^{194}Au IT decay (420 ms) 1977Pa20,1975Ya14

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Jun Chen and Balraj Singh	NDS 177, 1 (2021)	3-Sep-2021

Parent: ^{194}Au: E=475.7 *6*; J^{π}=(11$^-$); $T_{1/2}$=420 ms *10*; %IT decay=100.0

^{194}Au-E,J^{π},$T_{1/2}$: From the Adopted Levels.

1977Pa20: isomers were produced via ^{195}Pt(p,2nγ) with 12-20 MeV protons from the internal slow-pulsing system of the 90-cm MC-20 cyclotron at University of Jyvaskyla on a target 11 mg/cm^2 97.3% enriched ^{195}Pt. γ rays were detected with Ge(Li) and HPGe detectors; conversion electrons were detected with a cooled silicon surface-barrier detector. Measured Eγ, Iγ, $\gamma\gamma$-coin, γ(t), $\gamma(\theta)$, E(ce), I(ce). Deduced levels, J, π, conversion coefficients, multipolarities. 1977Pa20 also report Iγ data from ^{194}Pt(p,nγ).

1975Ya14: isomers were produced via ^{194}Pt(d,2nγ) with 11, 13, 15 MeV deuterons and ^{194}Pt(p,nγ) with 11 MeV protons from the ANL accelerator. Natural and enriched Pt targets. γ rays were detected with Ge detectors. Measured Eγ, Iγ, $\gamma\gamma$-coin, γ(t). Deduced levels, $T_{1/2}$ of isomers.

1982Ne05: isomers were produced via ^{193}Ir(α,3nγ) with α beam from the Julich isochronous cyclotron JULIC on enriched ^{193}Ir target. Measured Eγ, Iγ, γ(t) with a Ge(Li) detector and measured conversion electrons with an iron-free on-line electron spectrometer of the orange type in the off-beam slow pulsing mode. Deduced isomer $T_{1/2}$, J, π, γ-ray multipolarities.

Others: 1980RoZN, 1953He57.

^{194}Au Levels

E(level)[†]	J^{π}[‡]	$T_{1/2}$[#]	Comments
0.0	1$^-$		
35.22 *7*	(2)$^-$		
80.51 *10*	(3)$^-$		
107.4 *5*	(5$^+$)	600 ms *8*	%IT=100 $T_{1/2}$: from γ(t) and pulsed beam (1975Ya14). Other: 600 ms *50* (1982Ne05).
244.6 *6*	(7$^+$)	2.6 ns *2*	
278.2 *6*	(6$^+$)	1.1 ns *4*	
406.8 *6*	(8$^+$)	2.9 ns *4*	
475.7 *6*	(11$^-$)	420 ms *10*	E(level): from the Adopted Levels. $T_{1/2}$: from γ(t) and pulsed beam (1975Ya14). Others: 420 ms *20* (1982Ne05), 400 ms *20* (1953He57).

† From a least-squares fit to γ-ray energies.
‡ From Adopted Levels.
# From γ(t) in 1977Pa20, unless otherwise stated.

γ(^{194}Au)

Iγ normalization: From I(γ+ce)(128.6γ and 162.2γ)=100.

E_γ	I_γ[#]	E_i(level)	J_i^{π}	E_f	J_f^{π}	Mult.[‡]	α[@]	Comments
26.9[†] *5*		107.4	(5$^+$)	80.51	(3)$^-$			E_γ: from ce data in 1977Pa20.
(33.6)	2.2 *4*	278.2	(6$^+$)	244.6	(7$^+$)	[M1]	31.8	α(L)=24.4 *4*; α(M)=5.68 *8* α(N)=1.414 *20*; α(O)=0.260 *4*; α(P)=0.01753 *25* %Iγ=0.60 *11* E_γ: existence of transition required by intensity balance at 245 and 278 levels. Energy deduced from level energy difference. I_γ: deduced from weighted average of I(γ+ce) balance at

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^{194}Au IT decay (420 ms) 1977Pa20,1975Ya14 (continued)

γ(^{194}Au) (continued)

E_γ	I_γ[#]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	δ[‡]	α[@]	Comments
									245 (I(γ+ce) (33.6γ)=81 *13*) and 278 (I(γ+ce)(33.6γ)=53 *19*) levels, with theoretical α_T calculated by the BrIcc code.
35.22[†] *7*		35.22	$(2)^-$	0.0	1^-				E_γ: weighted average of 35.19 *7* (1977Pa20) and 35.27 *8* (1975Ya14).
45.29[†] *7*		80.51	$(3)^-$	35.22	$(2)^-$				E_γ: weighted average of 45.32 *7* (1977Pa20) and 45.25 *9* (1975Ya14).
69.0 *7*	0.37 *4*	475.7	(11^-)	406.8	(8^+)	(E3)		1.06×10^3 *7*	α(L)=7.7×10^2 *5*; α(M)=224 *15* α(N)=56 *4*; α(O)=8.8 *6*; α(P)=0.0124 *7* %Iγ=0.101 *11* E_γ: from ce data in 1977Pa20. I_γ: from ce(L)(69γ)/ce(L)(128.6γ)= 2.69 *28* (1977Pa20) and mult=E3. Others: 0.39 *5* from I(γ+ce) balance at 407 level; <10 from γ-ray spectrum (1977Pa20). Mult.: L/(M+N)=2.2 *3* and α(L)exp>26 (1977Pa20) rule out mult=D,E2; E3 proposed by 1982Ne05 based on their ce data (not explicitly given).
128.57 *10*	100	406.8	(8^+)	278.2	(6^+)	E2		1.89	α(K)=0.462 *7*; α(L)=1.069 *16*; α(M)=0.277 *4* α(N)=0.0683 *10*; α(O)=0.01099 *16*; α(P)=5.04×10^{-5} *8* %Iγ=27.3 *6* E_γ: weighted average of 128.58 *10* (1977Pa20) and 128.55 *12* (1975Ya14). Mult.: from α(L)exp=1.12 *8* (1977Pa20), relative to a known E2 transition from ^{133}Ba; α(K)exp<0.9 normalized to theoretical α(L)=1.08 for this transition.
137.17 *10*	64 *4*	244.6	(7^+)	107.4	(5^+)	E2		1.470	α(K)=0.406 *6*; α(L)=0.798 *12*; α(M)=0.207 *3* α(N)=0.0509 *8*; α(O)=0.00821 *12*; α(P)=4.31×10^{-5} *6* %Iγ=17.5 *12* E_γ: weighted average of 137.16 *10* (1977Pa20) and 137.20 *14* (1975Ya14). I_γ: from 1977Pa20. Other: 65 *5* (1975Ya14). Mult.: from α(L)exp=0.78 *9*, α(K)exp<1.2 (1977Pa20).
162.22 *12*	37 *3*	406.8	(8^+)	244.6	(7^+)	E2+M1	−1.6 *3*	1.08 *10*	α(K)=0.62 *12*; α(L)=0.343 *13*; α(M)=0.087 *4* α(N)=0.0214 *10*; α(O)=0.00356 *13*; α(P)=7.1×10^{-5} *14* %Iγ=10.1 *7*

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^{194}Au IT decay (420 ms) 1977Pa20,1975Ya14 (continued)

$\gamma(^{194}Au)$ (continued)

E_γ	I_γ[#]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	δ[‡]	α[@]	Comments
170.78 *10*	101 *6*	278.2	(6^+)	107.4	(5^+)	M1+E2	−0.6 *2*	1.34 *12*	E_γ: from 1977Pa20. Other: 162.22 *16* (1975Ya14). I_γ: from 1977Pa20. Other: 36 *4* (1975Ya14). Mult.,δ: from α(K)exp=0.65 *10*, α(L)exp=0.32 *8* (1977Pa20). Sign(δ) from $\gamma(\theta)$ in 1977Pa20. α(K)=1.02 *14*; α(L)=0.239 *12*; α(M)=0.058 *4* α(N)=0.0143 *9*; α(O)=0.00252 *11*; α(P)=0.000121 *17* %Iγ=27.6 *18* E_γ: weighted average of 170.78 *10* (1977Pa20) and 170.77 *12* (1975Ya14). I_γ: from 1977Pa20. Other: 102 *7* (1975Ya14). Mult.,δ: from α(K)exp=1.07 *13*, α(L)exp=0.24 *5* (1977Pa20). Sign(δ) from $\gamma(\theta)$ in 1977Pa20.

† See ^{194}Au IT decay (600 ms) for mult, δ and Iγ.

‡ From ce data, normalized to ce(L) for 128.6γ treated as E2 with α(L)=1.08. The E2 assignment to 128.6γ based on α(L)exp=1.12 *8* determined relative to a known E2 356.0γ from ^{133}Ba.

For absolute intensity per 100 decays, multiply by 0.273 *6*.

@ 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.

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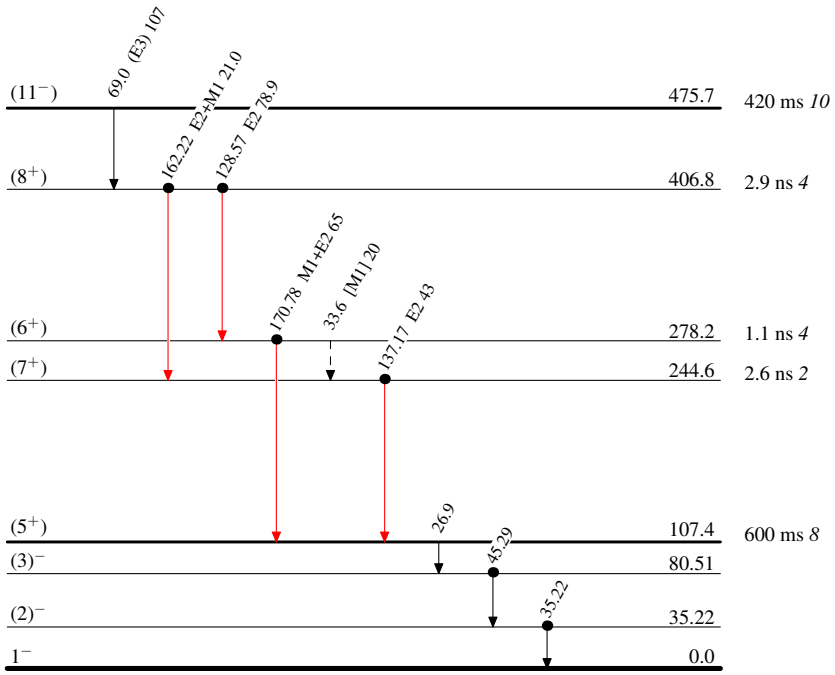
Decay Scheme

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays

%IT=100.0

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)
- Coincidence



$^{194}_{79}Au_{115}$