^{202}Pb IT decay 1957Mc40,1972Gu06

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	F. G. Kondev	NDS 196,342 (2024)	1-Sep-2023

Parent: ^{202}Pb: E=2169.83 *8*; $J^{\pi}=9^-$; $T_{1/2}$=3.54 h *2*; %IT decay=90.3 *4*

1957Mc40: ^{203}Tl(d,3n)^{202}Pb. E(d)=23 MeV. β spectrometer used for ce spectra. Measured: E(ce), K/L and (L1+L2)/L3.

1972Gu06: ^{203}Tl(p,2n)^{202}Pb. E(p)=16 MeV, ^{203}Tl 70% enriched. Chemically separated. 3 Ge(Li) detectors. Measured: $\gamma\gamma$ coin, Iγ, α(K)exp.

Others: 1954Ma78, 1957As65, 1959Jo21, 1974Go32, 1975Ha25, 1977Th02 and 1981An11.

^{202}Pb Levels

E(level)†	J^{π}‡	$T_{1/2}$	Comments
0.0	0^+	5.25×10^4 y *28*	
960.70 *15*	2^+	≤0.1 ns	$T_{1/2}$: From $\gamma\gamma$(t) in 1959Jo21.
1382.84 *16*	4^+	1.97 ns *2*	μ=+0.008 *16* J^{π}: From (422γ)(960γ)(θ) A_2=0.108 *7* (1956Wi39). $T_{1/2}$: From $\gamma\gamma(\Delta t)$ in 1977Th02. Other: 2.00 ns *15* [$\gamma\gamma$(t), 1959Jo21]. μ: Deduced from g=+0.002 *4* in 1977Th02, using the integral perturbed angular correlation technique.
1623.17 *16*	4^+		
1915.27 *16*	4^+		
2040.27 *16*	5^-		
2169.85 *17*	9^-	3.54 h *2*	%IT=90.3 *4*; %ε+%β^+=9.7 *4* %ε+%β^+ is weighted average of 9.8% *5* in (1957Mc40) and 9.3% *8* (1972Gu06). The value in 1957Mc40 is weighted average of 9.9% *6* (using ce data) and 9.5% *10* (using γ-ray data). The value in 1972Gu06 is determined from Iγ(490γ)/Iγ(961γ)=0.100 *10* and α(490γ,E2)=0.0295 *5* and α(961γ,E2)=0.00720 *10*. $T_{1/2}$: Weighted average of 3.53 h *1* (1981An11), 3.5 h *1* (1954Ma78) and 3.62 h *3* (1957As65). configuration: $\nu(f^{-1}_{5/2},i^{-1}_{13/2})$.

† From a least-squares fit to Eγ.

‡ From Adopted Levels.

^{202}Pb IT decay 1957Mc40,1972Gu06 (continued)

γ(^{202}Pb)

Iγ normalization: Deduced from ΣI(γ+ce)[g.s.]=100.

E_γ †	I_γ †@	E_i(level)	J_i^π	E_f	J_f^π	Mult.‡	δ‡	α#	Comments
124.75 *9*	1.1 *3*	2040.27	5^-	1915.27	4^+	E1		0.252 *4*	α(K)=0.2020 *29*; α(L)=0.0386 *5*; α(M)=0.00908 *13* α(N)=0.002273 *32*; α(O)=0.000430 *6*; α(P)=3.46×10^{-5} *5* %Iγ=0.54 *15*
129.1 *2*	0.08 *3*	2169.85	9^-	2040.27	5^-	E4		514 *9*	α(K)=1.506 *21*; α(L)=361 *6*; α(M)=115.6 *20* α(N)=30.1 *5*; α(O)=5.24 *9*; α(P)=0.225 *4* %Iγ=0.039 *15* Mult.: K/L<0.008, L12/L3=1.88 *12* (1957Mc40).
240.18 *4*	0.51 *4*	1623.17	4^+	1382.84	4^+	M1(+E2)	<0.5	0.73 *6*	α(K)=0.59 *5*; α(L)=0.1082 *25*; α(M)=0.0256 *4* α(N)=0.00650 *11*; α(O)=0.001285 *29*; α(P)=0.000132 *8* %Iγ=0.250 *28* E_γ: From adopted gammas; Other: 240.3 keV *1* in 1957Mc40. I_γ: From ce(K)(240.3γ)/ce(K)(786.99γ)=0.040 *3* (1957Mc40), since 240.3γ in ^{202}Pb and 241.1γ in ^{202}Tl are unresolved doublets in 1972Gu06 with Iγ(240γ+241γ)=2.2 *3*. Mult.: K/L=5.0 *6* in 1957Mc40 allows M1 or E1. The authors ruled out E1 from intensity balance considerations.
291.93‡ *9*	0.066‡ *17*	1915.27	4^+	1623.17	4^+	M1+E2	0.5 *4*	0.39 *8*	α(K)=0.31 *8*; α(L)=0.060 *6*; α(M)=0.0142 *11* α(N)=0.00360 *27*; α(O)=0.00071 *7*; α(P)=7.1×10^{-5} *13* %Iγ=0.032 *9*
417.3 *2*	0.8 *2*	2040.27	5^-	1623.17	4^+	[E1]		0.01406 *20*	α(K)=0.01158 *16*; α(L)=0.001894 *27*; α(M)=0.000441 *6* α(N)=0.0001112 *16*; α(O)=2.177×10^{-5} *31*; α(P)=2.096×10^{-6} *29* %Iγ=0.39 *10*
422.12 *6*	172 *9*	1382.84	4^+	960.70	2^+	E2		0.0448 *6*	α(K)=0.0299 *4*; α(L)=0.01119 *16*; α(M)=0.00281 *4* α(N)=0.000712 *10*; α(O)=0.0001333 *19*; α(P)=9.64×10^{-6} *14* %Iγ=84 *8* Mult.: K/L=2.6 *3*, L12/L3=5.6 *8* (1957Mc40).
532.34‡ *10*	0.112‡ *29*	1915.27	4^+	1382.84	4^+	[M1]		0.0915 *13*	α(K)=0.0750 *11*; α(L)=0.01261 *18*; α(M)=0.00295 *4* α(N)=0.000749 *10*; α(O)=0.0001494 *21*; α(P)=1.601×10^{-5} *22* %Iγ=0.055 *15*
547.6 *3*	0.25 *8*	2169.85	9^-	1623.17	4^+	E5		0.739 *11*	α(K)=0.2319 *33*; α(L)=0.373 *5*; α(M)=0.1031 *15* α(N)=0.0265 *4*; α(O)=0.00487 *7*; α(P)=0.000327 *5* %Iγ=0.12 *4* Mult.: α(L)exp=0.34 *15* (1972Gu06), K/L=0.8+1−8 L12/L3=6.0 *15* (1957Mc40).
657.49 *6*	65 *3*	2040.27	5^-	1382.84	4^+	E1		0.00550 *8*	α(K)=0.00456 *6*; α(L)=0.000716 *10*; α(M)=0.0001659 *23* α(N)=4.19×10^{-5} *6*; α(O)=8.27×10^{-6} *12*; α(P)=8.31×10^{-7} *12* %Iγ=31.8 *30* Mult.: α(K)exp=0.0053 *6* (1972Gu06). K/L=5.5 *7* (1957Mc40).

$^{202}_{82}Pb_{120}$-2

^{202}Pb IT decay 1957Mc40,1972Gu06 (continued)

γ(^{202}Pb) (continued)

E_γ [†]	I_γ [†@]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	α[#]	Comments
662.55[‡] *11*	0.150[‡] *27*	1623.17	4^+	960.70	2^+	E2	0.01546 *22*	α(K)=0.01168 *16*; α(L)=0.00287 *4*; α(M)=0.000700 *10* α(N)=0.0001773 *25*; α(O)=3.40×10^{-5} *5*; α(P)=2.95×10^{-6} *4* %Iγ=0.073 *15*
786.99 *6*	100	2169.85	9^-	1382.84	4^+	E5	0.1624 *23*	α(K)=0.0816 *11*; α(L)=0.0599 *8*; α(M)=0.01596 *22* α(N)=0.00408 *6*; α(O)=0.000764 *11*; α(P)=5.80×10^{-5} *8* %Iγ=49 *4* Mult.: α(K)exp=0.078 *8* (1972Gu06), K/L=1.18 *10* and L12/L3≈10 (1957Mc40).
954.5 *2*	2.0 *4*	1915.27	4^+	960.70	2^+	E2	0.00730 *10*	α(K)=0.00579 *8*; α(L)=0.001149 *16*; α(M)=0.000274 *4* α(N)=6.95×10^{-5} *10*; α(O)=1.356×10^{-5} *19*; α(P)=1.295×10^{-6} *18* %Iγ=0.98 *21*
960.70 *15*	184 *15*	960.70	2^+	0.0	0^+	E2	0.00720 *10*	α(K)=0.00572 *8*; α(L)=0.001132 *16*; α(M)=0.000270 *4* α(N)=6.84×10^{-5} *10*; α(O)=1.336×10^{-5} *19*; α(P)=1.278×10^{-6} *18* %Iγ=90.1 *4* Mult.: α(K)exp=0.0056 (1972Gu06); K/L=5.0 *7*, L12/L3=15 (1957Mc40).
1382.8[‡] *5*	6.5×10^{-4}[‡] *11*	1382.84	4^+	0.0	0^+	E4	0.01446 *20*	α(K)=0.01072 *15*; α(L)=0.00283 *4*; α(M)=0.000697 *10* α(N)=0.0001775 *25*; α(O)=3.44×10^{-5} *5*; α(P)=3.21×10^{-6} *5* %Iγ=3.2×10^{-4} *6* I_γ: From I(γ+ce)(1382.8γ)/I(γ+ce)(422.12γ)=3.8×10^{-6} *6* in 1975Ha25. Mult.: K/L=3.4 *7* in 1975Ha25 allows E4, E5 or M5, but E5 and M5 can be ruled out since 422γ E2 to 2^+.

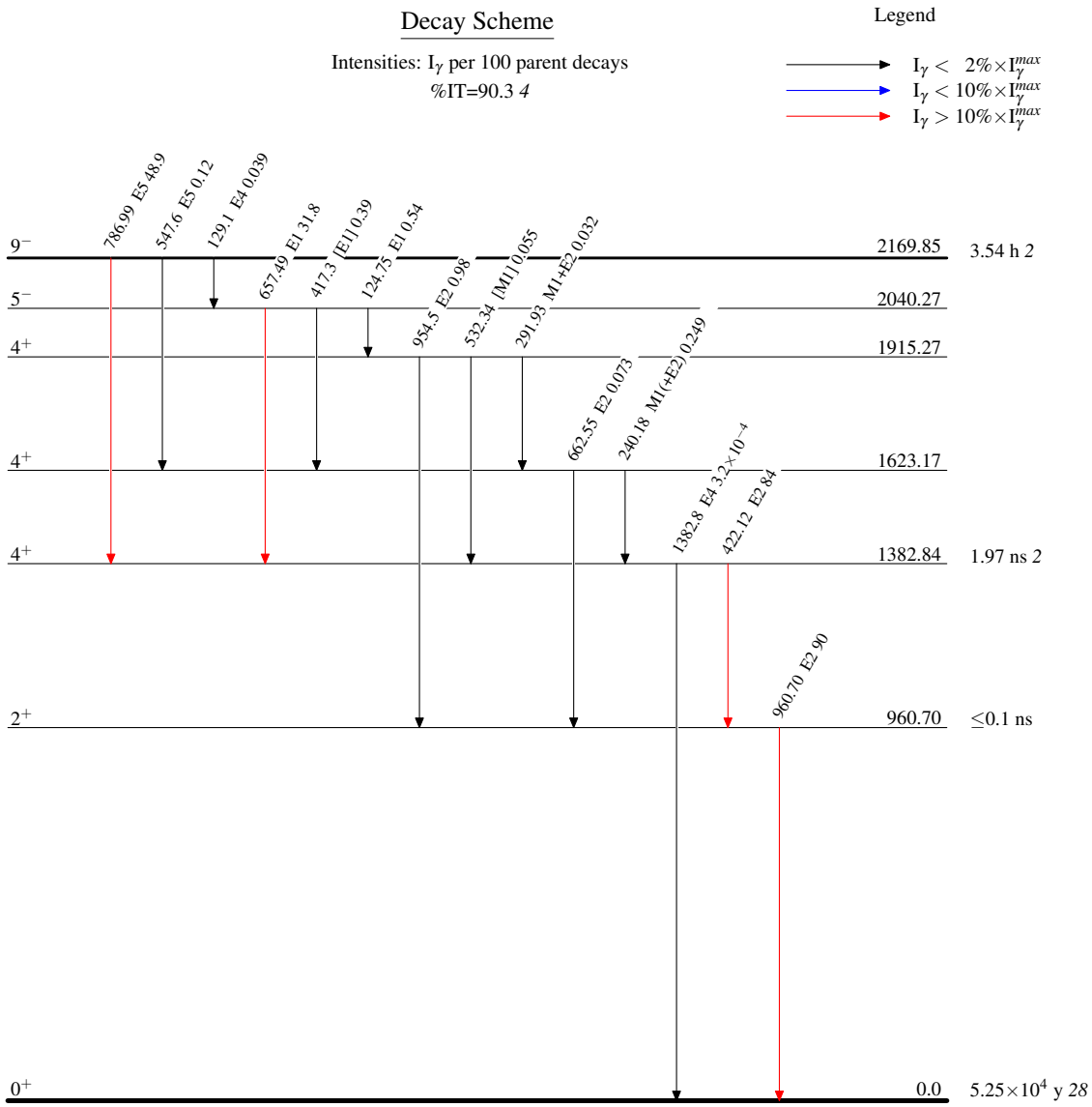
[†] From 1972Gu06, unless otherwise stated.
[‡] From adopted gammas.
[#] Additional information 1.
[@] For absolute intensity per 100 decays, multiply by 0.49 *4*.

$^{202}_{82}Pb_{120}$-3

^{202}Pb IT decay 1957Mc40,1972Gu06

Decay Scheme

Intensities: I_γ per 100 parent decays
%IT=90.3 *4*



$^{202}_{82}Pb_{120}$