$^{204}\text{Hg}(^9\text{Be,xn}\gamma)$ 1994Po20

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	F. G. Kondev	NDS 166, 1 (2020)	20-Apr-2020

1994Po20: Reaction: $^{204}\text{Hg}(^9\text{Be},\alpha\,4n\gamma)$; Projectile: ^9Be at 55-65 MeV; Target: ^{204}Hg, enriched up to 93%, 5 mg/cm^2 thick. Experiments: a) Excitation function, using a pulsed beam (1 ms on, 1 ms off); b) γ(t) and c) $\gamma\gamma$(t) both using pulsed beams (1 ns on, 642 ns off); d) $\gamma(\theta)$; e) Linear polarization using three 20% efficiency Ge detectors; Detectors: CAESAR array consisting of six Compton suppressed Ge detectors and several single crystal Ge detectors; Measured: excitation functions, Eγ, Iγ, $\gamma\gamma$ coin, $\gamma\gamma$(t), γ(t), $\gamma(\theta)$, γ-ray linear polarization.
Other: $^{208}\text{Pb}(^{36}\text{S},^{205}\text{Pb}\gamma)$ (2016Ch14).

^{205}Pb Levels

E(level)[†]	Jπ[‡]	T$_{1/2}$[#]	Comments
0.0[@]	5/2$^-$	1.70×10^7 y 9	T$_{1/2}$: From Adopted Levels.
703.40[&] 17	7/2$^-$		
987.50[&] 17	9/2$^-$		
1013.7[a] 5	13/2$^+$	≈4.9 ms	
1697.3[b] 6	17/2$^+$	<0.4 ns	
2020.5[b] 6	19/2$^+$	<0.4 ns	
2555.2[c] 6	(21/2$^+$)	<0.7 ns	
3167.8[d] 6	21/2$^-$	<0.7 ns	
3195.4[d] 6	25/2$^-$	217 ns	
3520.8[d] 8	(23/2$^-$)		
3625.8[e] 6	29/2$^-$	<0.7 ns	
3651.1[e] 8	(25/2$^-$)		
3910.3[e] 7	27/2$^-$		
5064.2[f] 7	29/2$^+$	<3.5 ns	
5161.3[f] 7	33/2$^+$	63 ns	
5284.3[g] 7	(27/2$^-$)	<0.7 ns	
5389.4[g] 9	(29/2$^-$)		
5734.8[h] 7	(29/2$^-$)	<0.7 ns	
5902.5[g] 8	(31/2$^-$)	<14 ns	
6139.1[i] 9	(33/2$^+$)		
6318.4[j] 9	(33/2$^-$)	<14 ns	
6533.2[i] 10	(35/2$^+$)	<14 ns	
6865.5[i] 11	(37/2$^+$)		

[†] From a least-squares fit to Eγ.
[‡] From 1994Po20, based on the deduced transition multipolarities and multiple decay branches.
[#] From 1994Po20, unless otherwise stated.
[@] configuration=$\nu(f^{-1}_{5/2})$.
[&] configuration=$\nu(f^{-1}_{5/2})\otimes 2^+$.
[a] configuration=$\nu(i^{-1}_{13/2})$.
[b] configuration=$\nu(i^{-1}_{13/2})\otimes 2^+$.
[c] configuration=$\nu(i^{-1}_{13/2})\otimes 4^+$.
[d] configuration=$\nu(p^{-1}_{1/2},i^{-2}_{13/2})$.
[e] configuration=$\nu(f^{-1}_{5/2},i^{-2}_{13/2})$.
[f] configuration=$\nu(i^{-3}_{13/2})$.

$^{204}\text{Hg}(^9\text{Be},xn\gamma)$ **1994Po20** (continued)

^{205}Pb Levels (continued)

^{g} configuration=$\nu(p_{1/2}^{-1},f_{5/2}^{-2},i_{13/2}^{-1},g_{9/2}^{+1})$.

^{h} configuration=$\nu(p_{1/2}^{-2},f_{5/2}^{-1},i_{13/2}^{-1},i_{11/2}^{+1})$.

^{i} configuration=$\nu(p_{1/2}^{-1},f_{5/2}^{-1},i_{13/2}^{-2},g_{9/2}^{+1})$.

^{j} configuration=$\nu(p_{1/2}^{-1},f_{5/2}^{-2},i_{13/2}^{-1},i_{11/2}^{+1})$ The assignment is tentative.

$\gamma(^{205}\text{Pb})$

E_γ†	I_γ†	E_i(level)	J_i^π	E_f	J_f^π	Mult.‡	Comments
(26.2)		1013.7	$13/2^+$	987.50	$9/2^-$	M2	Mult.: From intensity balance.
(27.7)		3195.4	$25/2^-$	3167.8	$21/2^-$		
97.1 5		5161.3	$33/2^+$	5064.2	$29/2^+$		
(105 5)		5389.4	$(29/2^-)$	5284.3	$(27/2^-)$		
167.7 5	15	5902.5	$(31/2^-)$	5734.8	$(29/2^-)$	M1	Mult.: α(exp)=3.4 15 from intensity balance.
^{x}207.3	8						
214.8 5	14	6533.2	$(35/2^+)$	6318.4	$(33/2^-)$		
236.6 5	8	6139.1	$(33/2^+)$	5902.5	$(31/2^-)$		
284.1 2	97	987.50	$9/2^-$	703.40	$7/2^-$	M1+E2	Mult.: A_2=0.03 11.
284.3 5	21	3910.3	$27/2^-$	3625.8	$29/2^-$		
310.3 5	4	1013.7	$13/2^+$	703.40	$7/2^-$	E3	Mult.: From intensity balance.
323.2 2	≈520	2020.5	$19/2^+$	1697.3	$17/2^+$	M1+E2	Mult.: A_2=−0.07 3; pol=−0.03 9.
325.4 5	21	3520.8	$(23/2^-)$	3195.4	$25/2^-$		
332.3 5	9	6865.5	$(37/2^+)$	6533.2	$(35/2^+)$		
415.9 5	19	6318.4	$(33/2^-)$	5902.5	$(31/2^-)$		
430.3 2	357	3625.8	$29/2^-$	3195.4	$25/2^-$	E2	Mult.: A_2=0.43 7; pol=+0.53 17.
450.5 2	48	5734.8	$(29/2^-)$	5284.3	$(27/2^-)$	M1	Mult.: A_2=−0.45 30; pol=−0.51 152.
455.7 5	16	3651.1	$(25/2^-)$	3195.4	$25/2^-$		
513.1 5	17	5902.5	$(31/2^-)$	5389.4	$(29/2^-)$		
534.3 5	16	2555.2	$(21/2^+)$	2020.5	$19/2^+$	(M1)	Mult.: A_2=0.27 45.
612.5 5	19	3167.8	$21/2^-$	2555.2	$(21/2^+)$		
618.3 5	25	5902.5	$(31/2^-)$	5284.3	$(27/2^-)$	(E2)	Mult.: A_2=0.58 30.
683.6 2	<1060	1697.3	$17/2^+$	1013.7	$13/2^+$	E2	Mult.: A_2=0.25 8; pol=0.04 13.
703.4 2	160	703.40	$7/2^-$	0.0	$5/2^-$	M1+E2	Mult.: A_2=−0.48 37.
714.9 5	18	3910.3	$27/2^-$	3195.4	$25/2^-$		
857.9 2	31	2555.2	$(21/2^+)$	1697.3	$17/2^+$		
928.9 5	6	6318.4	$(33/2^-)$	5389.4	$(29/2^-)$		
987.5 2	1000	987.50	$9/2^-$	0.0	$5/2^-$	(E2)	Mult.: A_2=0.02 2. Value is inconsistent with the assigned multipolarities presumably due to the attenuation of the initial spin alignment for this state; pol=−0.06 6.
1147.3 2	420	3167.8	$21/2^-$	2020.5	$19/2^+$	E1	Mult.: A_2=−0.11 5; pol=+0.06 19.
1153.8 5	9	5064.2	$29/2^+$	3910.3	$27/2^-$		
1174.9 2	71	3195.4	$25/2^-$	2020.5	$19/2^+$	E3	Mult.: A_2=0.08 3.
1251.0 5	4	5161.3	$33/2^+$	3910.3	$27/2^-$		
1438.5 5	16	5064.2	$29/2^+$	3625.8	$29/2^-$		
1535.6 5	15	5161.3	$33/2^+$	3625.8	$29/2^-$		
1658.5 2	89	5284.3	$(27/2^-)$	3625.8	$29/2^-$	D	Mult.: A_2=−0.21 8; pol=+0.18 79.

† From 1994Po20. $\Delta E\gamma$=0.5 keV has been assumed by the evaluator for $E\gamma$ with $I\gamma\leq50$ and $\Delta E\gamma$=0.2 keV for others.

‡ From 1994Po20 based on $\gamma(\theta)$, α(exp), γ-ray linear polarization (pol) and multiple decay branches.

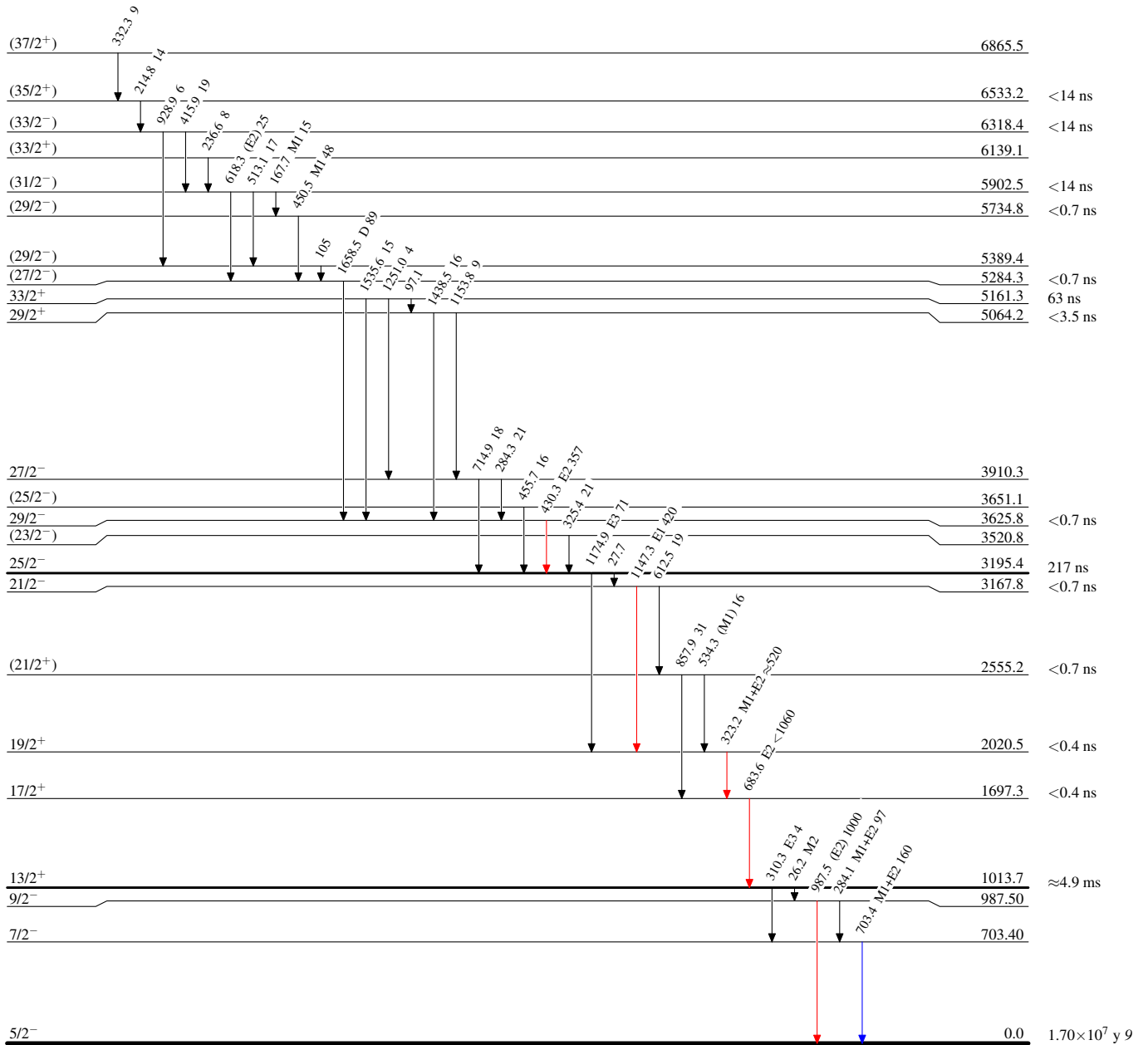^{x} γ ray not placed in level scheme.

$^{204}\text{Hg}(^{9}\text{Be},\text{xn}\gamma)$　　**1994Po20**

Legend

Level Scheme

Intensities: Relative I_γ

→ $I_\gamma < 2\% \times I_\gamma^{max}$
→ $I_\gamma < 10\% \times I_\gamma^{max}$
→ $I_\gamma > 10\% \times I_\gamma^{max}$
⇢ γ Decay (Uncertain)

Level	Energy	Half-life
$(37/2^+)$	6865.5	
$(35/2^+)$	6533.2	<14 ns
$(33/2^-)$	6318.4	<14 ns
$(33/2^+)$	6139.1	
$(31/2^-)$	5902.5	<14 ns
$(29/2^-)$	5734.8	<0.7 ns
$(29/2^-)$	5389.4	
$(27/2^-)$	5284.3	<0.7 ns
$33/2^+$	5161.3	63 ns
$29/2^+$	5064.2	<3.5 ns
$27/2^-$	3910.3	
$(25/2^-)$	3651.1	
$29/2^-$	3625.8	<0.7 ns
$(23/2^-)$	3520.8	
$25/2^-$	3195.4	217 ns
$21/2^-$	3167.8	<0.7 ns
$(21/2^+)$	2555.2	<0.7 ns
$19/2^+$	2020.5	<0.4 ns
$17/2^+$	1697.3	<0.4 ns
$13/2^+$	1013.7	$\approx$4.9 ms
$9/2^-$	987.50	
$7/2^-$	703.40	
$5/2^-$	0.0	1.70×10^7 y 9

Transition labels:

332.3 9
214.8 14
928.9 6
415.9 19
236.6 8
618.3 (E2) 25
513.1 17
167.7 M1 15
450.5 M1 48
105
1658.5 D 89
1535.6 15
1251.0 4
97.1
1438.5 16
1153.8 9
714.9 18
284.3 21
455.7 16
430.3 E2 357
325.4 21
1174.9 E3 71
27.7
1147.3 E1 420
612.5 19
857.9 31
534.3 (M1) 16
323.2 M1+E2 ≈520
683.6 E2 <1060
310.3 E3 4
26.2 M2
987.5 (E2) 1000
284.1 M1+E2 97
703.4 M1+E2 160

$^{205}_{82}\text{Pb}_{123}$