^{204}Hg(α,4nγ) 1978Li01

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	C. J. Chiara and F. G. Kondev	NDS 111,141 (2010)	1-Oct-2009

1978Li01: ^{204}Hg target enriched to 99.7% purity; E(α)=42 to 51 MeV; three coax Ge(Li) detectors, FWHM=1.2 to 1.6 keV at 122 keV and 2.2 to 3.0 keV at 1332 keV, for γ excit functions, prompt and delayed γ spectra, $\gamma(\theta)$, $\gamma\gamma$ coin; one planar Ge(Li), FWHM=0.7 keV at 122 keV and 1.6 keV at 662 keV, as monitor in $\gamma(\theta)$ measurements; delayed γ's measured during time window 34 to 84 ns after beam pulse, period of beam pulses 115 ns; ce spectrometer. Comparison with shell-model calculations.

^{204}Pb Levels

E(level)†	J$^\pi$‡	T$_{1/2}$#	Comments
0	0$^+$@		
899.30 *20*	2$^+$@		
1274.0 *3*	4$^+$@		
2185.7 *4*	9$^-$@	66.93@ min *10*	Proposed configuration=$\nu[(p_{1/2})^{-2}(f_{5/2})^{-1}(i_{13/2})^{-1}]$.
2945.4 *4*	10$^-$		J$^\pi$: $\gamma(\theta)$ of 246.2γ, 759.8γ, and 1005.7γ determine J, whereas parity assignment by 1978Li01 was taken from comparison with shell model; however, it is unlikely that the 759.8γ has mult M2+E1 with so large an M2 component. Thus, the parity is also experimentally established. Proposed configuration=$\nu[(p_{1/2})^{-1}(f_{5/2})^{-2}(i_{13/2})^{-1}]$.
3191.5 *4*	11$^-$		Proposed configuration=$\nu[(p_{1/2})^{-1}(f_{5/2})^{-2}(i_{13/2})^{-1}]$.
3516.2 *5*	12$^+$		Proposed configuration=$\nu[(p_{1/2})^{-2}(i_{13/2})^{-2}]$.
4134.6 *5*	14$^+$		Proposed configuration=$\nu[(p_{1/2})^{-1}(f_{5/2})^{-1}(i_{13/2})^{-2}]$.
4301.8 *5*	15$^+$		Proposed configuration=$\nu[(p_{1/2})^{-1}(f_{5/2})^{-1}(i_{13/2})^{-2}]$.
4887.6 *5*	16$^+$		Proposed configuration=$\nu[(f_{5/2})^{-2}(i_{13/2})^{-2}]$.
5348.5 *5*	16$^+$		Proposed configuration=$\nu[(f_{5/2})^{-1}(p_{3/2})^{-1}(i_{13/2})^{-2}]$.
5664.3 *6*	17$^-$		Proposed configuration=$\nu[(p_{1/2})^{-1}(i_{13/2})^{-3}]$.
6072.9 *6*	17		Proposed configuration=$\nu[(f_{5/2})^{-1}(i_{13/2})^{-3}]$.
6098.0 *6*	19$^-$		Proposed configuration=$\nu[(f_{5/2})^{-1}(i_{13/2})^{-3}]$.
7402.1 *6*	(20)		Proposed configuration=$\pi[(h_{9/2})(h_{11/2})^{-1}]\nu[(p_{1/2})^{-2}(i_{13/2})^{-2}]$.
7849.2 *7*	(21)		Proposed configuration=$\pi[(h_{9/2})(h_{11/2})^{-1}]\nu[(p_{1/2})^{-2}(i_{13/2})^{-2}]$.
8125.9 *7*	(22)		Proposed configuration=$\pi[(h_{9/2})(h_{11/2})^{-1}]$ $\nu[(p_{1/2})^{-1}(f_{5/2})^{-1}(i_{13/2})^{-2}]$.

† From a least-squares fit to Eγ.
‡ From 1978Li01 based on mult and on yrast arguments, except as noted.
# No delayed (>20 ns) γ's were found except for those deexciting the 9-, 66.93-min isomer.
@ From Adopted Levels.

γ(^{204}Pb)

α(K)exp from ce(K)/Iγ, normalized to α(K)(618.4γ)=0.014 (pure E2), at E(α)=51 MeV in 1978Li01.

E$_\gamma$‡	I$_\gamma$#	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$	Mult.@	δ&	α†	Comments
167.2 *2*	10.5 *6*	4301.8	15$^+$	4134.6	14$^+$	M1(+E2)	0.00 *4*	2.17 *4*	α(K)=1.77 *3*; α(L)=0.305 *5*; α(M)=0.0715 *11*; α(N+..)=0.0222 *4* α(N)=0.0182 *3*; α(O)=0.00362 *6*; α(P)=0.000387 *6* A$_2$=−0.21 *3*, A$_4$=0.00 *3*. 1978Li01 considered the intensities of transitions into and out of the 4301.8-keV

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^{204}Hg(α,4nγ) 1978Li01 (continued)

$\gamma(^{204}Pb)$ (continued)

E_γ[‡]	I_γ[#]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[@]	δ[&]	α[†]	Comments
									level and placed the limits 2.0 $2<\alpha(\text{exp})<5.0$ *6* for 167.2γ, consistent with an M1 assignment.
246.2 *2*	3.0 *2*	3191.5	11^-	2945.4	10^-	M1+E2	0.09 *5*	0.730 *12*	α(K)=0.596 *11*; α(L)=0.1027 *15*; α(M)=0.0241 *4*; α(N+..)=0.00746 *11* α(N)=0.00612 *9*; α(O)=0.001219 *18*; α(P)=0.0001299 *21* A_2=−0.32 *2*, A_4=+0.04 *2*.
276.7 *3*	2.0 *2*	8125.9	(22)	7849.2	(21)	D			A_2=−0.2 *3*, A_4=+0.2 *4*.
315.9 *2*	17.1 *9*	5664.3	17^-	5348.5	16^+	E1		0.0262 *7*	α(K)=0.0215 *5*; α(L)=0.00361 *11*; α(M)=0.00084 *3*; α(N+..)=0.000258 *9* α(N)=0.000213 *7*; α(O)=4.13×10^{-5} *14*; α(P)=3.86×10^{-6} *14* δ: found by 1978Li01 to be consistent with zero, δ=0.00 *2*. A_2=−0.232 *8*, A_4=−0.01 *1*, α(K)exp=0.029 *4*.
324.7 *2*	85 *4*	3516.2	12^+	3191.5	11^-	E1(+M2)	0.03 *3*	0.026 *4*	α(K)=0.0210 *25*; α(L)=0.0036 *6*; α(M)=0.00084 *15*; α(N+..)=0.00026 *5* α(N)=0.00021 *4*; α(O)=4.1×10^{-5} *8*; α(P)=3.9×10^{-6} *8* δ: from 1978Li01. A_2=−0.143 *5*, A_4=+0.031 *7*, α(K)exp=0.017 *8*, K/L=8 *5*; ce intensities are corrected for contamination by the 323.2-keV transition in ^{205}Pb.
374.7[a] *2*		1274.0	4^+	899.30	2^+				
433.7 *2*	17.3 *9*	6098.0	19^-	5664.3	17^-	E2		0.045 *15*	α(K)=0.030 *11*; α(L)=0.011 *4*; α(M)=0.0027 *9*; α(N+..)=0.0008 *3* α(N)=0.00070 *22*; α(O)=0.00013 *5*; α(P)=1.0×10^{-5} *4* δ: found by 1978Li01 to be consistent with zero, δ=0.05 *7*. A_2=+0.28 *1*, A_4=−0.16 *2*, α(K)exp=0.031 *4*.
447.1 *2*	6.5 *4*	7849.2	(21)	7402.1	(20)	D+Q	−0.05 *8*		A_2=−0.12 *4*, A_4=+0.06 *6*.
585.7 *2*	9.3 *5*	4887.6	16^+	4301.8	15^+	M1+E2	0.4 *2*	0.064 *7*	α(K)=0.052 *6*; α(L)=0.0090 *8*; α(M)=0.00211 *17*; α(N+..)=0.00065 *6* α(N)=0.00054 *5*; α(O)=0.000107 *9*; α(P)=1.13×10^{-5} *11* A_2=−0.86 *2*, A_4=+0.15 *3*, α(K)exp=0.038 *6*.
618.4 *2*	76 *4*	4134.6	14^+	3516.2	12^+	E2		0.0180 *6*	α(K)=0.0134 *5*; α(L)=0.00348 *12*; α(M)=0.00085 *3*; α(N+..)=0.000261 *9* α(N)=0.000216 *8*; α(O)=4.13×10^{-5} *15*; α(P)=3.50×10^{-6} *14* δ: found by 1978Li01 to be consistent with zero, δ=−0.01 *3*. A_2=+0.325 *7*, A_4=−0.048 *9*, K/L=3.5 *6*; α(K)exp normalized to 1968Ha53 theoretical value 0.014 for pure E2.
752.9 *2*	11.6 *6*	4887.6	16^+	4134.6	14^+	E2		0.0118 *4*	α(K)=0.00910 *25*; α(L)=0.00205 *6*; α(M)=0.000496 *15*; α(N+..)=0.000152 *5*

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^{204}Hg(α,4nγ) 1978Li01 (continued)

$\gamma(^{204}Pb)$ (continued)

E_γ[‡]	I_γ[#]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[@]	δ[&]	α[†]	Comments
									α(N)=0.000126 *4*; α(O)=2.43×10^{-5} *8*; α(P)=2.19×10^{-6} *7* δ: found by 1978Li01 to be consistent with zero, δ=−0.01 *+4−3*. A_2=+0.34 *1*, A_4=−0.07 *2*.
759.8 *2*	11.0 *6*	2945.4	10$^-$	2185.7	9$^-$	M1+E2	7 *+12−3*	0.0121 *10*	α(K)=0.0093 *9*; α(L)=0.00206 *12*; α(M)=0.00050 *3*; α(N+..)=0.000153 *9* α(N)=0.000126 *7*; α(O)=2.44×10^{-5} *14*; α(P)=2.22×10^{-6} *17* A_2=−0.25 *2*, A_4=+0.27 *3*.
776.7 *2*	7.1 *4*	5664.3	17$^-$	4887.6	16$^+$	(E1)		0.0041 *11*	α=0.0041 *11*; α(K)=0.0034 *9*; α(L)=0.00053 *17*; α(M)=0.00012 *4*; α(N+..)=3.8×10^{-5} *12* α(N)=3.1×10^{-5} *10*; α(O)=6.2×10^{-6} *20*; α(P)=6.3×10^{-7} *21* δ: found by 1978Li01 to be consistent with zero, δ=−0.04 *8*. A_2=−0.16 *5*, A_4=+0.01 *7*.
899.3[a] *2*		899.30	2$^+$	0	0$^+$				
911.7[a] *2*		2185.7	9$^-$	1274.0	4$^+$				
1005.7 *2*	100 *5*	3191.5	11$^-$	2185.7	9$^-$	E2		0.0067 *8*	α=0.0067 *8*; α(K)=0.0053 *6*; α(L)=0.00104 *14*; α(M)=0.00025 *4*; α(N+..)=7.6×10^{-5} *10* α(N)=6.3×10^{-5} *9*; α(O)=1.23×10^{-5} *17*; α(P)=1.19×10^{-6} *17* δ: found by 1978Li01 to be consistent with zero, δ=−0.04 *7*. A_2=+0.23 *1*, A_4=+0.005 *20*, α(K)exp=0.0056 *7*, K/L=4.8 *15*.
1046.7 *2*	22 *1*	5348.5	16$^+$	4301.8	15$^+$	M1(+E2)	−0.07 *4*	0.01577 *24*	α(K)=0.01298 *19*; α(L)=0.00214 *4*; α(M)=0.000499 *8*; α(N+..)=0.0001546 *23* α(N)=0.0001266 *19*; α(O)=2.53×10^{-5} *4*; α(P)=2.72×10^{-6} *4* A_2=−0.10 *3*, A_4=0.00 *4*, α(K)exp=0.013 *2*, K/L=5.4 *24*.
1185.3 *2*	5.9 *4*	6072.9	17	4887.6	16$^+$	D(+Q)	0.00 *3*		A_2=−0.22 *2*, A_4=+0.02 *2*.
1214.0 *3*	1.7 *3*	5348.5	16$^+$	4134.6	14$^+$	E2(+M3)	−0.2 *1*	0.0062 *19*	α=0.0062 *19*; α(K)=0.0050 *15*; α(L)=0.0009 *3*; α(M)=0.00022 *8*; α(N+..)=7.4×10^{-5} *23* α(N)=5.7×10^{-5} *19*; α(O)=1.1×10^{-5} *4*; α(P)=1.1×10^{-6} *4*; α(IPF)=4.91×10^{-6} *22* A_2=+0.50 *6*, A_4=−0.06 *9*.
1304.1 *2*	9.4 *6*	7402.1	(20)	6098.0	19$^-$	D+Q	0.05 *2*		A_2=−0.33 *1*, A_4=−0.02 *1*.

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^{204}Hg(α,4nγ) 1978Li01 (continued)

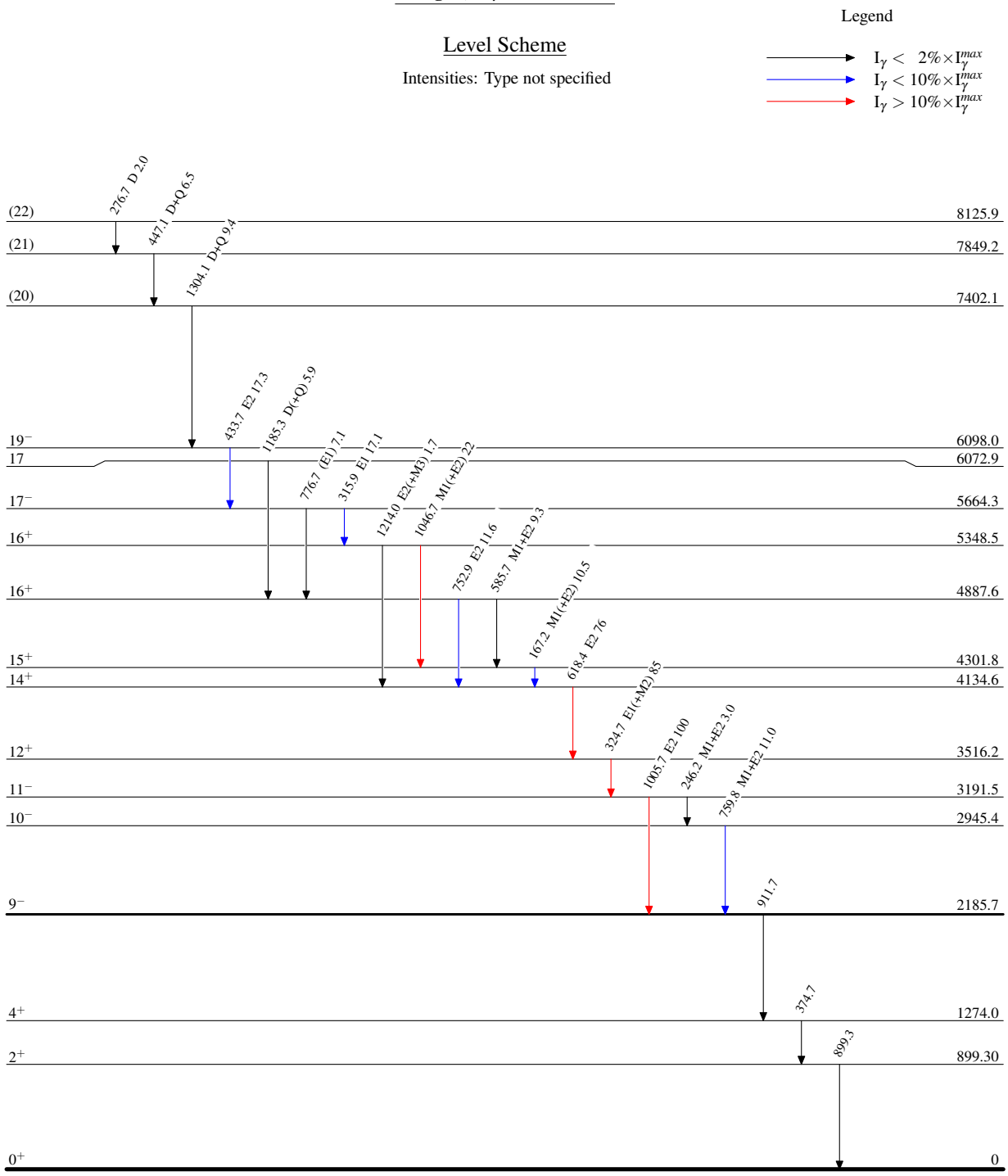
$\gamma(^{204}Pb)$ (continued)

† Additional information 1.
‡ From 1978Li01; $\Delta E\gamma$ was not given and is estimated by evaluators.
# At θ=125° and E(α)=48 MeV in 1978Li01.
@ From $\gamma(\theta)$, α(K)exp, and K/L in 1978Li01.
& From $\gamma(\theta)$ in 1978Li01.
a Observed in γ singles and in ce spectrum, but not in spectra gated on γ's above isomeric 9^- level.

^{204}Hg(α,4nγ) **1978Li01**

Level Scheme

Intensities: Type not specified



$^{204}_{82}Pb_{122}$