^{207}Tl β^- decay 1988Hi14,1967Da10

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	F. G. Kondev, S. Lalkovski	NDS 112, 707 (2011)	1-Aug-2010

Parent: ^{207}Tl: E=0; J^π=1/2$^+$; $T_{1/2}$=4.77 min *3*; Q(β^-)=1418 *5*; %β^- decay=100.0

1988Hi14: Source: ^{207}Tl produced in decay chain of ^{223}Ra. ^{223}Ra activity 1.9x10^7 Bq. Radiochemical separation; Detectors: Ge(Li) with anti-Compton shield of NaI; Measured: Eγ, Iγ.

1967Da10: Source:^{207}Tl, obtained as a recoil from ^{211}Bi α-decay and and collected on a 6 mg/cm^2 aluminum foil; Detectors: Ge(Li), Au-Si (FWHM=15.5 keV at 6 MeV), scintillation detectors; Measured: E(α), Eβ, Eγ.

Others: 1968Br17, 1967Tr01, 1963Ch09, 1961Cu05, 1950Ev03.

^{207}Pb Levels

E(level)†	J^π‡	$T_{1/2}$‡
0	1/2$^-$	stable
569.64 *10*	5/2$^-$	
897.76 *10*	3/2$^-$	

† From a least-squares fit to Eγ.
‡ From the Adopted Levels.

β^- radiations

B(pol) (1961Cu05); spectrum shape (1967Tr01).

E(decay)	E(level)	Iβ^-†‡	Log *ft*	Comments
533 *6*	897.76	0.271 *10*	6.157 *22*	av Eβ=155.0 *17* Iβ^-: Others: 0.24% in 1967Da10 0.155% 20 in 1963Ch09.
861# *6*	569.64	<8×10^{-5}	>10.5^{1u}	av Eβ=273.2 *18* Iβ^-: From 1988Hi14. Other: Iβ<1×10^{-2} in 1967Da10.
1431 *8*	0	99.729 *10*	5.108 *6*	av Eβ=492.5 *21* E(decay): From 1967Da10; Other: 1442 *8* (1950Ev03). Iβ^-: Others: 99.76% in 1967Da10 and 99.845% 20 in 1963Ch09.

† From I(γ+ce) imbalance at each level, unless otherwise stated.
‡ Absolute intensity per 100 decays.
# Existence of this branch is questionable.

γ(^{207}Pb)

Iγ normalization: From Iγ(897γ)/Iγ(351γ) in ^{211}Pb source (1988Hi14) and Iγ(351γ)=12.91% 11 (1991Ar04).

E_γ‡	I_γ#&	E_i(level)	J^π_i	E_f	J^π_f	Mult.@	α†	Comments
328.10 *12*	0.00142 *14*	897.76	3/2$^-$	569.64	5/2$^-$	[M1]	0.334	α(K)=0.273 *4*; α(L)=0.0466 *7*; α(M)=0.01090 *16*; α(N+..)=0.00338 *5* α(N)=0.00277 *4*; α(O)=0.000552 *8*; α(P)=5.91×10^{-5} *9* I_γ: From Iγ(328γ)/Iγ(898γ)=0.0054 *5* (1988Hi14). Other: 0.0020 *2* in 1968Br17.

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$^{207}Tl\ \beta^-$ decay 1988Hi14,1967Da10 (continued)

$\gamma(^{207}Pb)$ (continued)

E_γ ‡	I_γ #&	E_i(level)	J^π_i	E_f	J^π_f	Mult. @	δ @	α †	Comments
									Mult.: α(exp)=0.16 *8* in 1988Hi14 from the determination of the yields of the 328 and 570γ's along with the requirement that Ti(328γ)=Ti(570γ), with α(570γ)=0.0218. This value of α would lead to mult=E2(+M1) with δ>0.86 and large B(E2)(W.u.) value that is difficult to explain for a nucleus close to the doubly-magic ^{208}Pb. On the basis of theoretical calculations, 1974Ha34 suggest that δ<0.1. 1988Hi14 also suggest that the E2 component is negligible, and explained the deviation of α(exp) from theory as most likely due to penetration effect.
569.698 *2*	0.00185 *19*	569.64	5/2$^-$	0	1/2$^-$	E2		0.0216	α(K)=0.01584 *23*; α(L)=0.00439 *7*; α(M)=0.001081 *16*; α(N+..)=0.000330 *5* α(N)=0.000274 *4*; α(O)=5.21×10^{-5} *8*; α(P)=4.29×10^{-6} *6* E_γ: 569.62 *12* in 1988Hi14. I_γ: From Ti(328γ)=Ti(570γ). The Iβ(570)<8×10^{-5} (1988Hi14) contribution has been neglected in the intensity balance.
897.77 *12*	0.263 *9*	897.76	3/2$^-$	0	1/2$^-$	M1+E2	+0.091 *9*	0.0233	α(K)=0.0192 *3*; α(L)=0.00318 *5*; α(M)=0.000741 *11*; α(N+..)=0.000230 *4* α(N)=0.000188 *3*; α(O)=3.76×10^{-5} *6*; α(P)=4.04×10^{-6} *6* I_γ: From Iγ(898γ)/Iγ(351γ)=0.0202 *7* (1988Hi14) and Iγ(351γ in ^{211}Bi α decay)=13.02% 12. Note that the authors in 1988Hi14 quoted Ti(898γ)=0.263% 9, using Iγ(351γ)=12.76% with α taken as 0.022 *7* (private communication from first author in 1988Hi14, February 1993) leading to the same ratio of Iγ(898γ)/Iγ(351γ)=0.0202 *7*. Other: 0.270% 25 in 1968Br17.

† Additional information 1.
‡ From adopted gammas.
\# From 1988Hi14, unless otherwise stated.
@ From the adopted gammas, unless otherwise stated.
& Absolute intensity per 100 decays.

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Decay Scheme

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