^{192}Hg ε decay 1963Ja11,1968Ki04

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Coral M. Baglin	NDS 113, 1871 (2012)	15-Jun-2012

Parent: ^{192}Hg: E=0.0; J$^\pi$=0$^+$; T$_{1/2}$=4.85 h *20*; Q(ε)=764 *22*; %ε decay=100.0

Others: 1954Gi04, 1961Ja10, 1961Ja25, 1962Ja04, 1971Ho04.

The decay scheme is from 1968Ki04; see paper for more complete, but less well established, alternative scheme which introduces possible levels at 45.2, 92.9, 136.1 and 303.1 keV. Data are from 1963Ja11 (preliminary work by authors of 1968Ki04) and 1968Ki04, except where noted. Sources from ^{197}Au(p,6n); measured Eγ, Ice, Iγ, γce coin (Ge(Li), FWHM=0.85 keV at 88 keV; mag spect).

^{192}Au Levels

E(level)	J$^\pi$†	T$_{1/2}$‡	E(level)	J$^\pi$†	T$_{1/2}$‡	E(level)	J$^\pi$†	T$_{1/2}$‡
0.0	1$^-$	4.94 h *9*	157.28 *23*	0$^-$,1$^-$	<0.05 ns	262.59 *19*	0$^-$,1$^-$	
31.61 *5*	2$^-$	0.69 ns *2*	167.49 *19*	(1)$^-$		306.47 *16*	1$^+$	<0.18 ns
120.09 *19*	0$^-$,1$^-$,2$^-$		204.57 *20*	0$^-$,1$^-$,2$^-$		436.59 *24*	0$^-$,1$^-$	
146.06 *17*	(1,2)$^-$		245.57 *20*	0$^-$,1$^-$				

† From ^{192}Au Adopted Levels.

‡ From (ce)(ce)(t) (1971Ho04), except as noted. Others: 1961Ja10, 1962Ja04.

ε radiations

A β^+ group, corresponding to 1870 keV *70* for ^{192}Hg-^{192}Au decay energy, reported by 1975ViZK is not consistent with adopted Q+ (764 *22*, 2011AuZZ).

E(decay)	E(level)	Iε†	Log *ft*	Comments
(327 22)	436.59	1.37 *17*	6.39 *10*	εK=0.734 *9*; εL=0.198 *6*; εM+=0.0675 *24*
(458 22)	306.47	66 *5*	5.06 *7*	εK=0.764 *4*; εL=0.1771 *25*; εM+=0.0592 *10*
(501 22)	262.59	6.4 *8*	6.16 *8*	εK=0.770 *3*; εL=0.1729 *20*; εM+=0.0575 *8*
(518 22)	245.57	8.2 *18*	6.09 *11*	εK=0.772 *3*; εL=0.1715 *19*; εM+=0.0570 *8*
(597 22)	167.49	2.2 *11*	6.80 *22*	εK=0.7788 *19*; εL=0.1663 *13*; εM+=0.0549 *6*
(607 22)	157.28	19.7 *12*	5.87 *5*	εK=0.7796 *18*; εL=0.1657 *13*; εM+=0.0547 *5*

† Absolute intensity per 100 decays.

γ(^{192}Au)

Iγ normalization: From total I(γ+ce) to g.s.=100%, assuming no direct ε feeding from the 0$^+$ parent to either the 1$^-$ g.s. or the 2$^-$ 31.6 level; log *ft*=7.8 *+5−9* for a similar transition in ^{194}Hg decay leads to %ε+%β^+ to g.s.<2.5, and five other cases in α=188,190,194 give larger log *ft* values). log $f^{1u}t$>8.5 to 32 level implies %ε<0.09.

E$_\gamma$‡	I$_\gamma$#b	E$_i$(level)	J$^\pi_i$	E$_f$	J$^\pi_f$	Mult.@	δ&	α†	Comments
^{x}27.3 *6*	*a*								Weak.
31.61 *5*	17.5 *9*	31.61	2$^-$	0.0	1$^-$	M1+E2	0.084 *3*	46.2 *9*	α(L)exp=31 *7* (1968Ki04) α(L)=35.4 *7*; α(M)=8.37 *17*; α(N+..)=2.47 *5* α(N)=2.08 *5*; α(O)=0.372 *7*; α(P)=0.0209 *3* %Iγ=1.26 *7* assuming adopted decay scheme

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^{192}Hg ε decay 1963Ja11,1968Ki04 (continued)

γ(^{192}Au) (continued)

Eγ[‡]	Iγ[#b]	Ei(level)	$J^π_i$	E_f	$J^π_f$	Mult.[@]	δ[&]	α[†]	Comments
									normalization. L1:L2:L3=100 *4*:19.1 *12*:13.3 *7* (1971Ho04); L1:L2:L3=100:17:10, M1:M2:M3=100:16:13, L/M=4.2 (1963Ja11). Eγ,δ: from ce(L) data (1971Ho04). Iγ: from I(γ+ce), as deduced from intensity balance at 31.6 level, and α. Iγ=26 *6* from experiment (1968Ki04).
40.9 *3*	a	245.57	0⁻,1⁻	204.57	0⁻,1⁻,2⁻				
x45.2 *6*	a								Very weak.
x47.4 *6*	a								Very weak.
x47.7 *3*	a					M1		11.3 *3*	α(L)=8.70 *21*; α(M)=2.02 *5*; α(N+..)=0.602 *14* α(N)=0.503 *12*; α(O)=0.0924 *22*; α(P)=0.00624 *15* L1/L2≥8, L/M=3.3 (1963Ja11).
x58.0 *3*	a								L1/L3≥5 (1963Ja11).
x74.7 *6*	a								Very weak.
x77.9 *6*	a								Very weak.
88.5 *6*	a	120.09	0⁻,1⁻,2⁻	31.61	2⁻				Very weak.
x95.0 *3*	1.4 *4*								
99.4 *3*	9.4 *24*	245.57	0⁻,1⁻	146.06	(1,2)⁻	M1(+E2)	0.4 +*10*−*4*	7.1 *11*	α(K)exp=5.4 *28* (1968Ki04) α(K)=5 *3*; α(L)=1.4 *13*; α(M)=0.3 *4*; α(N+..)=0.10 *10* α(N)=0.08 *9*; α(O)=0.014 *14*; α(P)=0.0006 *4* Additional information 1. K/L=4, L1/L2=12.5 (1963Ja11).
101.9 *3*	17 *4*	306.47	1⁺	204.57	0⁻,1⁻,2⁻	E1		0.396 *7*	α(K)exp=0.31 *20* (1968Ki04) α(K)=0.317 *5*; α(L)=0.0602 *10*; α(M)=0.01403 *23*; α(N+..)=0.00405 *7* α(N)=0.00343 *6*; α(O)=0.000590 *10*; α(P)=2.62×10^{-5} *4* K/L≥5 (1963Ja11).
x104.5 *6*	10.0 *25*					M1(+E2)	0.6 +*8*−*6*	5.9 *9*	α(K)exp=4.2 *20* (1968Ki04) α(K)=4.0 *19*; α(L)=1.4 *8*; α(M)=0.34 *21*; α(N+..)=0.10 *6* α(N)=0.08 *5*; α(O)=0.014 *8*; α(P)=0.00049 *22* K/L=4.4, L1/L3=8 (1963Ja11). See comment with 105.4γ.
105.4 *6*	2.4 *6*	262.59	0⁻,1⁻	157.28	0⁻,1⁻	M1		6.24 *14*	α(K)exp=8 *4* (1968Ki04) α(K)=5.12 *11*; α(L)=0.861 *19*; α(M)=0.200 *5*; α(N+..)=0.0596 *13*

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^{192}Hg ε decay 1963Ja11,1968Ki04 (continued)

γ(^{192}Au) (continued)

E_γ[‡]	I_γ[#b]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[@]	δ[&]	α[†]	Comments
									α(N)=0.0498 *11*; α(O)=0.00915 *20*; α(P)=0.000618 *14* K/L≥4.5 (1963Ja11). Placement assumes 157.2γ-105.4γ coincidence; data are equally consistent with a 157.2γ-104.5γ cascade.
[x]109.4 *3*	8.5 *12*					M1(+E2)	0.7 *+8−7*	4.9 *8*	α(K)exp=3.4 *15* (1968Ki04) α(K)=3.3 *15*; α(L)=1.3 *6*; α(M)=0.31 *15*; α(N+..)=0.09 *5* α(N)=0.08 *4*; α(O)=0.013 *6*; α(P)=0.00040 *18* K/L=3, L1/L2≥10.
114.5 *3*	10.6 *24*	146.06	(1,2)$^-$	31.61	2$^-$	M1		4.92 *8*	α(K)exp=5.7 *22* (1968Ki04) α(K)=4.04 *7*; α(L)=0.678 *11*; α(M)=0.157 *3*; α(N+..)=0.0469 *8* α(N)=0.0392 *7*; α(O)=0.00721 *12*; α(P)=0.000487 *8* K/L=6.3, L1/L2≥16, L/M=3.5 (1963Ja11).
116.5 *3*	4.0 *4*	262.59	0$^-$,1$^-$	146.06	(1,2)$^-$	M1(+E2)	<0.2	4.65 *9*	α(K)exp=3.8 *15* (1968Ki04) α(K)=3.78 *9*; α(L)=0.665 *23*; α(M)=0.155 *6*; α(N+..)=0.0462 *17* α(N)=0.0387 *15*; α(O)=0.00706 *23*; α(P)=0.000455 *11* K/L≥5.5 (1963Ja11). δ: 0.12 *+82−12* from α(K)exp,≤0.18 from K/L.
120.1 *3*	11.0 *25*	120.09	0$^-$,1$^-$,2$^-$	0.0	1$^-$	M1		4.30 *7*	α(K)exp=5.5 *22* (1968Ki04) α(K)=3.53 *6*; α(L)=0.591 *10*; α(M)=0.1373 *22*; α(N+..)=0.0409 *7* α(N)=0.0342 *6*; α(O)=0.00629 *10*; α(P)=0.000424 *7* K/L>4, L1/L3≥16, L/(M+N)=3.1 (1963Ja11).
[x]122.3 *6*	[a]								Very weak.
135.9 *3*	12.4 *24*	167.49	(1)$^-$	31.61	2$^-$	M1(+E2)	0.3 *+9−3*	2.9 *8*	α(K)exp=2.3 *11* (1968Ki04) α(K)=2.3 *11*; α(L)=0.45 *22*; α(M)=0.11 *6*; α(N+..)=0.031 *17* α(N)=0.026 *15*; α(O)=0.0048 *21*; α(P)=0.00028 *13* K/L=6.7; L1/L2≥10, L/M=3.2 (1963Ja11).
[x]136.1 *6*	[a]								Very weak.
139.0 *3*	14 *6*	306.47	1$^+$	167.49	(1)$^-$	E1		0.180	α(K)exp=0.26 *10* (1968Ki04) α(K)=0.1463 *22*; α(L)=0.0261 *4*; α(M)=0.00607 *10*; α(N+..)=0.00176 *3* α(N)=0.001490 *23*; α(O)=0.000260 *4*; α(P)=1.261×10^{-5} *19* K/L≥7 (1963Ja11).

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^{192}Hg ε decay 1963Ja11,1968Ki04 (continued)

$\gamma(^{192}Au)$ (continued)

E_γ[‡]	I_γ[#b]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[@]	δ[&]	α[†]	Comments
142.5 *3*	9.5 *18*	262.59	$0^-,1^-$	120.09	$0^-,1^-,2^-$	M1		2.64	α(K)exp=3.3 *16* (1968Ki04) α(K)=2.17 *4*; α(L)=0.363 *6*; α(M)=0.0841 *13*; α(N+..)=0.0251 *4* α(N)=0.0210 *4*; α(O)=0.00385 *6*; α(P)=0.000260 *4* K/L=8, L1:L2:L3=100:<17:<17, L/M=3.5 (1963Ja11).
146.0 *3*	14 *3*	146.06	$(1,2)^-$	0.0	1^-	M1(+E2)	0.6 +*11*−*6*	2.1 *7*	α(K)exp=1.6 *8* (1968Ki04) α(K)=1.6 *8*; α(L)=0.41 *13*; α(M)=0.10 *4*; α(N+..)=0.029 *11* α(N)=0.025 *9*; α(O)=0.0043 *13*; α(P)=0.00019 *10* K/L1≈8.6, L1/L3≥8 (1963Ja11). Inconclusive coincidence data suggest possible second placement for 146.0γ.
157.2 *3*	100	157.28	$0^-,1^-$	0.0	1^-	M1		2.00	α(K)=1.642 *25*; α(L)=0.274 *5*; α(M)=0.0636 *10*; α(N+..)=0.0190 *3* α(N)=0.01585 *24*; α(O)=0.00291 *5*; α(P)=0.000197 *3* %Iγ=7.2 *12* assuming adopted decay scheme normalization. K/L=6.8, L1:L2:L3=97:10:<5; L/(M+N)=3.4 (1963Ja11). Mult.: from K/L and L subshell ratios.
167.5 *3*	[a]	167.49	$(1)^-$	0.0	1^-				
186.4 *3*	47 *8*	306.47	1^+	120.09	$0^-,1^-,2^-$	E1		0.0859	α(K)exp=0.09 *5* (1968Ki04) α(K)=0.0703 *11*; α(L)=0.01204 *18*; α(M)=0.00279 *4*; α(N+..)=0.000815 *12* α(N)=0.000687 *10*; α(O)=0.0001211 *18*; α(P)=6.31×10^{-6} *10*
[x]191.1 *3*	[a]								
204.6 *3*	11.8 *24*	204.57	$0^-,1^-,2^-$	0.0	1^-	(M1)		0.954	α(K)exp=0.8 *4* (1968Ki04) α(K)=0.784 *12*; α(L)=0.1303 *19*; α(M)=0.0302 *5*; α(N+..)=0.00901 *14* α(N)=0.00753 *11*; α(O)=0.001385 *21*; α(P)=9.36×10^{-5} *14* K/L=4.3, L1:L2:L3=100:<=14:<=14 (1963Ja11).
[x]232.0 *6*	[a]								Weak.
245.4 *3*	24 *4*	245.57	$0^-,1^-$	0.0	1^-	M1		0.576	α(K)exp=0.4 *2* (1968Ki04) α(K)=0.474 *7*; α(L)=0.0785 *12*; α(M)=0.0182 *3*; α(N+..)=0.00542 *8* α(N)=0.00453 *7*; α(O)=0.000834 *12*;

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^{192}Hg ε decay 1963Ja11,1968Ki04 (continued)

$\gamma(^{192}Au)$ (continued)

E_γ [‡]	I_γ [#b]	E_i(level)	J_i^π	E_f	J_f^π	Mult. [@]	α [†]	Comments
								α(P)=5.64×10^{-5} *9*
262.6 *3*	9.5 *30*	262.59	0$^-$,1$^-$	0.0	1$^-$	M1	0.478	K/L=5, (L1+L2)/L3≥6, L/M=3.2 (1963Ja11). α(K)exp=0.52 *19* (1968Ki04) α(K)=0.393 *6*; α(L)=0.0651 *10*; α(M)=0.01508 *22*; α(N+..)=0.00449 *7* α(N)=0.00376 *6*; α(O)=0.000691 *10*; α(P)=4.68×10^{-5} *7*
274.8 *3*	720 *28*	306.47	1$^+$	31.61	2$^-$	E1	0.0331	K/L=8.5 (1963Ja11). α(K)exp=0.27 *10* (1968Ki04) α(K)=0.0273 *4*; α(L)=0.00449 *7*; α(M)=0.001038 *15*; α(N+..)=0.000304 *5* α(N)=0.000256 *4*; α(O)=4.57×10^{-5} *7*; α(P)=2.57×10^{-6} *4*
279.2 *3*	6.0 *8*	436.59	0$^-$,1$^-$	157.28	0$^-$,1$^-$	M1	0.404	K/L=5, (L1+L2)/L3=3.6, L/M=3.4 (1963Ja11). α(K)exp=0.34 *15* (1968Ki04) α(K)=0.332 *5*; α(L)=0.0549 *8*; α(M)=0.01273 *19*; α(N+..)=0.00379 *6* α(N)=0.00317 *5*; α(O)=0.000584 *9*; α(P)=3.95×10^{-5} *6*
[x]303.1 *3*	2.4 *15*					(M1,E2)	0.21 *12*	K/L≥3.5 (1963Ja11). α(K)=0.16 *11*; α(L)=0.037 *8*; α(M)=0.0088 *14*; α(N+..)=0.0026 *5* α(N)=0.0022 *4*; α(O)=0.00038 *8*; α(P)=1.9×10^{-5} *13* α(K)exp<0.25 *20*.
306.5 *3*	77 *8*	306.47	1$^+$	0.0	1$^-$	E1	0.0256	α(K)exp=0.028 *15* (1968Ki04) α(K)=0.0211 *3*; α(L)=0.00344 *5*; α(M)=0.000794 *12*; α(N+..)=0.000233 *4* α(N)=0.000196 *3*; α(O)=3.51×10^{-5} *5*; α(P)=2.01×10^{-6} *3*
436.7 *3*	9.5 *15*	436.59	0$^-$,1$^-$	0.0	1$^-$	(M1)	0.1209	K/L≥5 (1963Ja11). α(K)exp=0.06 *3* (1968Ki04) α(K)=0.0998 *14*; α(L)=0.01630 *23*; α(M)=0.00377 *6*; α(N+..)=0.001124 *16* α(N)=0.000939 *14*; α(O)=0.0001729 *25*; α(P)=1.175×10^{-5} *17*

[†] Additional information 2.
[‡] Uncertainties not reported (1963Ja11,1968Ki04), but estimated by evaluator from implied precision of authors′ energies.
[#] Iγ relative to Iγ(157)=100; from 1968Ki04, except as noted.
[@] From α(K)exp, α(L)exp, and/or subshell ratios, except where noted. The photon and ce intensity scales were normalized assuming α(K)=1.642 (M1 theory) for 157.2γ.
[&] From α(K)exp, except as noted.
[a] Seen in ce spectrum only.
[b] For absolute intensity per 100 decays, multiply by 0.072 *4*.
[x] γ ray not placed in level scheme.

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