^{199}Au β^- decay (3.139 d) 1989Ch45,1977Dr06,1975Bo05

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	NDS 108, 79 (2007)	15-Oct-2006

Parent: ^{199}Au: E=0.0; $J^\pi=3/2^+$; $T_{1/2}$=3.139 d *7*; Q(β^-)=452.0 *6*; %β^- decay=100.0

$\beta\gamma$(t), $\gamma\gamma$(t): 1974Do01, 1972Si42, 1971Si20, 1967Ba27, 1966Ra28, 1964Li12, 1963Li08.

$\beta\gamma(\theta)$: 1975Ve14, 1965DeZZ, 1962Ge10, 1961El01.

(electron)$\gamma(\theta)$: 1968Th03, 1965Th03.

B(ce,transverse pol)(θ): 1962Bl05.

$\beta\gamma$(circ pol)(θ): 1971Va15.

^{199}Hg Levels

E(level)†	J^π‡	$T_{1/2}$	Comments
0.0	$1/2^-$		
158.37859 *10*	$5/2^-$	2.46 ns *3*	$T_{1/2}$: weighted average of 2.49 ns *3* (1971Si20), 2.38 ns *7* (1967Ba27), 2.37 ns *7* (1966Ra28), 2.42 ns *15* (1963Li08), 2.35 ns *20* (1952Be26).
208.20494 *10*	$3/2^-$	69 ps *3*	$T_{1/2}$: weighted average of 71 ps *5* (1974Do01), 70 ps *15* (1972Si42), 71 ps *7* (1966Ra28), 66 ps *6* (1963Li08,1964Li12).

† From Eγ's.

‡ From 'Adopted Levels'.

β^- radiations

Eβ, Iβ, spectrum shape: 1968Be06, 1966Le03, 1965Ke04, 1955Ha50, 1952Be26, 1952De34.

B(longitudinal polarization): 1968Be06, 1965Lo06.

E(decay)	E(level)	Iβ^-†‡	Log *ft*	Comments
(243.8 *6*)	208.20494	21.5 *4*	6.118 *9*	av Eβ=67.21 *21* E(decay),Iβ^-: from F-K plot: Eβ=250, Iβ=22.4% (1965Ke04), Eβ=251, Iβ=24.3% (1955Ha50), Eβ=250 *15* (1952Be26). B(208γ)(θ) is isotropic (1975Ve14,1962Ge10,1961El01). Transverse polarization of (β^-)(ce(K) 208γ) (1962Bl05). Circular polarization of (β^-)(208γ) (1971Va15).
(293.6 *6*)	158.37859	72.0 *13*	5.850 *9*	av Eβ=82.29 *22* E(decay),Iβ^-: from F-K plot: Eβ=295.8, Iβ=71.6% (1965Ke04), Eβ=302, Iβ=69.3% (1955Ha50), Eβ=291 *5* (1952De34), Eβ=297 *10* (1952Be26). B(158γ)(θ) is isotropic (1975Ve14,1962Ge10,1961El01).
(452.0 *6*)	0.0	6.5 *13*	7.50 *9*	av Eβ=132.77 *24* E(decay): from F-K plot: Eβ=453 *2* (1968Be06), 460 *6* (1966Le03), 461.7 (1965Ke04); β^-group has non statistical shape: α'=−0.24 *3* (1968Be06), −0.3 *1* (1966Le03). Iβ^-: unweighted average of 6.0% (1965Ke04), 6.4% (1955Ha50), 7% (1952De34). ΔIβ=20% assigned by evaluator. Longitudinal polarization: p=−0.84 v/c 3 (1968Be06), p=−0.83 v/c 5 (1965Lo06); based on p(^{32}P)=−1.0 v/c.

† From I(γ+ce) balance at each level and measured Iβ(to g.s.)=6.5 *13*.

‡ Absolute intensity per 100 decays.

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$\gamma(^{199}Hg)$

Iγ normalization: From Ti(208γ+158γ)=100−Iβ(g.s.), (Iβ^-(g.s.)=6.5 *13*).

Eγ, Iγ: 1989Ch45, 1991Ma65, 1975Bo05, 1972De67, 1972Si42, 1970Gr13, 1968Mu09, 1965Ke04, 1964Ka17, 1963Ha16, 1961Ha11, 1960De15, 1958Av89, 1958Cr09, 1951Sh58, 1952Si47.

Ice, α and ce-ratios: 1977Dr06, 1974Do01, 1965Ke04, 1964He19, 1960De17, 1960Na06, 1958Ba36, 1958Cr09, 1952De34, 1952Si47, 1951Sh58, 1950Hi59.

I(K x ray)=43.6 *5* (1989Ch45), 48 *2* (1963Ha16); I(L x ray)=36.9 *6* (1989Ch45), 56 *4* (1963Ha16). Measured I(K x ray) and L x ray subshell ratios (1989Ch45). (I(x) relative to I(158γ)=100).

1977Dr06 calculated the α for the transitions in this decay using Hartree-Fock wave functions. They also analyzed their experimental ce-ratios allowing for the nuclear structure effect in the M1 component. Their deduced δ and λ are given below in a footnote to the individual gammas. However, the experimental data can also be fitted without the penetration factor using the theoretical α of 1968Ha53.

E_γ[†]	I_γ[‡a]	E_i(level)	J_i^π	E_f	J_f^π	Mult.	δ[#]	α[@]	Comments
49.82635 *12*	0.901 *23*	208.20494	3/2$^-$	158.37859	5/2$^-$	M1+E2	−0.044[&] *4*	11.7[&]	α(L1)=7.85; α(L2)=0.895 *19*; α(L3)=0.176 *19*; α(L)=8.92 *4*; α(M)=2.08 *1* Mult.,δ: L1:L2:L3=7.85 *12*: 0.902 *20*: 0.157 *23*, M1:M2:M3= 1.77 *4*: 0.244 *14*: 0.063 *18* (1977Dr06), sign from: δ=−0.017 *6* from ce$\gamma(\theta)$ (1968Th03).
158.37851 *10*	100.0 *8*	158.37859	5/2$^-$	0.0	1/2$^-$	E2		0.914	α(K)=0.296; α(L1)=0.0382; α(L2)=0.251; α(L3)=0.172; α(M)=0.119; α(N+..)=0.0374 I$_\gamma$: absolute measurement with 4$\pi(\beta\gamma)$: Iγ=36.8% 11 (1963Ha16). Mult.: α(K)exp=0.284 *11*, α(L1)exp=0.0387 *8*, α(L2)exp=0.252 *3*, α(L3)=0.172, α(M)exp=0.121 *8*, α(N)exp=0.0304 *20*, normalized to theoretical α(L3) (1977Dr06).
208.20481 *12*	21.8 *3*	208.20494	3/2$^-$	0.0	1/2$^-$	M1+E2	−0.388[&] *9*	0.937[&]	α(K)=0.751 *4*; α(L)=0.142; α(M)=0.0334 *2*; α(N+..)=0.0106 Mult.,δ: L1:L2:L3=0.114 *2*: 0.0218 *5*: 0.00692 *10*, M1:M2:M3= 0.0261 *8*: 0.0054 *6*: 0.0021 *3*, K:L:M=0.74 *6*: 0.142 *2*: 0.0337 *10* normalized to theoretical α(L3) (1977Dr06); sign of δ from Coul ex. theory: α(L1):α(L2):α(L3)=0.114 *1*: 0.0210 *3*: 0.0069 *2*, α(M1):α(M2):α(M3)=

Continued on next page (footnotes at end of table)

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$\gamma(^{199}Hg)$ (continued)

E_γ †	E_i(level)	Comments
		1: 0.00536 *9*: 0.00183 *6*.

† From curved-crystal measurement of 1975Bo05, and as revised in the recommended values of 2000He14. The curved crystal spectrometer measurements have been adjusted for the change in ^{198}Au calibration standard (1980De40,2000He14).
‡ From 1989Ch45.
# Deduced from ce(L)- and ce(M)-subshell ratios of 1977Dr06 using theoretical values of 1968Ha53.
@ Theoretical α from 1968Ha53 for the multipolarity and δ given.
& 1977Dr06 analyzed the Ice subshell ratios including nuclear penetration effects in the wave functions. The results: 50 keV γ: δ=0.039 *4*, nuclear structure parameter λ=2.4 *10*; 208 keV γ: δ=0.350 *13*, nuclear structure parameter λ=3.8 *5*.
[a] For absolute intensity per 100 decays, multiply by 0.400 *6*.

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Decay Scheme

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