^{190}Ir IT decay (3.087 h) 1996Ga30,1964Ha06

History

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

Parent: ^{190}Ir: E=376.4 *1*; $J^{\pi}=(11)^{-}$; $T_{1/2}$=3.087 h *12*; %IT decay=8.6 *2*

^{190}Ir-%IT decay: From $\%\varepsilon$=91.4 *2* (as quoted in 1996Ga30 from 616γ intensity). Other: %IT=5.6 *8* (1964Ha06), from average of ce(K)(148.7γ)/ce(K)(502.5γ in ^{190}Os)=0.74 *11* and ce(M)(148.7γ)/ce(K)(502.5γ)=0.68 *10*.

1996Ga30: two measurements were performed: γ-ray and conversion electron measurements. In the first measurement, source was produced via ^{192}Os(p,3n) with E=18-31 MeV proton beams from the Philips variable-energy cyclotron of the Paul Scherrer Institute (PSI) in Switzerland; γ rays were detected with the Fribourg Fribourg anti-Compton spectrometer utilizing a PGT Ge detector; measured Eγ, Iγ. In the second measurement, source was produced via ^{192}Os(d,4n) with 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 γ rays were detected with an LEPS detector; measured E(ce), I(ce), Eγ, I(γ), ce-γ-coin, ce(t), ce-ce(t). Deduced levels, J, π, half-lives, conversion coefficients, γ-ray multipolarities.

1964Ha06: source was produced from ^{190}Os(p,n) with E=12-22 MeV proton beams from the ORNL 86-Inch cyclotron. Measured ce with a magnetic spectrograph. A 15% uncertainty from authors′ statement has been assigned to measured I(ce) values by evaluators.

Isomer ratio measurements: 1987Re05, 1984He15, 1975AvZM, 1972Ze02, 1972Qa01, 1970Bo22, 1967Fl14, 1963Gr22.

Others ($T_{1/2}$ and production): 1970Bo22, 1963Gr22, 1955At32, 1950Ch11.

^{190}Ir Levels

The level scheme is from 1996Ga30.

E(level)[†]	J^{π}[‡]	$T_{1/2}$	Comments
0.0	4^{-}		J^{π}: spin=4 from observation of ε feeding to J=3, 4 and 5 levels in ^{190}Os by 1974Ya02; negative parity is assigned by 1996Ga30 based on their measured ce data of 36.2γ, 56.1γ, 135.4γ and 205.2γ, that are identified and assigned by 1996Ga30 as from the negative-parity 3.087-h isomer.
22.45	6^{-}		
36.184 *17*	4^{+}	>2 μs	$T_{1/2}$: estimated by 1996Ga30 from absence of 36.1-keV transition in ce-γ-coin spectrum shown in their Fig. 5.
171.532 *22*	6^{+}	3.7 ns *1*	$T_{1/2}$: from ce-ce(t) (1996Ga30).
227.66 *3*	7^{+}	3.7 ns *2*	$T_{1/2}$: from ce-ce(t) (1996Ga30).
376.4	11^{-}	3.087 h *12*	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. 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 ce(t) (1996Ga30). Others: 3.35 h *20* (1970Bo22), 1963Gr22, 1950Ch11.

[†] From a least-squares fit to γ-ray energies.

[‡] As proposed by 1996Ga30 based on ce data, with parenthesis added by evaluators due to lack of firm experimental evidence, unless otherwise noted. The same assignments are recommended in the Adopted Levels.

^{190}Ir IT decay (3.087 h) 1996Ga30,1964Ha06 (continued)

γ(^{190}Ir)

Iγ normalization: From summed I(γ+ce)=100 for 135.35 and 205.21 transitions.
I(Kα$_1$ x ray)(Os)=47% *7*, I(Kα$_2$ x ray)(Os)=27% *4* (1987Re05).

E_γ [†]	I_γ [†‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[†]	α[#]	$I_{(\gamma+ce)}$ [‡]	Comments
22.45	0.0086 *4*	22.45	6$^-$	0.0	4$^-$	E2	5.54×10^3 *10*	47.8 *21*	α(L)=4.19×10^3 *8*; α(M)=1061 *19*; α(N)=255 *5*; α(O)=38.4 *7*; α(P)=0.0324 *6* $I_{(\gamma+ce)}$: from I(γ+ce)(205γ). I_γ: from I(γ+ce) and calculated α by BrIcc.
36.184 *17*	91 *5*	36.184	4$^+$	0.0	4$^-$	E1	1.241		α(L1)exp+α(L2)exp=0.97 *25* (1996Ga30) α(L)=0.955 *14*; α(M)=0.225 *4*; α(N)=0.0532 *8*; α(O)=0.00817 *12*; α(P)=0.000281 *4*
56.128 *23*	36.4 *22*	227.66	7$^+$	171.532	6$^+$	M1	5.80		α(L1)exp/α(L2)exp=9.2 *13* (1996Ga30) α(L)=4.47 *7*; α(M)=1.030 *15*; α(N)=0.253 *4*; α(O)=0.0448 *7*; α(P)=0.00337 *5* δ(E2/M1)=0.04 *+3−4* from L1/L2 ratio (using BrIccMixing code), which gives α(theory)=5.89 *20*.
135.348 *14*	100.0 *19*	171.532	6$^+$	36.184	4$^+$	E2	1.401		(α(L1)exp+α(L2)exp)/α(L3)exp= 1.41 *9* (1996Ga30) α(K)=0.438 *7*; α(L)=0.725 *11*; α(M)=0.186 *3*; α(N)=0.0450 *7* α(O)=0.00691 *10*; α(P)=4.40×10^{-5} *7*
148.7 *1*	0.62 *4*	376.4	11$^-$	227.66	7$^+$	M4	475	295 *21*	ce(K)/(γ+ce)=0.216; ce(L)/(γ+ce)=0.558; ce(M)/(γ+ce)=0.169; ce(N)/(γ+ce)=0.0557 α(K)=102.8 *15*; α(L)=267 *4*; α(M)=81.4 *12*; α(N)=20.5 *3*; α(O)=3.25 *5*; α(P)=0.0955 *14* $I_{(\gamma+ce)}$: from I(γ+ce)(56.128γ+205.206γ). I_γ: from I(γ+ce) and calculated α by BrIcc. Mult.: from K:L1:L3=50:40:100 (1964Ha06). Relative to ce(K)(502γ in ^{190}Os)=100, ce(K)=70 *11*, ce(L1)=56 *9* (partially resolved), ce(L3)=140 *21*, ce(M)=65 *10* (1964Ha06). The value of ce(K)(502γ) is the apparent intensity observed in equilibrium with 3.2-h ^{190}Ir.
205.206 *26*	44.9 *20*	227.66	7$^+$	22.45	6$^-$	E1	0.0640		α(K)exp=0.07 *2*;

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^{190}Ir IT decay (3.087 h) 1996Ga30,1964Ha06 (continued)

γ(^{190}Ir) (continued)

E_γ [†]	E_i(level)	Comments
		α(L1)exp+α(L2)exp≤0.025 (1996Ga30) α(K)=0.0527 *8*; α(L)=0.00870 *13*; α(M)=0.00200 *3*; α(N)=0.000486 *7* α(O)=8.28×10^{-5} *12*; α(P)=5.00×10^{-6} *7* I(γ+ce)(205.2γ)/I(γ+ce)(56.1γ)=16.5 *7*/83.5 *7* (1996Ga30). The photon intensity ratio of 205.2γ and 56.1γ are in severe disagreement in IT decay (1996Ga30) and in ^{192}Os(p,3nγ),(d,4nγ) work (2000Ga03), both from the same 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).

† From 1996Ga30 with multipolarities deduced from ce data, unless otherwise stated.
‡ For absolute intensity per 100 decays, multiply by 0.0298 *9*.
# 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.