^{198}Au β^- decay (2.6941 d) 1999He10,1991BaZS,1980Iw03

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Huang Xiaolong and Kang Mengxiao	NDS 133, 221 (2016)	1-Dec-2015

Parent: ^{198}Au: E=0.0; J$^\pi$=2$^-$; T$_{1/2}$=2.6941 d *2*; Q(β^-)=1372.9 *5*; %β^- decay=100.0

Sources produced by ^{197}Au(n,γ) (1980Da16,1981Ch35), ^{197}Au(d,p) (1973Pa08,1980Ba14,1987Lo07), ^{197}Au(^{14}N,^{13}N) (1980Ni06), ^{196}Pt(α,np) (1980SaZY,1975Ma30), ^{198}Pt(d,2n) (1975Ma30), and ^{198}Pt(p,n) (1949St17).

1999He10: compiled γ energies; deduced recommended γ calibration standards.

1994HeZZ: a consistent set of γ-ray energies is recommended for use in the energy calibration of γ-ray detectors.

1991BaZS: recommend x- and γ-ray standards for detector calibration.

1980De40: measure Eγ with double-crystal transmission instruments.

1980Iw03: measure Eγ, Iγ with Ge(Li).

1973Di15: measure $\gamma\gamma(\theta$,H).

1992Ha02: report relative and absolute γ-ray intensities.

^{198}Hg Levels

$\gamma\gamma(\theta)$: 1974Ka18, 1973Di15, 1953Sc23, 1953Sc19, 1964Ke02, 1964Sa11, 1966Uh01, 1967Ko13, 1968Mu02, 1969Za02, 1972Ve03, 1974Ka18, and ^{198}Tl ε decay.

E(level)[†]	J$^\pi$[‡]	T$_{1/2}$[‡]	Comments
0.0	0$^+$	stable	
411.80250 *17*	2$^+$	23.15 ps *28*	g=0.487 *7* (1984Ha12). Other g: +0.55 *11* (1964Ko15,1973Di15,1974Ka18) $\gamma\gamma(\theta$,H) external H=57.15 kG; +0.36 to +0.40 (1964Ke02,1973Ra35,1974Do01).
1087.6874 *5*	2$^+$	40.4 ps *5*	

† From decay scheme and Eγ's by using least-squares fit to Eγ.
‡ From Adopted Levels.

β^- radiations

Others: 1948Sa36, 1949Dz20, 1949La06, 1949Le07, 1960St14, 1961Bu18. For 961β transition calculation: 1970Bo38, 1970Sm08, 1973Bo01, 1974Kr23, 1972Sc43.

E(decay)	E(level)	Iβ^-[†‡]	Log *ft*	Comments
(285.2 *5*)	1087.6874	0.986 *6*	7.602 *4*	av Eβ=79.53 *16* Eβ measurements: 290 *15* (1951Br52). Other: 1951Ca24. For (285β)(676γ,1087γ)-coin, see 1951Ca24. From 676$\gamma(\theta$,t), 1970Pr10 deduced ΔJ components in 285β transition.
(961.1 *5*)	411.80250	98.990 *9*	7.3687 *8*	av Eβ=314.78 *19* Eβ measurements: 959.0 *25* (1954El04), 960 *2* (1956Po28), 962 *1* (1961De03), 964 *3* (1961De03), 960 *3* (1962Ha25), 957 *5* (1962Sh08), 959 *2* (1963Le11), 965 *2* (1964Le09), 959.4 *5* (1965Be24), 960.5 *8* (1965Ke04), 961.0 *12* (1965Pa08), 960 *2* (1966Pa01), 963 *4* (1967VaZZ), 966 *1* (1972Na22). Others: 1959Wa17, 1960De17, 1964Bl10, 1969KrZX. β-shape factor depends on Fermi function and screening correction used. For β-shape factor (961β) which leads to α(K)exp (412γ) in agreement with E2 theory(=0.0302), see 1965Ke04, 1965Pa08, 1972Na22. Average Eβ: 317 *15* (1956Sh37), 287 *20* (1964Le16). Longitudinal β polarization, see 1957Ca06, 1958Al97, 1958Be80, 1958Ge34, 1958He38, 1960Al30, 1960Sp06, 1960Sp10, 1961Av01, 1961So01, 1961Sp09,

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^{198}Au β^- decay (2.6941 d) 1999He10,1991BaZS,1980Iw03 (continued)

β^- radiations (continued)

E(decay)	E(level)	Iβ^- [†‡]	Log *ft*	Comments
				1961Ul01, 1964Va13, 1966Va06. 1960Si01 measure β transverse pol via 961β(412γ) cascade. 1974Ku16 measure internal, external bremsstrahlung spectra (energy, yield, polarization) associated with 961β decay. 1970Pr10 measure 412γ(θ,t) with pol ^{198}Au source; deduced ΔJ components in 961β transition. See energy dependence of $\beta\gamma(\theta)$, 1962Pe12, 1964Th08, 1965De18, 1967Ra28. 961β(Circularly Polarized(CP) γ)(θ) see 1957Be58, 1958Bo72, 1958Bo90, 1960St14, 1961De05, 1962Lo03, 1973Ha08.
1371 *4*	0.0	0.025 *5*	12.28^{1u} *9*	av Eβ=467.37 *19* Eβ=1371 *4*, Iβ=0.025% *5* (1955El11) (first unique forbidden(1U) shape factor applied).

† From intensity imbalance at each level and Iβ(exp) to g.s.

‡ Absolute intensity per 100 decays.

γ(^{198}Hg)

Iγ normalization: From I(γ+ce)(to g.s.)=99.975% (Iβ(to g.s.)=0.025% *5* (1955El11)). Other: 0.9557 *47* (1991BaZS).

γ absolute intensity ratios: Iγ(411γ):Iγ(676γ):Iγ(1088γ)=0.9556 *65*:0.00805 *9*:0.001595 *26* (1992Ha02).

I(Kα x-ray)/Iγ(411.8γ)=0.0229 *5*, I(Kβ x-ray)/Iγ(411.8γ)=0.00635 *15* (1975Ca15); I(K x-ray) value is consistent with decay scheme. Others: 1949St17, 1949Sa18, 1949Si19, 1949Dz20, 1950Hi56, 1950Pr63, 1951Hu18, 1951Ca06, 1952Fa14, 1952Hu01, 1952Mu45, 1955Bi24, 1956Co28, 1958Ba33, 1958Ka01, 1958Re22, 1960De17, 1960Be11, 1960De15, 1961Hu12, 1961Ha11, 1961Wo02, 1965Wa13, 1968Bo38, 1969Sa31.

Branching Iγ(1087γ)/Iγ(676γ): 0.22 *2* (1968De30), 0.20 *2* (1954El04), 0.23 *2* (1955Dz41), 0.23 *5* (1951Ca24), 0.22 *2* (1971Pa06, ^{198}Tl ε decay).

x-ray intensities

E, KeV	Radiation	I (expt)[a]	I (expt)[b]	I (expt)[c]
8.722	Hg L' x-ray		0.027 *3*	0.025 *3*
9.980	Hg Lα x-ray		0.592 *17*	0.532 *25*
10.467	Hg Lν x-ray		0.0105 *15*	0.0086 *5*
11.92	Hg Lβ x-ray		0.643 *19*	0.555 *31*
13.92	Hg Lγ x-ray		0.124 *5*	0.104 *8*
68.89	Hg Kα_2 x-ray	0.813 *10*	0.816 *2*	0.842 *24*
70.82	Hg Kα_1 x-ray	1.374 *17*	1.41 *4*	1.44 *4*
80.12	Hg K$'\beta$1 x-ray	0.460 *7*	0.485 *12*	0.504 *4*
82.78	Hg K$'\beta$2 x-ray	0.135 *3*	0.137 *7*	0.137 *4*

a Intensities per 100 parent decays. Values from 2010Mo06.
b Intensities per 100 parent decays. Values from 1989Ch45.
c Calculated values.

Recommended x-ray intensity values 1991BaZS

E, keV	Radiation	Intensity[a]
68.89-70.82	Hg Kα x-ray	2.19 *8*
80.12-82.78	Hg Kβ x-ray	0.61 *3*
68.89-82.78	Hg K x-ray	2.80 *10*

a Intensities per 100 parent decays.

γ(^{198}Hg) (continued)

E_γ †	I_γ ‡@	E_i(level)	J_i^π	E_f	J_f^π	Mult.#	δ	α&	Comments
411.80205 *17*	100	411.80250	2+	0.0	0+	E2		0.0439 *6*	α(K)=0.0300 *5*; α(L)=0.01055 *15*; α(M)=0.00263 *4*; α(N+..)=0.000774 *11* E_γ: Others: 411.8044 (1980Iw03), 411.795 *9* (1963Mu05,1965Mu03) ce; 411.794 *8* (1971He20) data of 1963Mu05, 1965Mu03 reevaluated. α(K)exp=0.0302 *3* from weighted average of 0.0302 *4* (1965Be07), 0.0305 *10* (1961Pe07), 0.03035 *45* (1973El10). α(exp)=0.0445 *9* (1980Iw03). Other α(K)exp: 0.0295 *15*, 0.0305 *15* (1972Sa34); 0.0311 *12* (1969Sa31) K x-ray/Iγ; 0.0302 *4* (1965Be07); 0.0299 *7* (1965LeZZ) βγ coin; 0.0296 *9* (1965LeZZ) βce coin. For other α(K)exp dependent on 961β spectrum shape factor, see 1952Si25, 1959Wa17, 1962Ha25, 1963Le11, 1964Pa20, 1965Ke04, 1965Pa08, 1972Na22. Other recommended values: α(K)exp=0.0301 *2*, α(exp)=0.044 *2* (1984HaZS). K:L1:L2:L3=673 *13*:100:105 *2*:45 *1* (1959Ke20), 687 *7*:100 *1*:101 *1*:45 *1* (1964He19); L1:L2:L3=100:103 *1*:44.6 *4* (1969MaZU); K:L:M:N:O=269 *2*:100:25.2 *5*:7.7 *4*:1.8 *2* (1959Ke20); M1:M2:M3:M4+M5=192 *13*:221 *15*:100:3 *2*, O/N=0.21 *3* (1972Dr02). 1965Pe05 deduce E2 particle parameters, α(K)exp=0.0308 *9* from γγ(θ), γce(θ). 1965Ra07 measure ce transverse pol via 961β(ce(K) 412γ) cascade.
675.8836 *7*	0.842 *5*	1087.6874	2+	411.80250	2+	M1+E2	+1.07 *14*	0.0267 *20*	α(K)=0.0216 *17*; α(L)=0.00389 *24*; α(M)=0.00091 *6*; α(N+..)=0.000274 *16* α(K)exp: 0.0224 *19* (1954El04), 0.019 *5* (1956Vo20). γγ(θ): A_2=−0.290 *17*, A_4=+0.187 *29* (1973Di15); A_2=−0.290 *18*, A_4=+0.183 *24* (1974Ka18). E_γ: others: 675.8874 *19* (1980Iw03), 675.878 *18* (1964Ka17) ce spectrometer, 675.879 *18* (1971He20) semi, 675.871 *18* (1974HeYW) semi, 675.8727 *38* (1976Bo16) cryst (675.890 *4* when corrected for the ^{198}Au line Eγ=411.8044 or 675.886 *4* relative to 411.8020. δ: From A_2=−0.290 *16* (1971Pa06, ^{198}Tl ε decay (5.3 h)). Other: 1.06 *16* from α(K)exp=0.0224 *19* (1954El04).
1087.6842 *7*	0.1662 *19*	1087.6874	2+	0.0	0+	E2		0.00512 *8*	α(K)=0.00414 *6*; α(L)=0.000751 *11*; α(M)=0.0001766 *25*; α(N+..)=5.29×10^{-5} *8* α(K)exp: 0.00450 *31* (1954El04), 0.0046 *6* (1956Vo20). E_γ: Others: 1087.6856 *17* (1980De40) cascade γ′s, 1087.69 *3* (1964Ka17) ce spectrometer, 1087.671 *24* (1971He20) semi, 1087.663 *24* (1974HeYW) semi. α(K)exp: 0.0045 *3* (1954El04), 0.0046 *6* (1956Vo20).

$^{198}_{80}$Hg$_{118}$-4

γ(^{198}Hg) (continued)

† From 2000He14 based on measurements of 1980De40.

‡ Relative intensities normalized to Iγ(411.8γ)=100. Values are from weighted average of 2010Mo06, 1989Ch45 and 1980Iw03. Other measurements: 1951Ca24, 1951Hu18, 1954El04, 1954Ma19, 1955Dz41, 1956Vo20, 1959Wa17, 1965Ke04, 1968De30, 1971Pa06.

From α(K)exp measurements.

@ For absolute intensity per 100 decays, multiply by 0.9562 *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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