^{193}Tl ε decay (21.6 min) 1974Va23,1976GoZP

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	M. Shamsuzzoha Basunia	NDS 143, 1 (2017)	31-Mar-2017

Parent: ^{193}Tl: E=0.0; J^π=1/2$^{(+)}$; $T_{1/2}$=21.6 min *8*; Q(ε)=3585 *17*; %ε+%β^+ decay=100.0
1976GoZP: measured γ, $\gamma\gamma$, γ(ce).
1974Va23: produced by spallation of Pb+p, E(p)=600 MeV, chem, ms; measured γ (Ge(Li)), ce (Si(Li)), $\gamma\gamma$.
Other: 1961An03.

^{193}Hg Levels

The decay scheme is that proposed by 1974Va23 with additional levels at 207.7 and 344.0 from 1976GoZP.

E(level)†	J^π†	$T_{1/2}$†
0.0	3/2$^{(-)}$	3.80 h *15*
39.51 *3*	5/2$^{(-)}$	
49.95 *14*	(1/2$^-$)	
207.74 *20*	(7/2$^-$)	
324.36 *8*	(3/2$^-$,5/2$^-$)	
344.00 *10*	(1/2$^-$,3/2$^-$)	
374.61 *10*	(3/2$^-$,5/2$^-$,7/2$^-$)	
752.63 *25*	(1/2$^-$,3/2$^-$,5/2$^-$)	
1523.3 *3*	(1/2$^-$,3/2$^-$,5/2$^-$)	
1580.10 *21*	(1/2$^-$,3/2,5/2$^-$)	

† From Adopted Levels.

γ(^{193}Hg)

All data are from 1974Va23, unless otherwise noted.

E_γ	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.[†]	δ[†&]	α[@]	Comments
(39.51[‡] *3*)		39.51	5/2$^{(-)}$	0.0	3/2$^{(-)}$	M1		21.7	α(L)=16.64 *24*; α(M)=3.88 *6* α(N)=0.972 *14*; α(O)=0.184 *3*; α(P)=0.01406 *20* E_γ,Mult.: from ^{193}Hg IT decay (11.8 h).
49.5[a] *11*	10.5[a#] *50*	49.95	(1/2$^-$)	0.0	3/2$^{(-)}$	(M1)[#]		11.2 *8*	α(L)=8.6 *6*; α(M)=2.00 *14* α(N)=0.50 *4*; α(O)=0.095 *7*; α(P)=0.0072 *5* Mult.: α(L)exp=21 *11*.
49.5[a] *11*	10.5[a#] *50*	374.61	(3/2$^-$,5/2$^-$,7/2$^-$)	324.36	(3/2$^-$,5/2$^-$)	(M1)[#]		11.2 *8*	α(L)=8.6 *6*; α(M)=2.00 *14* α(N)=0.50 *4*; α(O)=0.095 *7*; α(P)=0.0072 *5* Mult.: α(L)exp=21 *11*.
207.74 *20*	19.5 *10*	207.74	(7/2$^-$)	0.0	3/2$^{(-)}$	(E2)		0.343	α(K)=0.1546 *22*; α(L)=0.1415 *21*; α(M)=0.0365 *6* α(N)=0.00907 *14*; α(O)=0.001536 *23*; α(P)=1.93×10^{-5} *3* Mult.: α(K)exp=0.16 *3*; K/L=1.5 *10*.
274.39 *14*	13.5 *13*	324.36	(3/2$^-$,5/2$^-$)	49.95	(1/2$^-$)	(E2)		0.1395	α(K)=0.0783 *11*; α(L)=0.0460 *7*; α(M)=0.01172 *17* α(N)=0.00292 *5*; α(O)=0.000500 *7*; α(P)=1.000×10^{-5} *14* Mult.: α(K)exp=0.15 *10*. δ: ≤62% M1 (1974Va23).
284.89 *13*	21.6 *10*	324.36	(3/2$^-$,5/2$^-$)	39.51	5/2$^{(-)}$	(M1)		0.415	α(K)=0.341 *5*; α(L)=0.0570 *8*; α(M)=0.01325 *19* α(N)=0.00332 *5*; α(O)=0.000629 *9*; α(P)=4.82×10^{-5} *7* Mult.: α(K)exp=0.30 *7*, K/L=5.2 *17*. δ: ≤44% E2 (1974Va23).
294.08 *25*	4.3 *5*	344.00	(1/2$^-$,3/2$^-$)	49.95	(1/2$^-$)	(M1)		0.381	α(K)=0.313 *5*; α(L)=0.0522 *8*; α(M)=0.01214 *18* α(N)=0.00305 *5*; α(O)=0.000576 *9*; α(P)=4.42×10^{-5} *7* Mult.: α(K)exp=0.31 *12*. δ: ≤48% E2 (1974Va23).
324.37 *10*	100	324.36	(3/2$^-$,5/2$^-$)	0.0	3/2$^{(-)}$	(M1)		0.292	α(K)=0.240 *4*; α(L)=0.0399 *6*; α(M)=0.00928 *13* α(N)=0.00233 *4*; α(O)=0.000441 *7*; α(P)=3.38×10^{-5} *5* Mult.: α(K)exp=0.22 *3*, K/L=5.8 *14*. δ: ≤22% E2 (1974Va23).
335.11 *10*	26.1 *11*	374.61	(3/2$^-$,5/2$^-$,7/2$^-$)	39.51	5/2$^{(-)}$	(M1)		0.267	α(K)=0.219 *3*; α(L)=0.0365 *6*; α(M)=0.00849 *12* α(N)=0.00213 *3*; α(O)=0.000403 *6*; α(P)=3.09×10^{-5} *5* Mult.: α(K)exp=0.21 *4*, K/L=4.8 *15*. δ: ≤34% E2 (1974Va23).

γ(^{193}Hg) (continued)

E_γ	I_γ	E_i(level)	J^π_i	E_f	J^π_f	Mult.†	δ†&	α@	Comments
343.99 *10*	41.7 *18*	344.00	(1/2⁻,3/2⁻)	0.0	3/2$^{(-)}$	(M1+E2)	1.7 *+17−6*	0.12 *4*	α(K)=0.09 *4*; α(L)=0.023 *3*; α(M)=0.0057 *6* α(N)=0.00143 *15*; α(O)=0.00026 *4*; α(P)=1.2×10^{-5} *5* Mult.,δ: From α(K)exp=0.089 *30*, K/L=4.3 *16*.
^{x}369.8 *5*	1.6 *8*								
374.58 *22*	7.6 *9*	374.61	(3/2⁻,5/2⁻,7/2⁻)	0.0	3/2$^{(-)}$	(E2)		0.0566	α(K)=0.0372 *6*; α(L)=0.01459 *21*; α(M)=0.00365 *6* α(N)=0.000910 *13*; α(O)=0.0001591 *23*; α(P)=4.88×10^{-6} *7* Mult.: α(K)exp=0.025 *13*; theory: α(K)=0.0375. δ: ≤1% M1 (1974Va23).
^{x}398.6 *4*	6.9 *10*					(M1,E2)		0.11 *6*	α(K)=0.08 *6*; α(L)=0.017 *6*; α(M)=0.0041 *12* α(N)=0.0010 *3*; α(O)=0.00019 *7*; α(P)=1.2×10^{-5} *8* Mult.: α(K)exp=0.11 *10*.
^{x}493.52 *15*	12.1 *7*					(E2)		0.0278	α(K)=0.0200 *3*; α(L)=0.00589 *9*; α(M)=0.001448 *21* α(N)=0.000361 *5*; α(O)=6.43×10^{-5} *9*; α(P)=2.66×10^{-6} *4* Mult.: α(K)exp=0.020 *10*. δ: ≤19% M1 (1974Va23).
^{x}543.3 *7*	3.8 *9*					(M1,E2)		0.05 *3*	α(K)=0.039 *23*; α(L)=0.007 *3*; α(M)=0.0017 *7* α(N)=0.00042 *16*; α(O)=8.E−5 *3*; α(P)=5.E−6 *4* Mult.: α(K)exp=0.053 *24*.
^{x}574.9 *5*	3.8 *6*								
^{x}636.4 *3*	18 *7*					(M1)		0.0488	α(K)=0.0402 *6*; α(L)=0.00657 *10*; α(M)=0.001523 *22* α(N)=0.000382 *6*; α(O)=7.23×10^{-5} *11*; α(P)=5.59×10^{-6} *8* Mult.: α(K)exp=0.040 *17*; K/L=3.3 *13*.
^{x}652.9 *3*	10 *4*								
^{x}655.0 *5*	7 *4*								
^{x}676.10 *19*	48 *4*					(M1)		0.0417	α(K)=0.0344 *5*; α(L)=0.00560 *8*; α(M)=0.001299 *19* α(N)=0.000326 *5*; α(O)=6.17×10^{-5} *9*; α(P)=4.77×10^{-6} *7* Mult.: α(K)exp=0.031 *6*; K/L=4.9 *15*. δ: ≤35% E2 (1974Va23).
^{x}692.3 *4*	20.9 *16*					(M1)		0.0392	α(K)=0.0323 *5*; α(L)=0.00527 *8*; α(M)=0.001221 *18* α(N)=0.000306 *5*; α(O)=5.80×10^{-5} *9*; α(P)=4.49×10^{-6} *7* Mult.: α(K)exp=0.027 *6*. δ: ≤52% E2 (1974Va23).
713.0 *4*	6.0 *7*	752.63	(1/2⁻,3/2⁻,5/2⁻)	39.51	5/2$^{(-)}$	(E2)		0.01204	α(K)=0.00933 *13*; α(L)=0.00207 *3*; α(M)=0.000496 *7* α(N)=0.0001240 *18*; α(O)=2.26×10^{-5} *4*; α(P)=1.235×10^{-6} *18* Mult.: α(K)exp=0.011 *10*. δ: ≤54% M1.
^{x}720.0 *5*	1.7 *8*								Mult.: α(K)exp=0.050 *46*; theory: α(K)(M1)=0.0292 *5*, α(K)(E2)=0.00915 *13*.
752.5 *4*	11.6 *17*	752.63	(1/2⁻,3/2⁻,5/2⁻)	0.0	3/2$^{(-)}$	(M1)		0.0316	α(K)=0.0261 *4*; α(L)=0.00424 *6*; α(M)=0.000982 *14* α(N)=0.000246 *4*; α(O)=4.66×10^{-5} *7*; α(P)=3.61×10^{-6} *5* Mult.: α(K)exp=0.028 *13*. δ: ≤63% E2.

From ENSDF

γ(^{193}Hg) (continued)

E_γ	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.†	δ†&	α@	Comments
^{x}759.1 *7*	6.5 *15*					(M1,E2)		0.021 *11*	α(K)=0.017 *9*; α(L)=0.0030 *12*; α(M)=0.0007 *3* α(N)=0.00017 *7*; α(O)=3.2×10^{-5} *14*; α(P)=2.3×10^{-6} *13* Mult.: α(K)exp=0.022 *18*.
770.4 *4*	12.9 *8*	1523.3	(1/2$^-$,3/2$^-$,5/2$^-$)	752.63	(1/2$^-$,3/2$^-$,5/2$^-$)	(M1+E2)	1.2 *10*	0.021 *7*	α(K)=0.017 *6*; α(L)=0.0030 *8*; α(M)=0.00069 *18* α(N)=0.00017 *5*; α(O)=3.3×10^{-5} *9*; α(P)=2.4×10^{-6} *8* Mult.,δ: From α(K)exp=0.018 *6*. δ deduced by evaluator, BriccMixing gives 0.8 *8* and 0.8 *+10−7*.
^{x}773.9 *6*	1.6 *7*								
^{x}783.0 *15*	4.0 *16*								
^{x}821.2 *2*	9.4 *5*					(M1+E2)	1.1 *6*	0.016 *5*	α(K)=0.013 *4*; α(L)=0.0022 *6*; α(M)=0.00052 *12* α(N)=0.00013 *3*; α(O)=2.5×10^{-5} *6*; α(P)=1.7×10^{-6} *6* Mult.,δ: From α(K)exp=0.013 *4*. δ from BriccMixing, other value it gives 1.1 *+13−6*.
^{x}942.1 *5*	1.8 *8*								
^{x}994.75 *25*	11.0 *11*								
^{x}1014.4 *3*	8.9 *10*								
^{x}1044.7 *3*	59 *6*								
^{x}1064.3 *4*	7.1 *5*								
^{x}1086.2 *6*	1.6 *8*								
^{x}1130.3 *3*	12.3 *13*								
^{x}1145.8 *4*	4.2 *8*								
^{x}1152.0 *4*	4.9 *9*								
1205.4 *3*	10.2 *12*	1580.10	(1/2$^-$,3/2,5/2$^-$)	374.61	(3/2$^-$,5/2$^-$,7/2$^-$)				
^{x}1229.2 *6*	2.5 *10*								
^{x}1236.1 *4*	4.6 *12*								
1256.0 *3*	10.3 *19*	1580.10	(1/2$^-$,3/2,5/2$^-$)	324.36	(3/2$^-$,5/2$^-$)				
^{x}1337.6 *4*	5.6 *10*								
^{x}1360.8 *4*	4.8 *9*								
^{x}1430.7 *4*	4.5 *9*								
^{x}1474.7 *7*	2.6 *10*								
1484.1 *7*	3.4 *10*	1523.3	(1/2$^-$,3/2$^-$,5/2$^-$)	39.51	5/2$^{(-)}$				
1523.4 *4*	8.0 *19*	1523.3	(1/2$^-$,3/2$^-$,5/2$^-$)	0.0	3/2$^{(-)}$				
1539.4 *10*	8.8 *20*	1580.10	(1/2$^-$,3/2,5/2$^-$)	39.51	5/2$^{(-)}$				
1579.3 *10*	45 *10*	1580.10	(1/2$^-$,3/2,5/2$^-$)	0.0	3/2$^{(-)}$				

† From α(K)exp and/or α(L)exp. 1974Va23 have normalized the ce-intensities to the photon intensities so that α(K)exp and α(L)exp for the 284.9γ, 324.4γ, 335.1γ, 344.0γ and 676.1γ gave the same multipolarities as their respective K/L ratios. This normalization gives α(K)exp(207.7γ)=0.16 *3* which is in

$\gamma(^{193}Hg)$ (continued)

agreement with proposed E2 multipolarity for this γ (expected α(K)(E2)=0.156). However, several γ's which are expected to be [M1,E2] have α(K)exp or α(L)exp outside the range of expected values e.g. α(L)exp(636.4γ), α(K)exp(374.6γ) thus suggesting that although the multipolarities have been established, the mixing ratios should be considered tentative.

‡ Presence suggested by decay scheme and constant energy differences between pairs of γ rays.

\# Based on α(L)exp, only 12% *11* of the undivided intensity can come from an E2 transition.

@ Additional information 1.

& If No value given it was assumed δ=1.00 for E2/M1, δ=1.00 for E3/M2 and δ=0.10 for the other multipolarities.

[a] Multiply placed with undivided intensity.

[x] γ ray not placed in level scheme.

$^{193}_{80}Hg_{113}$-5

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Decay Scheme