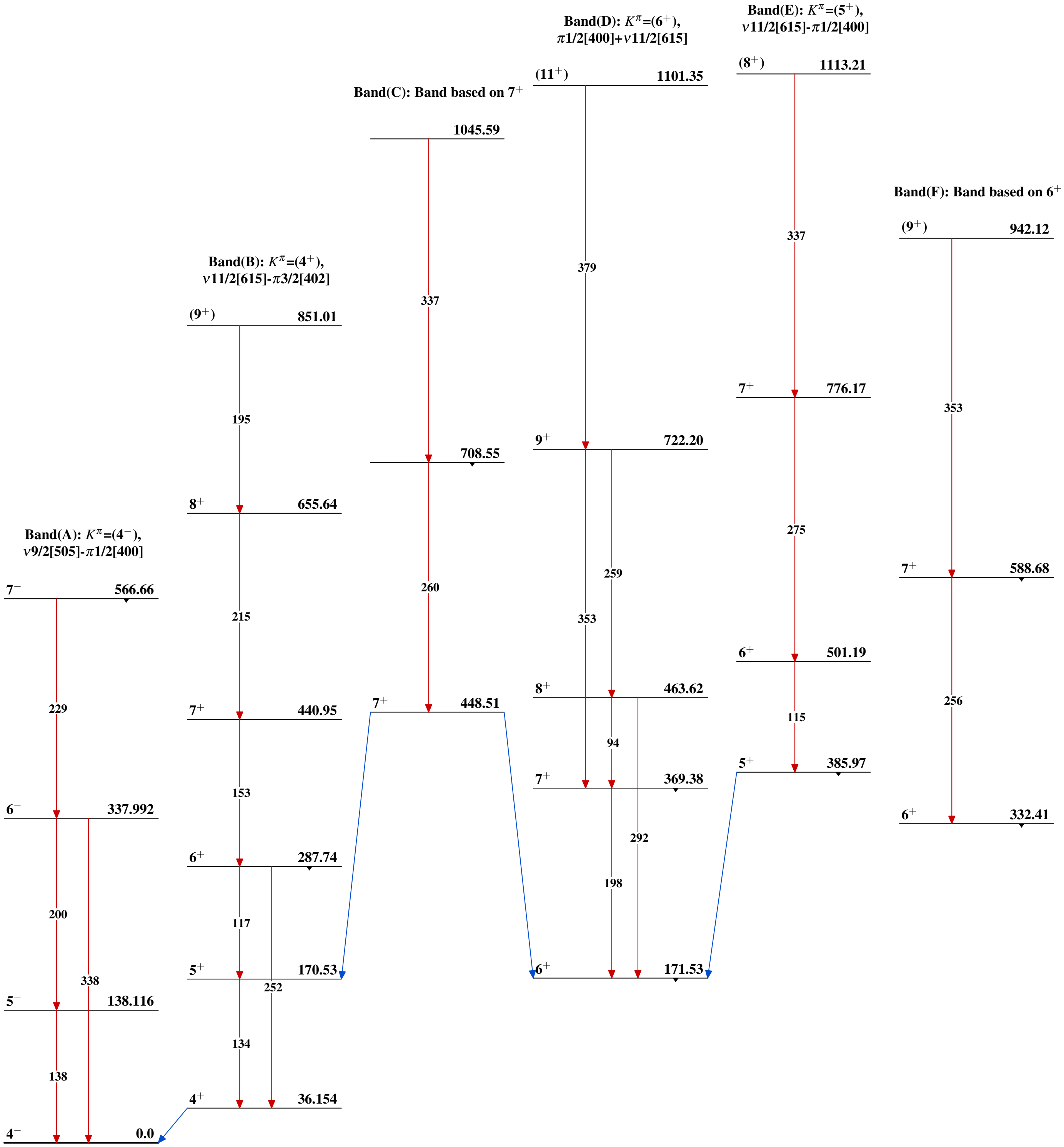
Level Scheme (continued)

Intensities: Relative I_γ
& Multiply placed: undivided intensity given



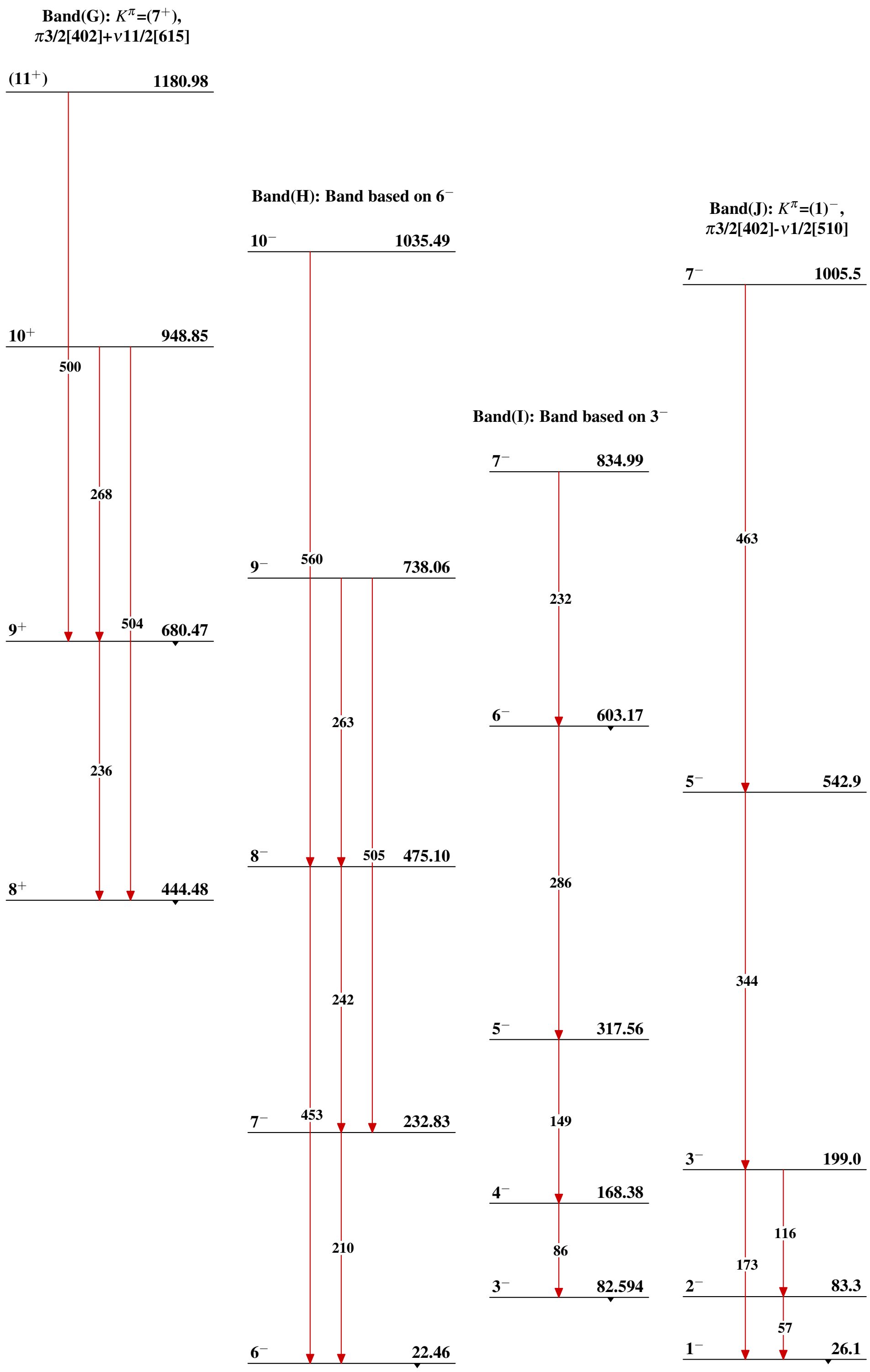
$^{190}_{77}Ir_{113}$

^{192}Os(p,3nγ),(d,4nγ) 2000Ga03



$^{190}_{77}Ir_{113}$

^{192}Os(p,3nγ),(d,4nγ) 2000Ga03 (continued)



$^{190}_{77}Ir_{113}$