^{196}Au ε decay (6.1669 d) 1967Ja02,1963Ik01

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Huang Xiaolong	NDS 108, 1093 (2007)	1-Jan-2006

Parent: ^{196}Au: E=0.0; J$^{\pi}$=2^{-}; $T_{1/2}$=6.1669 d *6*; Q(ε)=1507 *3*; %ε+%β^+ decay=93.0 *3*

Source prepared by ^{196}Pt(d,2n), enriched target, chem, γ's semi (1967Ja02); natural Pt(p,n) and ^{197}Au(γ,n), chem, cryst γ, s ce (1963Ik01).

The adopted level scheme is essentially that given by 1967Ja02.

^{196}Pt Levels

E(level)†	J$^{\pi}$‡	$T_{1/2}$	Comments
0.0	0$^+$	stable	
355.73 *5*	2$^+$	32 ps *2*	E(level): from 1961Be14. J$^{\pi}$: supported by E2 transition, Coul. ex. $T_{1/2}$: weighted av: $T_{1/2}$=30.2 ps *21*, delayed coin (1972Be53); 35.4 ps *35*, recoil-distance Doppler shift (1971NoZT).
688.76 *7*	2$^+$	38 ps *4*	E(level): from 1961Be14. J$^{\pi}$: supported by E0+M1+E2 transition to 356 level. $T_{1/2}$: from delayed coin, renormalized to $T_{1/2}$(356)=32 ps (1972Be53).
877.0 *2*	4$^+$		E(level): from coin observation of 521.4 and 355.7 γ's (1962Wa16,1963Ik01). J$^{\pi}$: supported by E2 character of 521.4γ, E1 character of 571γ, as well as log *ft*. See also ^{196}Ir β^- decay.
1015.2 *3*	(2$^+$,3$^+$)		E(level): supported by coin between 326, 333 and 356 γ's. J$^{\pi}$: if 659 γ is M1.
1270.4? *10*	5$^-$		
1361.5 *5*	(1$^+$,2$^+$)		
1447.3 *8*	(3)$^-$		E(level): from 1091.4 and 355.7 γ's. J$^{\pi}$: supported by E1 character of 1091 and 759 γ's.

† From least-squares fit to Eγ's.
‡ From Adopted Levels, except as noted.

ε,β^+ radiations

E(decay)	E(level)	Iε†‡	Log *ft*	I($\varepsilon+\beta^+$)‡	Comments
(60 *3*)	1447.3	0.210 *9*	6.45 *6*	0.210 *9*	εL=0.677 *6*; εM+=0.323 *6*
(146 *3*)	1361.5	0.0059 *5*	9.22 *5*	0.0059 *5*	εK=0.534 *12*; εL=0.340 *9*; εM+=0.125 *4*
(237 *3*)	1270.4?	0.0102 *7*	9.61 *4*	0.0102 *7*	εK=0.693 *3*; εL=0.2277 *19*; εM+=0.0789 *8*
(492 *3*)	1015.2	0.057 *15*	9.65 *12*	0.057 *15*	εK=0.7726 *4*; εL=0.1710 *3*; εM+=0.05643 *11*
(630 *3*)	877.0	0.380 *15*	9.167^{1u} *20*	0.380 *15*	εK=0.7319 *6*; εL=0.1998 *5*; εM+=0.06828 *17*
(818 *3*)	688.76	24.6 *10*	7.509 *18*	24.6 *10*	εK=0.7941 2; εL=0.15547 *8*; εM+=0.05040 *3*
(1151 *3*)	355.73	67.0 *21*	7.392 *14*	67.0 *21*	εK=0.8026; εL=0.14939 *4*; εM+=0.04806 *2* Iε: Iε/Iβ=2.0×10^6 *4* (1963Ik01).
(1507 *3*)	0.0	<0.9	>10.4^{1u}	<0.9	εK=0.7907; εL=0.15782 *5*; εM+=0.05138 *2* Iε: <0.9 estimated from β^- systematics (calculated and observed ε/β^+).

† From intensity balance at each level.
‡ Absolute intensity per 100 decays.

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γ(^{196}Pt)

Iγ normalization: From ε+β^+(g.s.)≤0.9% and B^-(GS)≤0.3% (systematics of log *ft* in neighboring nuclei) and [Ti(356γ, with ε decay)+I(γ+ce) (426γ, with β^- decay)]=100%-ε+β^+(g.s.)−B^-(GS)=100-0.6 *6*=99.4 *6*%.

E_γ	I_γ[†]	E_i(level)	J^π_i	E_f	J^π_f	Mult.	δ	α[‡]	Comments
326.2 *4*	0.057 *13*	1015.2	(2+,3+)	688.76	2+	[M1]		0.243	α(K)=0.201 *3*; α(L)=0.0327 *5*; α(M)=0.00755 *11*; α(N+..)=0.00223 *4* Eγ,Iγ: from 1967Ja02, seen in γγ-coin.
333.03 *5*	26.3 *6*	688.76	2+	355.73	2+	E0+M1+E2	5.2 *5*	0.0782 *17*	α(K)=0.0523 *14*; α(L)=0.0196 *3*; α(M)=0.00487 *7*; α(N+..)=0.001398 *21* α(K)=0.051, α(L)=0.021 (from α(K)exp and K/L/MNO from E2 theory). E_γ: from 1961Be14. I_γ: from 1967Ja02. Mult.: based upon angular correlation; see comment under δ. Also from α(K)exp: 0.059 *4* (1956Th10), 0.056 *3* (1962Ge07), 0.048 *5* (1967Ja02,1963Ik01); also 1961Be14, theory: α(K)(E2)=0.050, α(K)(M1)=0.253. Mult.: theory predicts that monopole internal conversion transitions between states of equal J^π can compete with E2 transitions. Although conversion coefficients may be too insensitive to detect E0 admixtures, angular correlations have been so used. Two solutions have been identified. Q, λ: −0.22 *7*, 2 *6*, and +0.39 *5*, 68 *12* (1965Pe06); −0.25 *11*, 2 *7*, and +0.42 *6*, 62 *15* (1968IkZZ); −0.23 +*16*−*20*, 6 *9*, and +0.44 +*9*−*10*, 67 *11* (1971Do12). Q**2=(E0 ce)/(E2 ce) and λ=penetration factor. See also 1955Ch65, 1956Ch21, 1958Ch48, 1958Ge37, 1962Ge07. δ: 5.2 adopted. δ: from angular correlation measurements: δ=−5 *1* (1953St05), δ=−5.0 *5* (1963Ik01), δ=−4.9 *2* (1965Pe06), δ=−4.03 *12* (1969Ha43), δ=−5.7 *3* (1971Kr01).
355.73 *5*	100	355.73	2+	0.0	0+	E2		0.0603	α(K)=0.0402 *6*; α(L)=0.01519 *22*; α(M)=0.00377 *6*;

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$\gamma(^{196}Pt)$ (continued)

E_γ	I_γ†	E_i(level)	J_i^π	E_f	J_f^π	Mult.	α‡	Comments
								α(N+..)=0.001081 *16* E_γ: from 1961Be14, 1976HeZF; also 355.68 *6* (1960De17, calibration correction by evaluators). Mult.: supported by α(K)exp: 0.0395 *22* (1962Ja10), 0.041 *3* and 0.042 *3* (1962Ge07), 0.0367 *24* (1960De17), 0.042 *3* (1956Th10). Theory: α(K)(E2)=0.0404, α(K)(M1)=0.165.
393.4 *4*	0.0116 *6*	1270.4?	5$^-$	877.0	4$^+$	E1	0.01395	α(K)=0.01159 *17*; α(L)=0.00182 *3*; α(M)=0.000419 *6*; α(N+..)=0.0001220 *18* E_γ: placement based upon observation of coin with 356γ and absence of coin with either 333 or 326 G. See also ^{196}Ir β^- decay.
432.0 *3*	0.0077 *7*	1447.3	(3)$^-$	1015.2	(2$^+$,3$^+$)	[E1,M2]	0.19 *18*	α(K)=0.15 *14*; α(L)=0.03 *3*; α(M)=0.007 *7*; α(N+..)=0.0021 *21* Eγ,Iγ: from 1967Ja02, seen in $\gamma\gamma$-coin.
521.4 *2*	0.447 *10*	877.0	4$^+$	355.73	2$^+$	E2	0.0224	α(K)=0.01666 *24*; α(L)=0.00435 *7*; α(M)=0.001054 *15*; α(N+..)=0.000305 *5* E_γ: from 1967Ja02, also 521.3 *7* (1962Wa16). I_γ: from 1967Ja02, also 1963Ik01. Mult.: supported by α(K)exp=0.015 *2* (Ice(K) from 1963Ik01, Iγ from 1967Ja02). α(K)(theory)=0.017; see also ^{196}Ir(1.4-h) β^- decay.
570.8 *4*	0.0079 *6*	1447.3	(3)$^-$	877.0	4$^+$	(E1+M2)	0.08 *8*	α(K)=0.07 *7*; α(L)=0.013 *12* Eγ,Iγ: from 1967Ja02. Mult.: α(K)exp=0.016 *6* (1967Ja02), α(K)exp=0.0061 (1963Ik01).
659.5 *3*	0.0042 *3*	1015.2	(2$^+$,3$^+$)	355.73	2$^+$	(M1)	0.0379	α(K)=0.0314 *5*; α(L)=0.00501 *7*; α(M)=0.001153 *17*; α(N+..)=0.000340 *5* Eγ,Iγ: from 1967Ja02. Mult.: α(K)exp=0.029 *10* (if the 645 K-line of 1963Ik01 may be identified with the 659.5γ).
673.5 *7*	0.0031 *3*	1361.5	(1$^+$,2$^+$)	688.76	2$^+$	(M1+E2)	0.024 *12*	α(K)=0.020 *10*; α(L)=0.0034 *14*; α(M)=0.0008 *3*; α(N+..)=0.00023 *9* Eγ,Iγ: from 1967Ja02.
688.76	0.007 *2*	688.76	2$^+$	0.0	0$^+$	(E2)	0.01184	α(K)=0.00924 *13*; α(L)=0.00199 *3*; α(M)=0.000473 *7*; α(N+..)=0.0001375 *20* I_γ: from 1967Ja02; also α(K)exp(689)/α(K)exp(356)<2×10^{-5} (1963Ik01), α(K)exp(689)/α(K)exp(333)< 1/12000 (1957Al45), Iγ=0.003 *2* (1962Wa16), Iγ(688.7)/ Iγ(333.0)≤6.E−5 (1972Be53). Mult.: α(K)exp=0.006 *6* (1967Ja02,1963Ik01).
759.1 *3*	0.051 *2*	1447.3	(3)$^-$	688.76	2$^+$	(E1)	0.00355	α(K)=0.00297 *5*; α(L)=0.000444 *7*; α(M)=0.0001014 *15*; α(N+..)=2.97×10^{-5} *5*

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^{196}Au ε decay (6.1669 d) 1967Ja02,1963Ik01 (continued)

$\gamma(^{196}Pt)$ (continued)

E_γ	I_γ †	E_i(level)	J_i^π	E_f	J_f^π	Mult.	α ‡	Comments
								Eγ,Iγ: from 1967Ja02. Mult.: supported by α(K)exp=0.0032 *8*, theory: α(K)(E1)=0.0030.
1005.7 *3*	0.0031 *3*	1361.5	$(1^+,2^+)$	355.73	2^+			Eγ,Iγ: from 1967Ja02; also 1962Wa16,1963Ik01.
1091.4 *2*	0.171 *7*	1447.3	$(3)^-$	355.73	2^+	E1	0.00181	α(K)=0.001521 *22*; α(L)=0.000222 *4*; α(M)=5.06×10^{-5} *7*; α(N+..)=1.486×10^{-5} *21* Eγ,Iγ: from 1967Ja02; also 1963Ik01,1962Wa16. Mult.: supported by α(K)exp=0.0016 *2* (1967Ja02,1963Ik01), also 1961Be14; theory: α(K)(E1)=0.0015.
1361.0 *10*	0.0005 *2*	1361.5	$(1^+,2^+)$	0.0	0^+	[E2]	0.00305	α(K)=0.00249 *4*; α(L)=0.000410 *6*; α(M)=9.48×10^{-5} *14*; α(N+..)=5.61×10^{-5} *8* Eγ,Iγ: from 1967Ja02.
1446.3 *7*	0.0009 *2*	1447.3	$(3)^-$	0.0	0^+	[E3]	0.00555	α(K)=0.00442 *7*; α(L)=0.000849 *12*; α(M)=0.000200 *3*; α(N+..)=7.99×10^{-5} *12* Eγ,Iγ: from 1967Ja02.

† For absolute intensity per 100 decays, multiply by 0.87 *3*.

‡ 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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