Adopted Levels, Gammas

History

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

Q(β^-)=552.9 *13*; S(n)=6375 *13*; S(p)=5055.8 *12*; Q(α)=2748.6 *15* 2017Wa10

S(2n)=14551 *9*, S(2p)=12314.7 *13* (2017Wa10).

Mass measurement: 2013Sh30 (Schottky mass spectrometry).

A tentative long-lived isomer ($T_{1/2}$=60-130 d) is reported by 2001Ma73 in ^{181}Ta(^{28}Si,4a3n)^{190}Au reaction at 125, 135 MeV followed by ε decay chain ^{190}Au $\rightarrow$ ^{190}Pt $\rightarrow$ ^{190}Ir. The isomer is identified through α and γ ray studies of the reaction products, several days after the irradiation procedures.

Additional information 1.

Theory references: consult the NSR database (www.nndc.bnl.gov/nsr/) for two primary references dealing with nuclear structure calculations.

^{190}Ir Levels

All configuration assignments are from 1995Ga04 and/or 2000Ga03.

Cross Reference (XREF) Flags

A	^{190}Ir IT decay (1.120 h)	D	^{189}Os(α,t)
B	^{190}Ir IT decay (3.087 h)	E	^{191}Ir(d,t)
C	^{189}Os(^{3}He,d)	F	^{192}Os(p,3nγ),(d,4nγ)

E(level)[†]	J$^\pi$[‡]	$T_{1/2}$[@]	XREF	Comments
0.0[&]	4$^-$	11.78 d *10*	AB EF	%ε+%β^+=100; %β^+<0.002 (1960Ka14) μ=0.04 *1* (1983Al15,2019StZV) Q=+2.87 *16* (1980Mu07,2016St14) J$^\pi$: spin from direct ε feeding to 3$^-$, 4$^+$, 4$^-$, and 5$^-$ levels in ^{190}Os, respectively; parity based on 22.5γ E2 from 6$^-$ and L(d,t)=3 from 3/2$^+$ to the lowest energy state which is most probably the ground state. $T_{1/2}$: from 1975Ba35. Others: 12.1 d *2* (1969Sa18), 11 d *1* (1963Gr22), 12.3 d *4* (1960Ka14), 11 d (1955At32), 12.6 d *3* (1950Ch11), 10.7 d *3* (1947Go01). μ: nuclear orientation with γ detection (1983Al15). Q: nuclear orientation with γ detection (1980Mu07) (relative to 1.0 for ^{189}Ir). Other: +2.71 *19* (quoted in 1985Ha41, also 2014StZZ from a thesis by Schneider (1980)). 1996Ga30 propose that this state is a mixture of two configurations: ν9/2[505]-π1/2[400] (dominant), with 18% admixture of π3/2[402]+ν5/2[503], to explain spectroscopic strength in (d,t) as as well as the measured magnetic moment.
0+x			F	
22.46[j] *4*	6$^-$		B F	J$^\pi$: 22.5γ E2 to J$^\pi$=4$^-$ ground state; 205.2γ E1 from 7$^+$. Possible configuration=ν9/2[505]+π3/2[402] (1995Ga04), same as for the 38.1 level, but with K$^\pi$=6$^-$, consistent with GM rule.
26.1[a] *1*	(1)$^-$	1.120 h *3*	A CDEF	%IT=100 %IT=100 is assigned as only the isomeric decay of this activity has been reported by 1996Ga30, with a reasonable B(M3)(W.u.) value for the 26.1-keV transition, although, some branching by ε decay is possible. J$^\pi$: 26.1γ M3 to 4$^-$; L(d,t)=1 from 3/2$^+$ and L(p)=(2) for a group at 26 keV. This level was assigned to have J$^\pi$=7$^+$ by 1964Ha06 based on a 148.7, M4 transition to this level from the (11)$^-$ 3.1-h isomer at an energy of 175 keV as proposed by 1964Ha06, and later based on the newly-identified γ transitions from the γ decay of the 3.1-h isomer and the ce data of the 26.1-keV transition, 1996Ga30 claimed that the 3.1-h isomer is at E=374.6 keV and that the 26.1-keV transition does not belong

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Adopted Levels, Gammas (continued)

^{190}Ir Levels (continued)

E(level)[†]	J^{π}[‡]	$T_{1/2}$[@]	XREF	Comments
				to the decay path of the 3.1-h isomer, and assigned $J^{\pi}=1^-$ to the 1.1-h isomer. $T_{1/2}$: from 1996Ga30. Other: 1.2 h (1964Ha06).
36.154[f] *25*	4^+	>2 μs	B F	%IT=100 J^{π}: 36.2γ E1 to 4^-. See comments for 171.5 level. $T_{1/2}$: estimated by 1996Ga30 from absence of 36.1-keV transition in (ce)γ-coin spectrum in IT decay, shown in their Fig. 5.
38.1 *2*	$(3)^-$[#]		E	J^{π}: L(d,t)=5 from $3/2^+$. Configuration=ν9/2[505]-π3/2[402], $K^{\pi}=(3)^-$ (1995Ga04). See also possible configuration for the 22.46, $(6)^-$ level.
82.594[k] *20*	$(3)^-$[#]	6 ns *2*	cdeF	J^{π}: L(d,t)=1+3 from $3/2^+$ for a doublet; 82.6γ D, ΔJ=(1) to 4^-. $T_{1/2}$: centroid-shift method in (p,3nγ),(d,4nγ) (2000Ga03). Configuration=π3/2[402]-ν1/2[510], $K^{\pi}=1^-$ and configuration=π3/2[402]+ν3/2[512] for a doublet (1995Ga04).
83.3[a] *10*	$(2)^-$		cdeF	J^{π}: L(d,t)=1+3 from $3/2^+$ for a doublet; 57.1γ D, ΔJ=(1) to $(1)^-$.
138.116[&] *17*	(5^-)		F	
144.1[d] *10*	$(1)^-$		CDEF	J^{π}: L(d,t)=1 from $3/2^+$. L(p)=(0+2) from $3/2^-$ suggests 1^-, 2^-.
148.696+x *20*		90 ns *3*	F	%IT=100 $T_{1/2}$: (beam pulse)(149γ)(t) in (p,3nγ),(d,4nγ) (2000Ga03). A 90 ns *3* isomer is indicated in (149γ)(beam pulse)(t) decay curve in Fig. 4 of 2000Ga03.
168.38[k] *3*	(4^-)		F	
170.53[f] *3*	(5^+)		F	
171.532[i] *22*	6^+	3.73 ns *5*	B F	J^{π}: 56.1γ M1 from 7^+, and 135.4γ E2 to 36.2 level which has 36.2γ E1 to 4^-, determine $J^{\pi}(36.2)=4^+$ and $J^{\pi}(171.5)=6^+$. $T_{1/2}$: from ce-ce(t) (p,3nγ),(d,4nγ). Other: 3.7 ns *1* from ce-ce(t) in IT decay.
173.8[c] *2*	$(1)^-$[#]		CDE	J^{π}: L(d,t)=1+3 from $3/2^+$. L(p)=(2) from $3/2^-$ suggests $\leq 4^-$.
183.4[c] *4*	$(0)^-$[#]		CDE	J^{π}: L(d,t)=1 from $3/2^+$.
199.0[a] *10*	$(3)^-$		CDEF	J^{π}: L(d,t)=1+3 from $3/2^+$; spin=(3) proposed in (p,3nγ),(d,4nγ).
210.3			F	Additional information 2.
223.6[b] *5*	$(2)^-$[#]		CDE	XREF: C(227.0)D(225.9). E(level): unresolved doublet. J^{π}: L(d,t)=(1,3) from $3/2^+$. L(p)=(0+2) from $3/2^-$ suggests 1^-,2^-. Configuration=π1/2[400]+ν3/2[512] and configuration=π3/2[402]+ν1/2[510] for two components.
227.68[g] *4*	7^+	3.7 ns *2*	B F	J^{π}: 148.7γ M4 from 11^-. $T_{1/2}$: ce-ce(t) (1996Ga30) in IT decay. Configuration=π3/2[402]$\otimes\nu$11/2[615], $K^{\pi}=7^+$ bandhead.
231.3+x			F	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[j] *5*	(7^-)		F	
241.7 *6*	1^-,2^-,3^-		E	J^{π}: L(d,t)=1+3 from $3/2^+$.
245.0 *7*	(0 to 4)$^{(-)}$		CD	J^{π}: L(p)=(2) from $3/2^-$.
266.8 *3*	(0 to 3)$^-$		E	J^{π}: L(d,t)=1 from $3/2^+$.
269.4 *11*	$(1^-,2^-)$		CD	E(level): weighted average of 270.3 *14* from (^{3}He,d) and 268.8 *11* from (α,t). J^{π}: L(p)=(0+2) from $3/2^-$.
278.9 *3*	1^-,2^-,3^-		E	J^{π}: L(d,t)=1+3 from $3/2^+$.

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Adopted Levels, Gammas (continued)

^{190}Ir Levels (continued)

E(level)[†]	J^{π}[‡]	$T_{1/2}$[@]	XREF	Comments
284.8[d] *3*	$(2)^-$		CDE	E(level): weighted average of 284.8 *19* from (^{3}He,d), 282.9 *16* from (α,t), and 284.9 *3* from (d,t). J^{π}: L(d,t)=1+3 from $3/2^+$.
287.74[f] *3*	(6^+)		F	
313.2[c] *5*	$(2)^-$[#]		CDE	E(level): weighted average of 311.1 *11* from (^{3}He,d), 313.3 *8* from (α,t), and 313.4 *4* from (d,t). J^{π}: L(d,t)=1+3 from $3/2^+$.
314.10? *4*	(4^+)		F	
317.56[k] *4*	(5^-)		F	
331.7 *4*	$(1\text{ to }5)^-$		E	J^{π}: L(d,t)=3 from $3/2^+$.
332.41[l] *3*	(6^+)		F	
337.992[&] *18*	(6^-)		F	
347.8[b] *4*	$(3)^-$		E	J^{π}: L(d,t)=1+3 from $3/2^+$.
351.44 *3*	(6^+)		F	
366.7 *4*	$1^-,2^-,3^-$		E	J^{π}: L(d,t)=1+3 from $3/2^+$.
369.38[i] *3*	(7^+)		F	
375.7 *4*	$(0\text{ to }3)^-$		E	J^{π}: L(d,t)=1 from $3/2^+$.
376.4 *1*	11^-	3.087 h *12*	B	$\%\varepsilon+\%\beta^+$=91.4 *2*; %IT=8.6 *2* E(level): this isomer was proposed by 1964Ha06 to be at an energy of 175 keV and to feed the 1.12-h isomer at E=26.1 keV by the 148.7γ transition, and later based on their newly-identified γ transitions from the γ decay of the 3.1-h isomer and the ce data of the 26.1-keV transition, 1996Ga30 claimed that the 3.1-h isomer is at E=374.6 keV and that the 26.1-keV transition does not belong to the decay path of the 3.1-h. J^{π}: 11^- is proposed by 1964Ha06 from their observation of a strong allowed ε feeding (log*ft*=4.8) to the $(10)^-$ isomer in ^{190}Os and possible configuration=π11/2[505]+ν11/2[615], based on the configuration of 10^- isomer in ^{190}Os. $T_{1/2}$: from 1996Ga30. Others: 3.25 h 20 (1970Bo22), 3.0 h *2* (1963Gr22), 3.2 h *2* (1950Ch11). $\%\varepsilon$ from 1996Ga30. Other: 94.4 *8* (1964Ha06).
379.9 *8*	$(1^-,2^-)$		CD	E(level): weighted average of 379.0 *9* from (^{3}He,d) and 380.6 *8* from (α,t). J^{π}: L(p)=(0+2) from $3/2^-$.
385.97[h] *4*	(5^+)		F	
404.02 *3*	(6^-)		F	
408.0 *4*	$1^-,2^-,3^-$		E	J^{π}: L(d,t)=1+3 from $3/2^+$.
415.09 *4*	(5^-)		F	
426.7 *4*	$(0\text{ to }3)^-$		E	J^{π}: L(d,t)=1 from $3/2^+$.
430.7 *13*	$(1^-,2^-)$		CD	E(level): weighted average of 431.4 *13* from (^{3}He,d) and 429.0 *21* from (α,t). J^{π}: L(p)=(0+2) from $3/2^-$.
431.62 *5*			F	
440.95[f] *4*	(7^+)		F	
442.78 *4*	$(6)^-$[#]		DEF	J^{π}: L(d,t)=5 from $3/2^+$. Additional information 3.
444.48[g] *4*	(8^+)		F	
447.5 *10*	(5^-)		F	
448.51[m] *3*	(7^+)		F	
449.57 *4*	(6^-)		F	
452.43 *21*			c EF	XREF: c(450.0). J^{π}: L(^{3}He,d)=(2) from $3/2^-$ for a group at 450.0.
456.6 *14*	$(0\text{ to }4)^{(-)}$		cD	XREF: c(450.0). J^{π}: L(α,t)=(2) from $3/2^-$.

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Adopted Levels, Gammas (continued)

^{190}Ir Levels (continued)

E(level)[†]	Jπ[‡]	XREF	Comments
463.62[i] 4	(8+)	F	
465.4[e] 16	(4+)	CD	E(level): weighted average of 465.9 21 from (^{3}He,d) and 465.1 16 from (α,t). Jπ: L(p)=(4,5) from 3/2−.
475.10[j] 5	(8−)	F	
478.5 5	(1 to 5)−	E	Jπ: L(d,t)=3 from 3/2+.
479.52 5		F	
485.8 5	(0 to 3)−	E	Jπ: L(d,t)=1 from 3/2+.
496.4 5	(0 to 3)−	E	Jπ: L(d,t)=1 from 3/2+.
498.2 9	(1−,2−)	CD	E(level): weighted average of 499.3 16 from (^{3}He,d) and 497.8 9 from (α,t). Jπ: L(p)=(0+2) from 3/2−.
501.19[h] 4	(6+)	F	
510.9 5	(0 to 3)−	CDE	E(level): weighted average of 511.1 16 from (^{3}He,d), 511.1 13 from (α,t), and 510.9 5 from (d,t). Jπ: L(d,t)=1 from 3/2+. L(p)=(0+2) from 3/2− suggests 1−,2−.
528.36 7		F	
541.44 4	(7+)	F	
542.9[a] 10	(5)−	EF	Jπ: L(d,t)=3+5 from 3/2+.
551.0 9	(1−,2−)	CD	E(level): weighted average of 550.9 27 from (^{3}He,d) and 551.0 9 from (α,t). Jπ: L(p)=(0) from 3/2−.
557.12 11		F	
566.66[&] 8	(7−)	F	
574.37 4	(8+)	F	
577.49? 5	(5+)	F	
588.68[l] 4	(7+)	F	
589.4 6	(0 to 3)−	CDE	E(level): weighted average of 589.6 16 from (^{3}He,d), 589.9 13 from (α,t), and 589.3 6 from (d,t). Jπ: L(d,t)=1 from 3/2+.
602.7 6	(1 to 5)−	E	Jπ: L(d,t)=3 from 3/2+.
603.17[k] 4	(6−)	F	
612.8 7	(0 to 3)−	E	Jπ: L(d,t)=1 from 3/2+.
619.1 7	(0 to 3)−	E	Jπ: L(d,t)=1 from 3/2+.
621.5 13	(0 to 4)(−)	CD	E(level): weighted average of 620.7 13 from (^{3}He,d) and 622.2 13 from (α,t). Jπ: L(p)=(2) from 3/2−.
633.0 7	(0 to 3)−	E	Jπ: L(d,t)=1 from 3/2+.
655.3 7	(0 to 3)−	E	Jπ: L(d,t)=1 from 3/2+.
655.64[f] 21	(8+)	F	
657.29 11		F	
661.45 5	(7−)	F	
669.0 7	1−,2−,3−	E	Jπ: L(d,t)=1+3 from 3/2+.
670.8 13	(0 to 4)(−)	CD	E(level): weighted average of 670.0 14 from (^{3}He,d) and 671.5 13 from (α,t). Jπ: L(p)=(2) from 3/2−.
678.59 4	(6,7)	F	Jπ: 229.9γ D to (7+), 292.4γ to (5+).
680.47[g] 4	(9+)	F	
680.9		F	
684.7 7	(0 to 3)−	E	Jπ: L(d,t)=1 from 3/2+.
693.02 20		F	
694.1 9	(1−,2−)	CD	E(level): weighted average of 694.5 14 from (^{3}He,d) and 694.0 9 from (α,t). Jπ: L(p)=(0+2) from 3/2−.
705.2 8	1−,2−,3−	E	Jπ: L(d,t)=1+3 from 3/2+.
708.55[m] 15		F	
716.2[e] 17	(5+)	CD	E(level): weighted average of 714.9 22 from (^{3}He,d) and 717.0 17 from (α,t). Jπ: L(p)=(4,5) from 3/2−.
719.32 4	(8+)	F	
722.1 7	(0 to 3)−	E	Jπ: L(d,t)=1 from 3/2+.

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Adopted Levels, Gammas (continued)

^{190}Ir Levels (continued)

E(level)[†]	J$^{\pi}$[‡]	XREF	Comments
722.20[i] *4*	(9$^+$)	F	
727.4 *10*	(6$^-$)	F	
738.06[j] *5*	(9$^-$)	F	
741.6 *13*	(0 to 4)$^{(-)}$	CD	E(level): weighted average of 741.3 *13* from (^{3}He,d) and 741.9 *13* from (α,t). J$^{\pi}$: L(p)=(2) from 3/2$^-$.
743.5 *7*	(0 to 3)$^-$	E	J$^{\pi}$: L(d,t)=1 from 3/2$^+$.
747.07 *15*		F	
753.82 *5*	(8$^+$)	F	
754.21 *5*	(8$^+$)	F	
755.7 *8*	1$^-$,2$^-$,3$^-$	E	J$^{\pi}$: L(d,t)=1+3 from 3/2$^+$.
759.1 *9*		CD	E(level): weighted average of 759.4 *13* from (^{3}He,d) and 758.9 *9* from (α,t).
772.5 *11*	(3 to 7)$^-$	E	J$^{\pi}$: L(d,t)=5 from 3/2$^+$.
776.17[h] *5*	(7$^+$)	F	
787.5 *9*	(0 to 3)$^-$	E	J$^{\pi}$: L(d,t)=1 from 3/2$^+$.
794.9 *9*	(0 to 3)$^-$	E	J$^{\pi}$: L(d,t)=1 from 3/2$^+$.
799.67 *15*		F	
804.4 *13*		CD	E(level): weighted average of 802.4 *27* from (^{3}He,d) and 804.9 *13* from (α,t).
806.2 *9*	1$^-$,2$^-$,3$^-$	E	J$^{\pi}$: L(d,t)=1+3 from 3/2$^+$.
807.39 *5*		F	
819.8 *21*		CD	E(level): unweighted average of 821.8 *16* from (^{3}He,d) and 817.7 *9* from (α,t).
823.6 *9*	1$^-$,2$^-$,3$^-$	E	J$^{\pi}$: L(d,t)=1+3 from 3/2$^+$.
831.56 *6*		F	
834.99[k] *5*	(7$^-$)	F	
835.9 *9*	1$^-$,2$^-$,3$^-$	E	J$^{\pi}$: L(d,t)=1+3 from 3/2$^+$.
843.5 *9*	1$^-$,2$^-$,3$^-$	E	J$^{\pi}$: L(d,t)=1+3 from 3/2$^+$.
847.3 *10*	(0 to 4)$^-$	CD	E(level): weighted average of 845.6 *14* from (^{3}He,d) and 847.9 *9* from (α,t). J$^{\pi}$: L(p)=(2) from 3/2$^-$.
851.01[f] *21*	(9$^+$)	F	
862.0 *10*	1$^-$,2$^-$,3$^-$	E	J$^{\pi}$: L(d,t)=1+3 from 3/2$^+$.
867.68 *21*		F	
867.82 *5*	(7,8,9)	F	J$^{\pi}$: 423.3γ D to (8$^+$).
868.8 *10*		CD	E(level): weighted average of 867.4 *13* from (^{3}He,d) and 869.5 *9* from (α,t).
891.3 *9*		CD	E(level): weighted average of 891.8 *13* from (^{3}He,d) and 891.1 *9* from (α,t).
902.1 *10*	(1 to 5)$^-$	E	J$^{\pi}$: L(d,t)=3 from 3/2$^+$.
917.68 *21*		F	
924.6 *9*		CD	E(level): weighted average of 923.7 *13* from (^{3}He,d) and 925.0 *9* from (α,t).
929.4 *10*	1$^-$,2$^-$,3$^-$	E	J$^{\pi}$: L(d,t)=1+3 from 3/2$^+$.
942.12[l] *6*	(9$^+$)	F	
948.85[g] *5*	(10$^+$)	F	
960.1 *10*	1$^-$,2$^-$,3$^-$	E	J$^{\pi}$: L(d,t)=1+3 from 3/2$^+$.
966.78 *21*		F	
971.2 *10*	1$^-$,2$^-$,3$^-$	E	J$^{\pi}$: L(d,t)=1+3 from 3/2$^+$.
993.2 *11*	1$^-$,2$^-$,3$^-$	E	J$^{\pi}$: L(d,t)=1+3 from 3/2$^+$.
1005.5[a] *10*	(7$^-$)	F	
1006.4 *14*	1$^-$,2$^-$,3$^-$	E	J$^{\pi}$: L(d,t)=1+3 from 3/2$^+$.
1014.8 *14*	(0 to 3)$^-$	E	J$^{\pi}$: L(d,t)=1 from 3/2$^+$.
1017.15 *5*		F	
1026.8 *14*	1$^-$,2$^-$,3$^-$	E	J$^{\pi}$: L(d,t)=1+3 from 3/2$^+$.
1034.4 *16*	(1 to 5)$^-$	E	J$^{\pi}$: L(d,t)=3 from 3/2$^+$.
1035.49[j] *8*	(10$^-$)	F	
1045.59[m] *15*		F	
1062.9 *18*		E	
1082.8 *12*		E	
1092.4 *15*		E	

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Adopted Levels, Gammas (continued)

^{190}Ir Levels (continued)

E(level)[†]	Jπ[‡]	XREF	Comments
1099.08 *5*		F	
1101.35[i] *21*	(11$^+$)	F	
1113.21[h] *5*	(8$^+$)	F	
1115.6 *17*		E	
1135.9 *19*		E	
1143.0 *18*		E	
1175.79 *9*		F	
1180.98[g] *11*	(11$^+$)	F	
y?			y ≥3100, T$_{1/2}$=60-130 d (2001Ma73). From α, γ, α-γ and α-γ-x coin studies (by 2001Ma73) of reaction products from ^{181}Ta(^{28}Si,4a3n)^{190}Au reaction followed by ε decay chain ^{190}Au-^{190}Pt-^{190}Ir, two α groups at 5290 and 5430, and 144.0γ-141.0γ cascade in ^{186}Re (possibly populating 471-330-186 levels in ^{186}Re) were tentatively assigned to the decay of this isomer. This isomer was interpreted as a possible (SD) state in the second-potential well.

† From least-squares fit to Eγ values when a level is populated in decay data for isomers and in ^{192}Os(p,3nγ),(d,4nγ). When a level is populated only in particle-transfer studies, values are from (d,t), unless otherwise noted.
‡ Mainly from L(n) (from L(d,t)) and L(p) (from σ(^{3}He,d)/σ(α,t) ratio) values in transfer reactions. For selected levels, comparison of observed and predicted strengths and/or cross sections is used to narrow down J^π and proposed configurations Where there are no arguments given, assignments are from ^{192}Os(p,3nγ),(d,4nγ) (2000Ga03) based on γ(θ) data and slopes of γ-ray relative excitation function.
# Spin from comparison of observed and predicted (DWBA) strengths in (p,t) (1995Ga04).
@ From γγ(t) in (p,3nγ),(d,4nγ), unless otherwise stated.
& Band(A): K^π=(4$^-$),ν9/2[505]-π1/2[400].
a Band(B): K^π=(1)$^-$,π3/2[402]-ν1/2[510].
b Band(C): K^π=(2)$^-$,π3/2[402]+ν1/2[510]. Tentative band assignment.
c Band(D): K^π=(0)$^-$,π3/2[402]-ν3/2[512].
d Band(E): K^π=(1)$^-$,ν3/2[512]-π1/2[400].
e Band(F): K^π=(4)$^+$,π11/2[505]-ν3/2[512] Tentative band assignment.
f Band(G): K^π=(4$^+$),ν11/2[615]-π3/2[402].
g Band(H): K^π=(7$^+$),π3/2[402]+ν11/2[615].
h Band(I): K^π=(5$^+$),ν11/2[615]-π1/2[400].
i Band(J): K^π=(6$^+$),π1/2[400]+ν11/2[615].
j Band(K): Band based on (6$^-$). Possible configuration=π3/2[402]⊗ν9/2[505].
k Band(L): Band based on (3$^-$).
l Band(M): Band based on (6$^+$).
m Band(N): Band based on (7$^+$).

γ(^{190}Ir)

E$_i$(level)	J$^\pi_i$	Eγ[†]	Iγ[†]	E$_f$	J$^\pi_f$	Mult.[†]	α[#]	Comments
22.46	6$^-$	22.45 *5*	100	0.0	4$^-$	E2	5.54×10^3 *10*	Eγ,Mult.: from ^{190}Ir IT decay (3.087 h), uncertainty in energy assigned by evaluators, based on that in level energy.
26.1	(1)$^-$	26.1 *1*	100	0.0	4$^-$	M3	9.9×10^5 *3*	B(M3)(W.u.)=0.00185 *8* Eγ,Mult.: from ^{190}Ir IT decay (1.120 h).
36.154	4$^+$	36.175 *17*	100	0.0	4$^-$	E1	1.241	B(E1)(W.u.)<9.7×10^{-7} Eγ: weighted average of 36.184 *17* from ^{190}Ir IT

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Adopted Levels, Gammas (continued)

$\gamma(^{190}Ir)$ (continued)

E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f	Mult.†	α#	Comments
								decay (3.087 h) and 36.154 *25* from (p,3nγ).
								Mult.: from ^{190}Ir IT decay (3.087 h).
82.594	(3)$^-$	82.594 *20*	100	0.0	4$^-$	(M1)	10.58	B(M1)(W.u.)=0.00056 *19*
								Mult.: D from $\gamma(\theta)$ in 2000Ga03; M1 indicated by negative level parity.
83.3	(2)$^-$	57.143 *22*	100	26.1	(1)$^-$	D		E_γ: level-energy difference=57.228.
138.116	(5$^-$)	138.093 *20*	100	0.0	4$^-$			
144.1	(1)$^-$	118.132‡ *20*	100	26.1	(1)$^-$	D		E_γ: level energy difference=118.061.
148.696+x		148.696 *20*	100	0+x		D		(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.
168.38	(4$^-$)	85.790 *21*	100	82.594	(3)$^-$	D		
170.53	(5$^+$)	134.363 *20*	100	36.154	4$^+$	D		
171.532	6$^+$	135.353 *14*	100	36.154	4$^+$	E2	1.401	B(E2)(W.u.)=21.4 *9*
								E_γ: weighted average of 135.348 *14* from ^{190}Ir IT decay (3.087 h) and 135.363 *20* from (p,3nγ).
								Mult.: from ^{190}Ir IT decay (3.087 h).
199.0	(3)$^-$	115.73 *3*	37.8 *13*	83.3	(2)$^-$			
		172.864 *21*	100.0 *22*	26.1	(1)$^-$			
227.68	7$^+$	56.124 *25*	57 *3*	171.532	6$^+$	M1	5.80	B(M1)(W.u.)=0.0039 *4*
								I_γ: photon branching ratio of 205.2γ and 56.1γ are in severe disagreement in IT decay (1996Ga39) and in ^{192}Os(p,3nγ),(d,4nγ) work (2000Ga03), both studies by the same experimental group: Iγ(205.2)/Iγ(56.1)=100.0 *29*/56.6 *29* in in-beam γ-ray study (2000Ga03) versus 100.0 *45*/81.1 *49* in IT decay (1996Ga30). Here value is adopted from the in-beam γ-ray study by 2000Ga03.
								Mult.: from ^{190}Ir IT decay (3.087 h).
		205.225 *21*	100 *3*	22.46	6$^-$	E1	0.0640	B(E1)(W.u.)=1.30×10^{-6} *10*
								Mult.: from ^{190}Ir IT decay (3.087 h).
231.3+x		82.6		148.696+x				See comment for 231.3+x level.
232.83	(7$^-$)	210.294‡ *21*	100	22.46	6$^-$	D		E_γ: level energy difference=210.369.
287.74	(6$^+$)	116.245 *22*	55.0 *25*	171.532	6$^+$	D		
		117.290‡ *21*	58.0 *15*	170.53	(5$^+$)			E_γ: level energy difference=117.209.
		251.630 *21*	100.0 *20*	36.154	4$^+$			
314.10?	(4$^+$)	277.949@ *21*	100	36.154	4$^+$			
317.56	(5$^-$)	149.196 *21*	100	168.38	(4$^-$)	D		
332.41	(6$^+$)	160.904 *20*	100.0 *20*	171.532	6$^+$			
		161.891 *22*	36.6 *11*	170.53	(5$^+$)	D		
337.992	(6$^-$)	199.853 *21*	100.0 *21*	138.116	(5$^-$)	D		
		338.022 *23*	71.7 *17*	0.0	4$^-$			
351.44	(6$^+$)	179.880 *21*	100.0 *25*	171.532	6$^+$			
		180.893 *22*	39.0 *14*	170.53	(5$^+$)	D		
369.38	(7$^+$)	141.694 *21*	52.7 *13*	227.68	7$^+$	D		
		197.966‡ *24*	100.0 *19*	171.532	6$^+$	D		E_γ: level energy difference=197.850.
		198.786@ *22*	<33	170.53	(5$^+$)			

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Adopted Levels, Gammas (continued)

$\gamma(^{190}Ir)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[†]	α[#]	Comments
376.4	11^-	148.7 *1*	100	227.68	7^+	M4	475	B(M4)(W.u.)=2.68 *8* E_γ,Mult.: from ^{190}Ir IT decay (3.087 h).
385.97	(5^+)	214.47 *3*	100 *3*	171.532	6^+	D		
		215.39 *3*	84 *4*	170.53	(5^+)			
		349.81 *4*	58 *3*	36.154	4^+	D		
404.02	(6^-)	265.901 *22*	100	138.116	(5^-)	D		
415.09	(5^-)	246.692[@] *21*	100	168.38	(4^-)	D		
431.62		198.786[@] *22*	100	232.83	(7^-)			
440.95	(7^+)	153.203 *20*	100	287.74	(6^+)	D		
442.78	$(6)^-$	304.66 *3*	100	138.116	(5^-)	D		
444.48	(8^+)	216.832 *21*	100	227.68	7^+	D		
447.5	(5^-)	248.575 *21*	100	199.0	$(3)^-$			
448.51	(7^+)	276.834[‡] *23*	100.0 *27*	171.532	6^+	D		E_γ: level energy difference=276.980.
		277.949[@] *21*	<680	170.53	(5^+)			
449.57	(6^-)	132.005 *21*	100	317.56	(5^-)	D		
452.43		219.6 *2*		232.83	(7^-)			
463.62	(8^+)	94.257 *22*	56.9 *17*	369.38	(7^+)			
		291.88[‡] *4*	100 *8*	171.532	6^+			E_γ: level energy difference=292.00.
475.10	(8^-)	242.195[‡] *21*	100.0 *18*	232.83	(7^-)	D		E_γ: level energy difference=242.272.
		452.734[@‡] *23*	<106	22.46	6^-			E_γ: level energy difference=452.791.
479.52		246.692[@] *21*	100	232.83	(7^-)	D		
501.19	(6^+)	115.246 *25*	100	385.97	(5^+)	D		
528.36		295.53 *5*	100	232.83	(7^-)			
541.44	(7^+)	189.994 *22*	100 *3*	351.44	(6^+)	D		
		209.1 *1*		332.41	(6^+)			
542.9	$(5)^-$	343.88[‡] *3*	100	199.0	$(3)^-$			E_γ: level energy difference=343.97.
557.12		419.0 *1*		138.116	(5^-)			
566.66	(7^-)	162.6 *1*		404.02	(6^-)			
		228.7 *1*		337.992	(6^-)			
574.37	(8^+)	346.679 *24*	54.8 *16*	227.68	7^+	D		
		402.835 *23*	100.0 *21*	171.532	6^+			
577.49?	(5^+)	263.39 *3*	100	314.10?	(4^+)	D		
588.68	(7^+)	237.196 *23*	70 *3*	351.44	(6^+)	D		
		256.300 *22*	100.0 *24*	332.41	(6^+)	D		
603.17	(6^-)	188.062 *21*	100 *4*	415.09	(5^-)			
		285.66 *4*	37 *3*	317.56	(5^-)	D		
655.64	(8^+)	214.7 *2*		440.95	(7^+)			
657.29		319.3 *1*		337.992	(6^-)			
661.45	(7^-)	211.883 *22*	100	449.57	(6^-)	D		
678.59	(6,7)	229.932[‡] *21*	100.0 *21*	448.51	(7^+)	D		E_γ: level energy difference=230.076.
		292.4 *1*		385.97	(5^+)			
		391.065[‡] *25*	97.3 *23*	287.74	(6^+)			E_γ: level energy difference=390.844.
680.47	(9^+)	236.050 *22*	100.0 *22*	444.48	(8^+)			
		452.734[@] *23*	<190	227.68	7^+			
680.9		470.6 *1*		210.3				
693.02		554.9 *2*		138.116	(5^-)			
708.55		260.0 *2*		448.51	(7^+)			
		480.9 *2*		227.68	7^+			
719.32	(8^+)	270.808 *24*	100	448.51	(7^+)	D		
722.20	(9^+)	258.684 *22*	100.0 *23*	463.62	(8^+)	D		
		352.62[‡] *3*	52.5 *19*	369.38	(7^+)			E_γ: level energy difference=352.82.
727.4	(6^-)	279.901 *24*	100	447.5	(5^-)	D		

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Adopted Levels, Gammas (continued)

$\gamma(^{190}Ir)$ (continued)

E_i(level)	J^π_i	E_γ †	I_γ †	E_f	J^π_f	Mult. †
738.06	(9⁻)	262.957 *24*	100 *5*	475.10	(8⁻)	D
		505.23 *4*	47.9 *19*	232.83	(7⁻)	
747.07		272.0 *2*		475.10	(8⁻)	
		514.2 *2*		232.83	(7⁻)	
753.82	(8⁺)	526.14 *3*	100	227.68	7⁺	D
754.21	(8⁺)	253.08 *5*	100 *9*	501.19	(6⁺)	
		309.71 *3*	97 *5*	444.48	(8⁺)	
776.17	(7⁺)	274.979 *22*	100	501.19	(6⁺)	D
799.67		324.6 *2*		475.10	(8⁻)	
		566.8 *2*		232.83	(7⁻)	
807.39		362.91 *3*	100 *5*	444.48	(8⁺)	
		438.0 *2*		369.38	(7⁺)	
831.56		330.37 *4*	100	501.19	(6⁺)	
834.99	(7⁻)	231.823 *23*	100	603.17	(6⁻)	D
851.01	(9⁺)	195.361 *24*	100	655.64	(8⁺)	D
867.68		640.0 *2*		227.68	7⁺	
867.82	(7,8,9)	423.34 *3*	100	444.48	(8⁺)	D
917.68		473.2 *2*		444.48	(8⁺)	
942.12	(9⁺)	353.44 *4*	100	588.68	(7⁺)	
948.85	(10⁺)	268.380 *25*	100	680.47	(9⁺)	D
		504.4 *2*		444.48	(8⁺)	
966.78		522.3 *2*		444.48	(8⁺)	
1005.5	(7⁻)	462.55 *3*	100	542.9	(5)⁻	
1017.15		442.78 *3*	100	574.37	(8⁺)	
1035.49	(10⁻)	560.39 *6*	100	475.10	(8⁻)	
1045.59		337.037@ *23*	100	708.55		
1099.08		376.83 *3*	100	722.20	(9⁺)	
1101.35	(11⁺)	379.1 *2*		722.20	(9⁺)	
1113.21	(8⁺)	337.037@ *23*	100	776.17	(7⁺)	
1175.79		368.40 *7*	100	807.39		
1180.98	(11⁺)	500.5 *1*		680.47	(9⁺)	

† From ^{192}Os(p,3nγ),(d,4nγ) (2000Ga03), unless otherwise stated. Mult=D for ΔJ=1 or 0 transitions is assigned by evaluators based on $\gamma(\theta)$ data in 2000Ga03.

‡ Value from least-squares adjustment deviates from Eγ of 2000Ga03 by more than 2 standard deviations. Level-energy difference is given under comments.

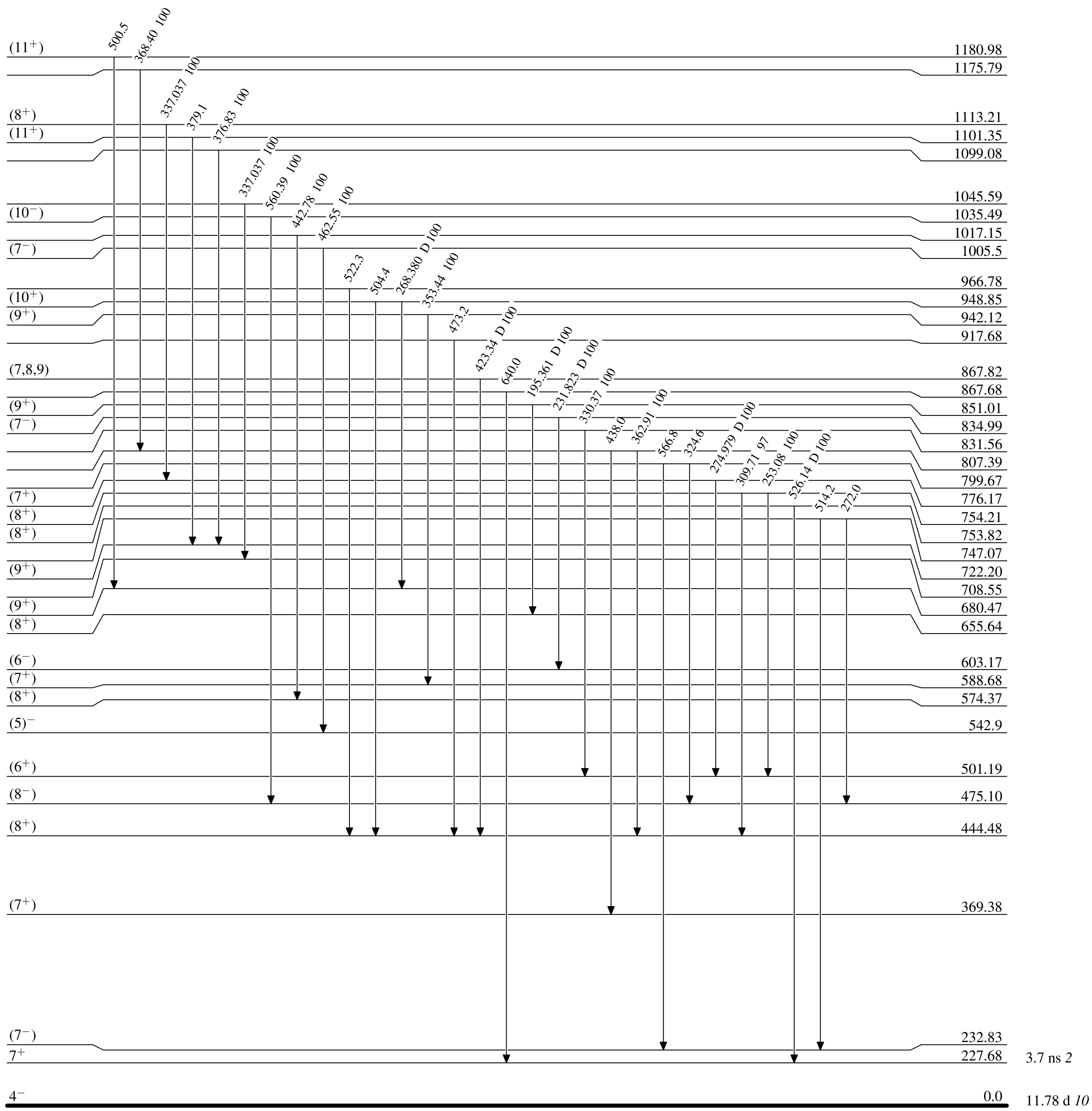
\# Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.

@ Multiply placed.

Adopted Levels, Gammas

Level Scheme

Intensities: Relative photon branching from each level

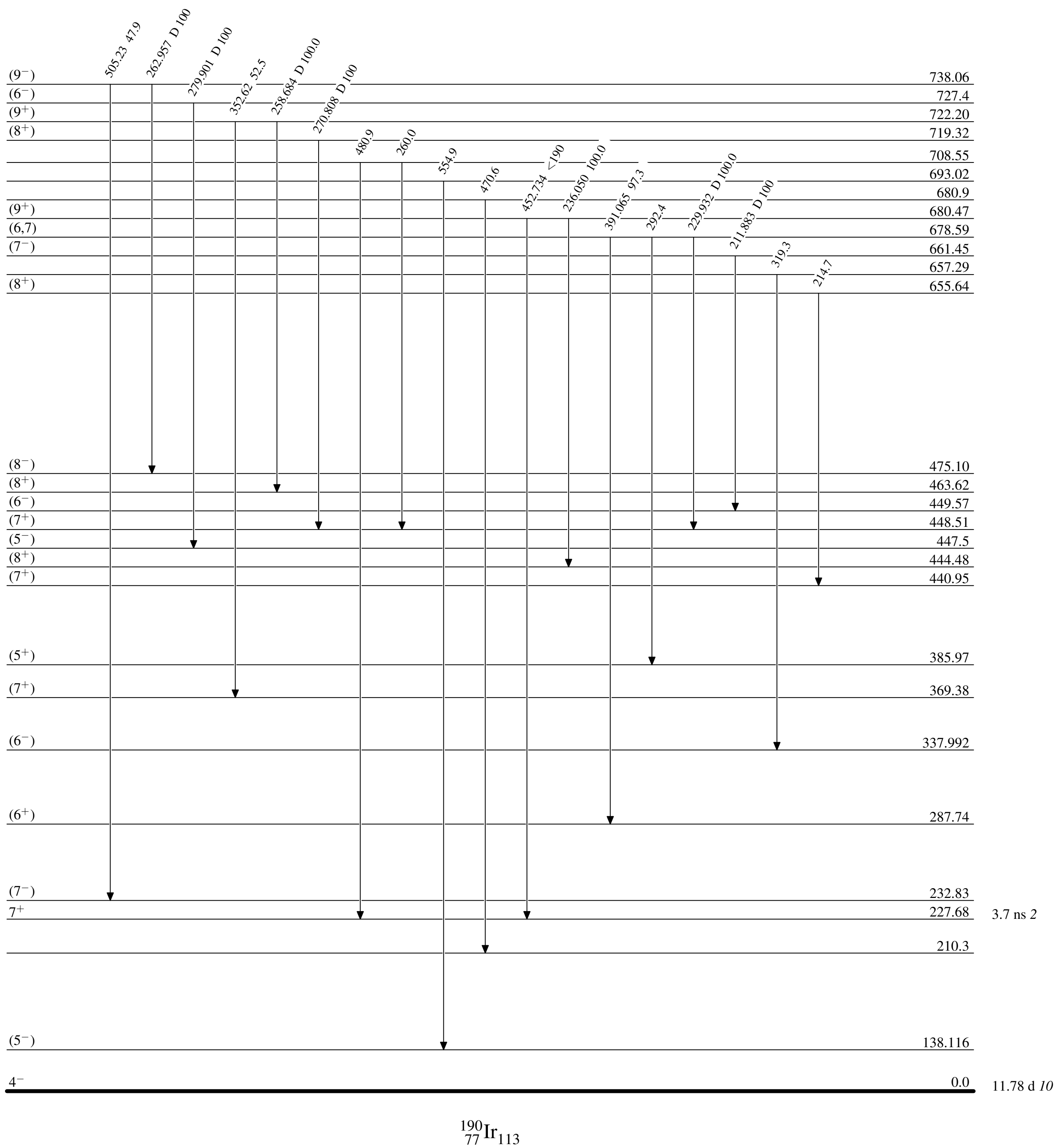


$^{190}_{77}Ir_{113}$

Adopted Levels, Gammas

Level Scheme (continued)

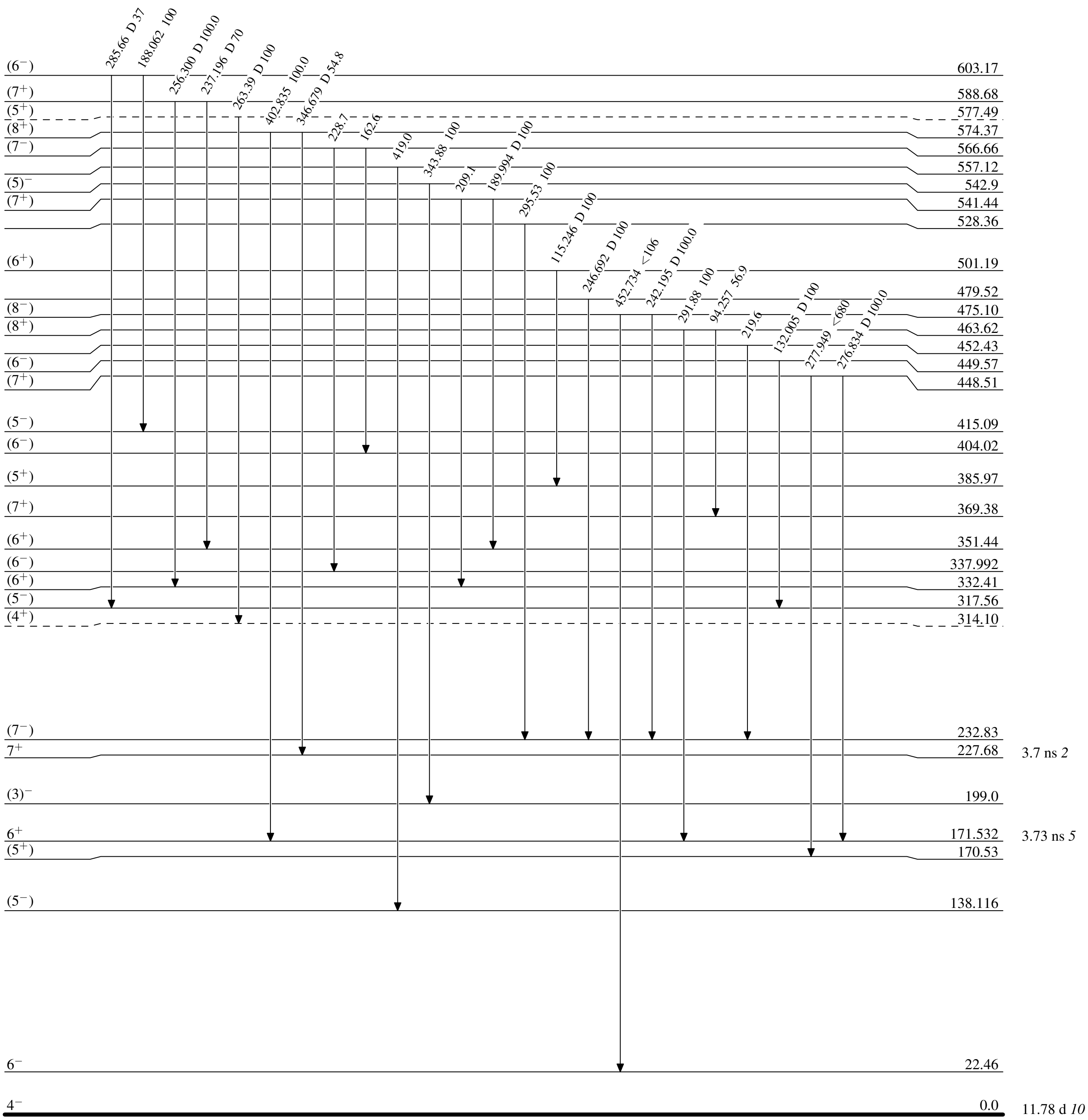
Intensities: Relative photon branching from each level



Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

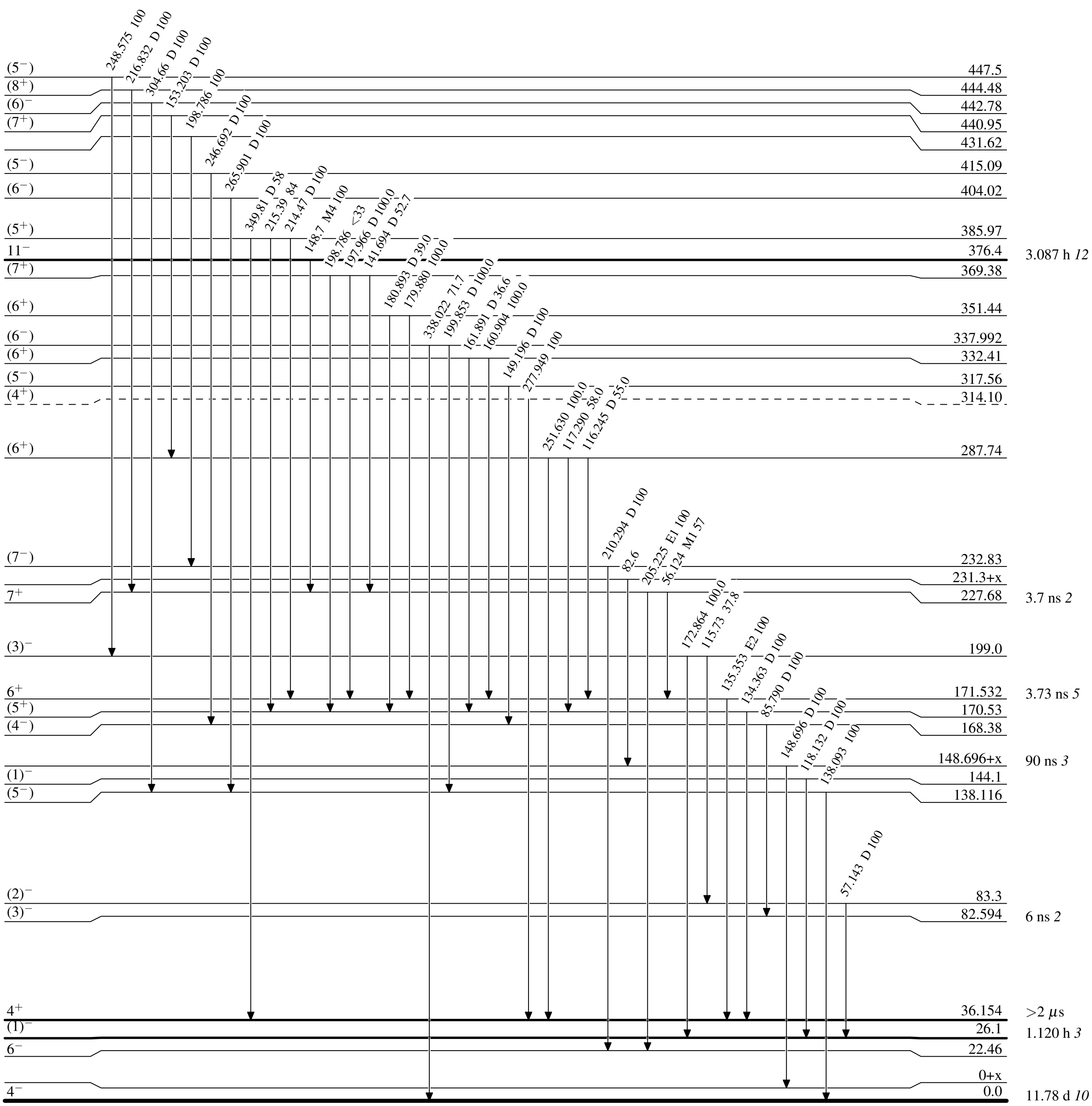


$^{190}_{77}Ir_{113}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

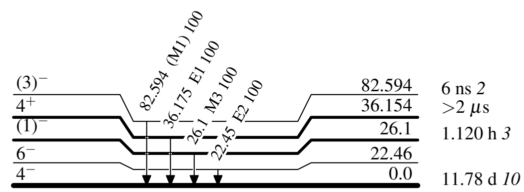


$^{190}_{77}Ir_{113}$

Adopted Levels, Gammas

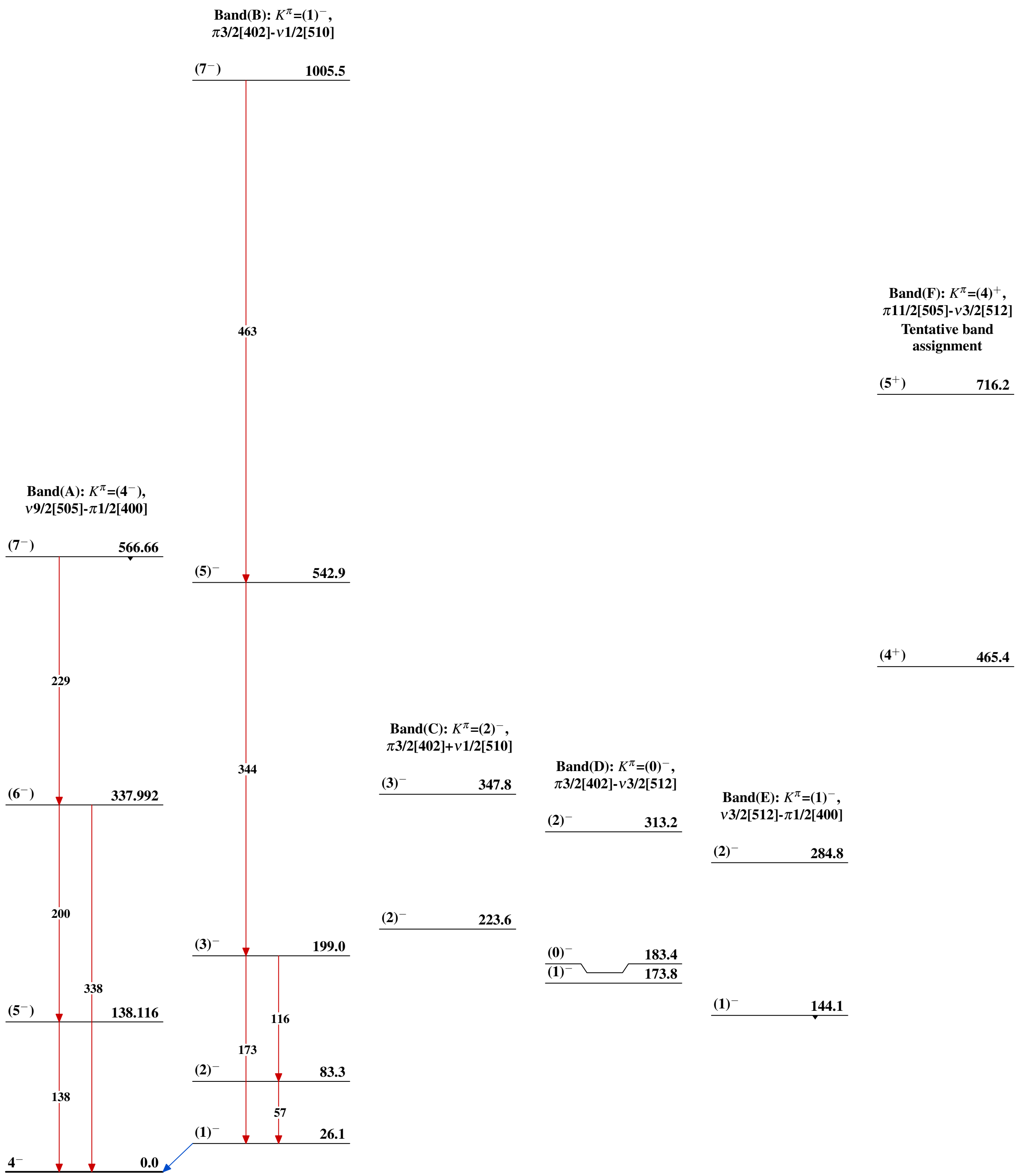
Level Scheme (continued)

Intensities: Relative photon branching from each level



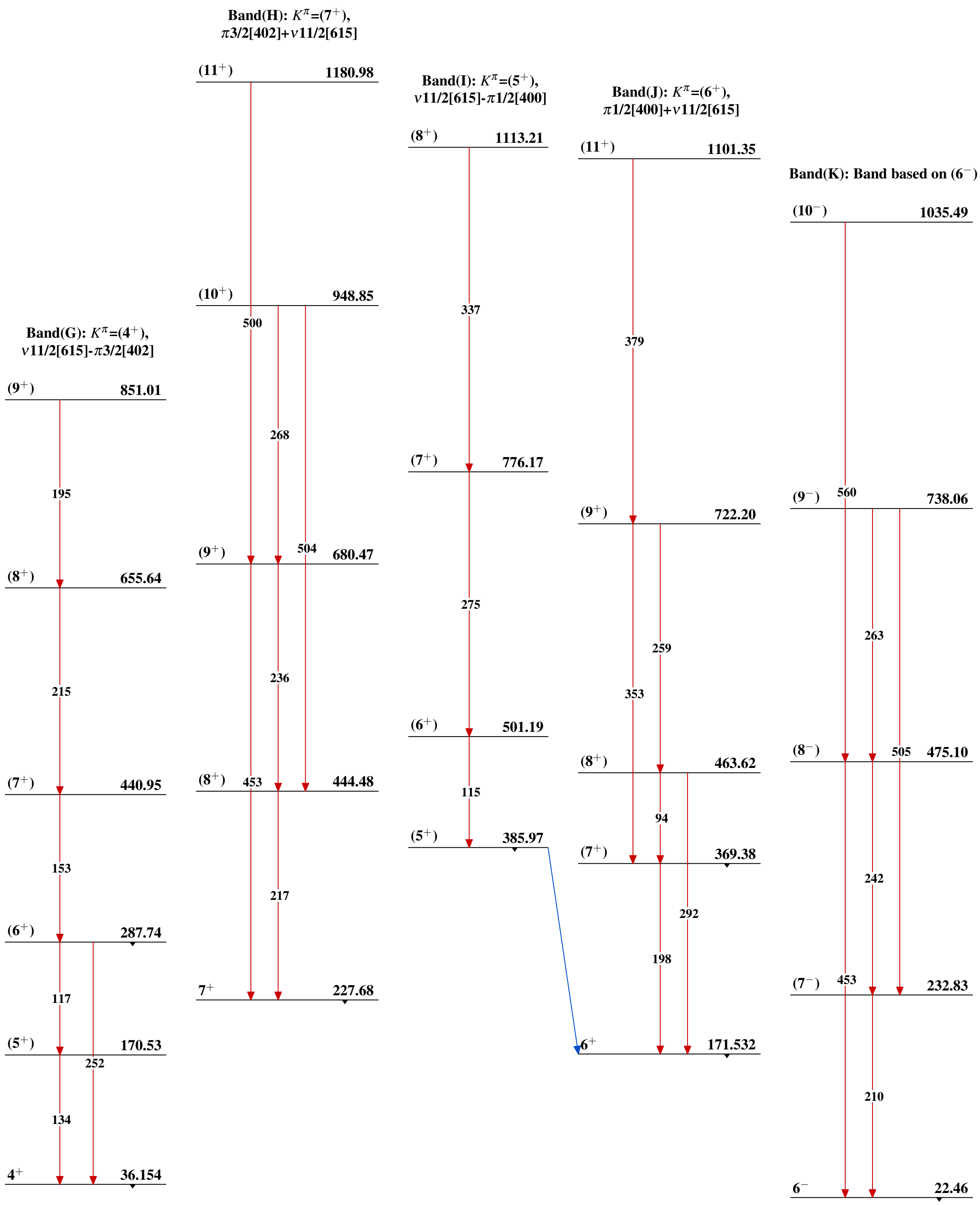
$^{190}_{77}Ir_{113}$

Adopted Levels, Gammas



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

Adopted Levels, Gammas (continued)



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

Adopted Levels, Gammas (continued)