^{204}Hg(^{9}Be,α3nγ) 1994Po20

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	F. G. Kondev	NDS 201,346 (2025)	21-Jan-2025

Projectile: ^{9}Be, E=62 MeV. Target: enriched ^{204}Hg. Measured Eγ, Iγ, $\gamma\gamma$(t), $\gamma(\theta)$, linear polarization. Deduced levels half-life and γ-ray multipolarities. Detectors: CAESAR, an array of Compton suppressed germanium hyper-pure detectors; germanium hyper-pure linear polarimeter. Others: 2016Ch14, 2019Ra28.

^{206}Pb Levels

E(level)†	J$^{\pi}$‡	T$_{1/2}$‡	Comments
0.0	0$^+$		
803.1 *10*	2$^+$	12 ps *3*	T$_{1/2}$: From RDDS in 2019Ra28.
1340.5 *13*	3$^+$		
1684.0 *13*	4$^+$		
2200.2 *17*	7$^-$	124 μs	
2658.3 *20*	9$^-$		
3957.4 *21*	10$^+$		Dominant configuration=$\nu(i^{-2}_{13/2})$.
4027.1 *21*	12$^+$	197 ns	Dominant configuration=$\nu(i^{-2}_{13/2})$.
5217.3 *22*	12$^+$		Possible configuration=$\pi(h^{+1}_{9/2},h^{-1}_{11/2})$ $\nu(p^{-1}_{1/2},f^{-1}_{5/2})$.
5553.6 *22*	(11$^+$)		Possible configuration=$\pi(h^{+1}_{9/2},h^{-1}_{11/2})$ $\nu(p^{-1}_{1/2},f^{-1}_{5/2})$.
5782.9 *22*	13$^+$		Possible configuration=$\pi(h^{+1}_{9/2},s^{-1}_{1/2})$ $\nu(f^{-1}_{5/2},i^{-1}_{13/2})$.
6033.7 *22*	14$^+$		Possible configuration= $\nu(p^{-1}_{1/2},f^{-1}_{5/2},i^{-1}_{13/2},g^{+1}_{9/2})$.
6382.1 *24*	(14$^+$)		Possible configuration=$\pi(h^{+1}_{9/2},d^{-1}_{3/2})$ $\nu(f^{-1}_{5/2},i^{-1}_{13/2})$.
6564.8 *24*	15$^{(-)}$		Possible configuration=$\pi(h^{+1}_{9/2},h^{-1}_{11/2})$ $\nu(p^{-1}_{1/2},i^{-1}_{13/2})$.
6564.8+x *16*	16$^{(-)}$		Additional information 1. E(level): State predicted by theory. Possible configuration=$\pi(h^{+1}_{9/2},h^{-1}_{11/2})$ $\nu(p^{-1}_{1/2},i^{-1}_{13/2})$.
6850.6+x *10*	17$^{(-)}$		Possible configuration=$\pi(h^{+1}_{9/2},h^{-1}_{11/2})$ $\nu(f^{-1}_{5/2},i^{-1}_{13/2})$.
7661.1+x *15*	18$^{(-)}$		Possible configuration=$\nu(f^{-1}_{1/2},i^{-2}_{13/2},g^{9/2\ +1})$.
7758.4+x *18*	(19$^+$)	7.5 ns *9*	Possible configuration=$\pi(h^{+1}_{9/2},h^{-1}_{11/2})\nu(i^{-2}_{13/2})$.
8081.0+x *20*	(20$^+$)		Possible configuration=$\pi(h^{+1}_{9/2},h^{-1}_{11/2})\nu(i^{-2}_{13/2})$.
8704.8+x *23*	(21$^+$)		Possible configuration=$\pi(h^{+1}_{9/2},h^{-1}_{11/2})\nu(i^{-2}_{13/2})$.

† From a least-squares fit to Eγ with ΔEγ=0.5 keV used for all γ rays.
‡ From 1994Po20, unless otherwise stated. Uncertainty was reported only to the T$_{1/2}$(19$^+$) value.

γ(^{206}Pb)

E$_\gamma$†	I$_\gamma$†	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$	Mult.#	Comments
69.7 *5*		4027.1	12$^+$	3957.4	10$^+$	E2@	E$_\gamma$: From adopted gamma. Not observed directly in 1994Po20.
97.3	≈8	7758.4+x	(19$^+$)	7661.1+x	18$^{(-)}$	E1	Mult.: α(exp)<2, deduced from transition intensity balance.
x135.0	9 *2*						E$_\gamma$: in coincidence with 285.6-, 322.6- and 810.5-keV γ rays.
229.4	6 *1*	5782.9	13$^+$	5553.6	(11$^+$)	Q	Mult.: A$_2$=0.46 *25*.
250.8	18 *4*	6033.7	14$^+$	5782.9	13$^+$	(M1)	Mult.: A$_2$=−0.38 *7*.
285.8	45 *5*	6850.6+x	17$^{(-)}$	6564.8+x	16$^{(-)}$	M1	Mult.: A$_2$=−0.30 *6*, pol=−0.65 *47*.
322.6	18 *4*	8081.0+x	(20$^+$)	7758.4+x	(19$^+$)		
336.4	17 *4*	5553.6	(11$^+$)	5217.3	12$^+$	(M1)	E$_\gamma$: Unresolved from a 335.6-keV line from a contaminant.
343.5	234 *12*	1684.0	4$^+$	1340.5	3$^+$	M1(+E2)@	Mult.: A$_2$=0.02 *2*, pol=−0.05 *8*.

Continued on next page (footnotes at end of table)

^{204}Hg(^{9}Be,α3nγ) 1994Po20 (continued)

$\gamma(^{206}Pb)$ (continued)

E_γ[†]	I_γ[†]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	Comments
348.4	5 *1*	6382.1	(14^+)	6033.7	14^+		E_γ: Unresolved from a 348.0-keV line from ^{207}Po.
x354.8	5 *1*						E_γ: Possibly feeds the 5217.3-keV level.
x425.6	5 *1*						E_γ: Possibly feeds the 6033.7-keV level.
458.1	471 *24*	2658.3	9^-	2200.2	7^-	E2[@]	Mult.: A_2=0.12 *1*, pol=+0.17 *3*. E_γ: Partially contaminated by 457.5-keV line from ^{208}Po.
516.2	955 *48*	2200.2	7^-	1684.0	4^+	E3[@]	Mult.: A_2=0.06 *2* and assigned E2 in 1994Po20. E_γ: Partially contaminated by 516.2-keV line from ^{208}Po.
x528.1	6 *1*						E_γ: in coincidence with 531.1-keV γ ray.
531.1	91 *9*	6564.8	$15^{(-)}$	6033.7	14^+	(E1)	E_γ: Partially contaminated by 530.9-keV line from ^{208}Po. Mult.: A_2=−0.08 *5*, pol=+0.52 *33*.
537.4	283 *14*	1340.5	3^+	803.1	2^+	M1(+E2)[@]	Mult.: A_2=−0.21 *13*, pol=−0.04 *8*.
565.5	9 *2*	5782.9	13^+	5217.3	12^+		
623.8	10 *2*	8704.8+x	(21^+)	8081.0+x	(20^+)		
803.1	1000 *50*	803.1	2^+	0.0	0^+	E2[@]	Mult.: A_2=0.06 *4*, pol=−0.05 *5*. The value is inconsistent with the assigned multipolarity.
810.5	18 *4*	7661.1+x	$18^{(-)}$	6850.6+x	$17^{(-)}$	D	Mult.: A_2=−0.18 *16*.
816.3	73 *7*	6033.7	14^+	5217.3	12^+	(E2)	Mult.: A_2=0.21 *8*.
880.9	648 *32*	1684.0	4^+	803.1	2^+	E2[@]	Mult.: A_2=0.18 *5*, pol=0.05 *5*.
x1186[‡]	7 *1*						
1190.2	95 *10*	5217.3	12^+	4027.1	12^+	M1	Mult.: A_2=0.40 *5*, pol=+0.19 *25*; J to J transition, based on $\gamma(\theta)$ and linear polarization. δ=−2.2 *8*, or δ=+0.8 *3*.
x1239[‡]	5 *1*						
1299.1	228 *11*	3957.4	10^+	2658.3	9^-	E1[@]	Mult.: A_2=−0.13 *6*.
1368.7	254 *13*	4027.1	12^+	2658.3	9^-	E3[@]	Mult.: A_2=0.25 *5*.
1526.5	20 *4*	5553.6	(11^+)	4027.1	12^+	M1	Mult.: A_2=−0.34 *16*, pol=−0.25 *83*.
x1748[‡]	8 *2*						
1755.9	65 *7*	5782.9	13^+	4027.1	12^+	M1	Mult.: A_2=−0.55 *4*, pol=−0.83 *33*.
x1825[‡]	4 *1*						
2006.7	>10	6033.7	14^+	4027.1	12^+	(E2)	

[†] From 1994Po20.
[‡] Feeds the 4020.2-keV level.
[#] From 1994Po20, based on $\gamma(\theta)$ and linear polarization, unless otherwise stated.
[@] From adopted gammas.
[x] γ ray not placed in level scheme.

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Level Scheme

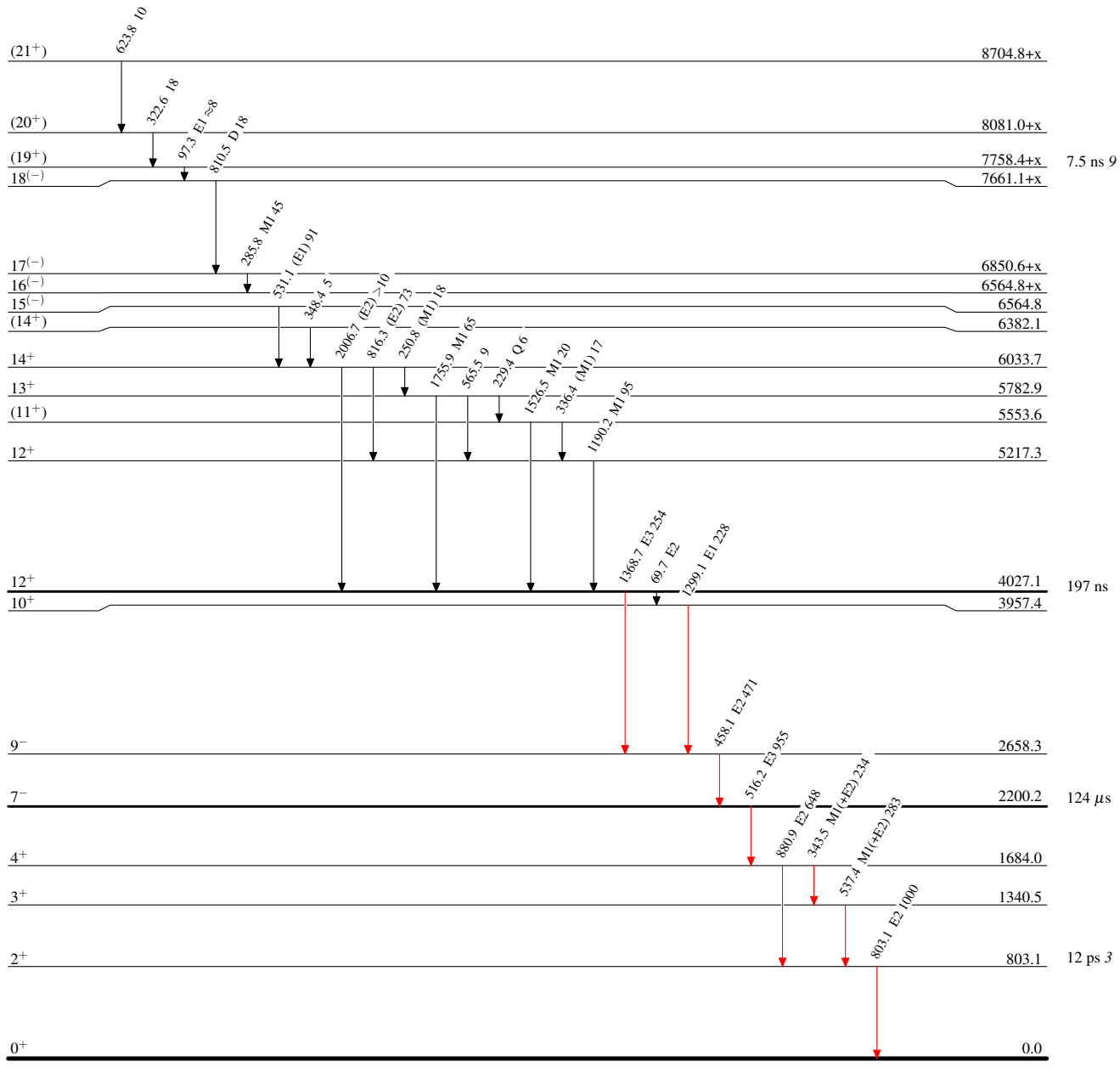
Intensities: Relative I_γ

Legend

$I_\gamma < 2\% \times I_\gamma^{max}$

$I_\gamma < 10\% \times I_\gamma^{max}$

$I_\gamma > 10\% \times I_\gamma^{max}$



$^{206}_{82}Pb_{124}$