$^{204}\text{Hg}(\alpha,5n\gamma)$ 1977Li04,1979Mc02

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	F. G. Kondev	NDS 177, 509, 2021	4-Jul-2021

1977Li04: $E(\alpha)$=45-55 MeV; Target: 10 mg/cm^2 enriched up to 84% for the singles experiment and up to 99.7% for the $\gamma\gamma$ coin, γ(t) and conversion electron experiments; Experiments: singles at $E(\alpha)$=51 MeV using a single Ge(Li) detector, Excitation functions at $E(\alpha)$=45, 47, 49 and 51 MeV using a single Ge(Li) detector, $\gamma\gamma$ coin at $E(\alpha)$=51 MeV using two Ge(Li) detectors, γ(t) at $E(\alpha)$=55 MeV using a single Ge(Li) detector, Conversion electron at $E(\alpha)$=51 MeV using an electron spectrometer; Measured: γ singles, $\gamma\gamma$ coin, γ(t) and Ice; Deduced: $E\gamma$, $I\gamma$, $T_{1/2}$, α(K)exp, α(exp), α(L)exp, K/L, level scheme, J^π, transition multipolarities.

1979Mc02: $E(\alpha)$=53.5 MeV; Target: 5 mg/cm^2 enriched to 93%; Detectors: Ge(Li), Si(Li); Measured: γ singles, Ice; Deduced: $E\gamma$, $I\gamma$, α(K)exp, α(L)exp, K/L,level scheme, J^π, transition multipolarities.

^{203}Pb Levels

E(level)[†]	J^{π}[‡]	$T_{1/2}$[#]	Comments
0[@]	5/2$^-$		
825.3[&] 5	13/2$^+$	6.4 s 2	$T_{1/2}$: From γ(t) for 825.3γ in 1977Li04.
1664.0[a] 7	17/2$^+$		
1922.5[b] 9	21/2$^+$		
2161.9 10	21/2$^+$,23/2$^+$		E(level): The placement of this level is in accordance with 1979Mc02.
2796.4[c] 9	23/2$^+$		
2949.9[d] 10	29/2$^-$	480 ms 7	$T_{1/2}$: Weighted average from γ(t) for 838.7γ (475 ms 12),258.6γ (487 ms 10), 874.0γ (475 ms 19), 634.2γ (466 ms 40) and 153.4γ (471 ms 71). This value is consistent with that deduced from γ(t) for the weak 1027.5γ (441 ms 49), 853.8γ (535 ms 71) and 174.0γ (458 ms 82), as well as for the doublet 239.6γ (460 ms 110) deduced using a two isomer fit. All data are from 1977Li04.

[†] From a least-squares fit to $E\gamma$ with $\Delta E\gamma$=0.5 keV estimated by the evaluator.
[‡] From the deduced γ-ray transition multipolarities.
[#] From 1977Li04.
[@] Configuration=$\nu(f_{5/2}^{-1})$.
[&] Configuration=$\nu(i_{13/2}^{-1})$.
[a] Configuration=$\nu(i_{13/2}^{-1})\otimes2^+$.
[b] Configuration=$\nu(i_{13/2}^{-1})\otimes4^+$.
[c] Dominant $\nu(p_{1/2}^{-1},f_{5/2}^{-3},f_{7/2}^{-1},i_{13/2}^{-2})$ with $\nu(f_{5/2}^{-1},f_{7/2}^{-1},i_{13/2}^{-2})\otimes2^+$ admixtures.
[d] Configuration=$\nu(f_{5/2}^{-1},i_{13/2}^{-2})$.

²⁰⁴Hg(α,5nγ)   1977Li04,1979Mc02 (continued)

γ(²⁰³Pb)

E_γ[†]	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[@]	δ[&]	$I\gamma$(singles)[#]	Comments
153.4	4.8 5	2949.9	29/2⁻	2796.4	23/2⁺	E3		2.7 3	Mult.: K/L<0.7 and α(L)exp=9.9 15 (1979Mc02); α(exp)=14.8 18 (1977Li04).
[x]238.5	4.9 12								E_γ: From 1977Li04. The origin is unknown. 238.5γ(t) shows $T_{1/2}$=1.3 s 5.
239.1	9.5 20	2161.9	21/2⁺,23/2⁺	1922.5	21/2⁺	M1			E_γ,I_γ: From 1979Mc02. Doublet in 1977Li04. Mult.: K/L=7 1 and α(K)exp=0.9 3 (1979Mc02); α(exp)=1.1 6 (1977Li04).
258.5	84 5	1922.5	21/2⁺	1664.0	17/2⁺	E2		68 4	Mult.: K/L=1.2 1 and α(K)exp=0.074 10 (1979Mc02); α(L)exp=0.0047 24 and α(exp)=0.19 9 (1977Li04).
634.2	20 1	2796.4	23/2⁺	2161.9	21/2⁺,23/2⁺	M1		14.9 8	E_γ: The placement is in accordance with 1979Mc02, albeit some ambiguities exist due to the ordering of the 239.1γ and 634.2γ. Mult.: K/L=5.8 13 and α(K)exp=0.053 11 (1979Mc02); α(K)exp=0.054 6 (1977Li04).
825.3	270 12	825.3	13/2⁺	0	5/2⁻	M4		151 8	Mult.: α(K)exp=0.22 2 (1979Mc02); K/L=3.3 3 and α(K)exp=0.22 (1977Li04).
838.7	100 6	1664.0	17/2⁺	825.3	13/2⁺	E2		100 6	Mult.: α(K)exp=0.0082 14 (1979Mc02); α(K)exp=0.0067 9 (1977Li04).
874.0	51 3	2796.4	23/2⁺	1922.5	21/2⁺	M1+E2	1.4 3	33 2	Mult.,δ: From K/L=6.1 14 and α(K)exp=0.011 1 (1979Mc02). Other: α(K)exp=0.0056 11 (1977Li04).
1027.5	14 1	2949.9	29/2⁻	1922.5	21/2⁺	M4		9.1 5	Mult.: K/L=3.9 4 and α(K)exp=0.106 18 (1979Mc02); α(K)exp=0.12 1 (1977Li04).

[†] From 1977Li04, unless otherwise stated.
[‡] Delayed intensities from 1977Li04. Values are consistent with these reported by 1979Mc02.
[#] From the singles data of 1977Li04.
[@] From α(K)exp, α(L)exp, K/L and α(exp) in 1977Li04 and 1979Mc02.
[&] From 1979Mc02.
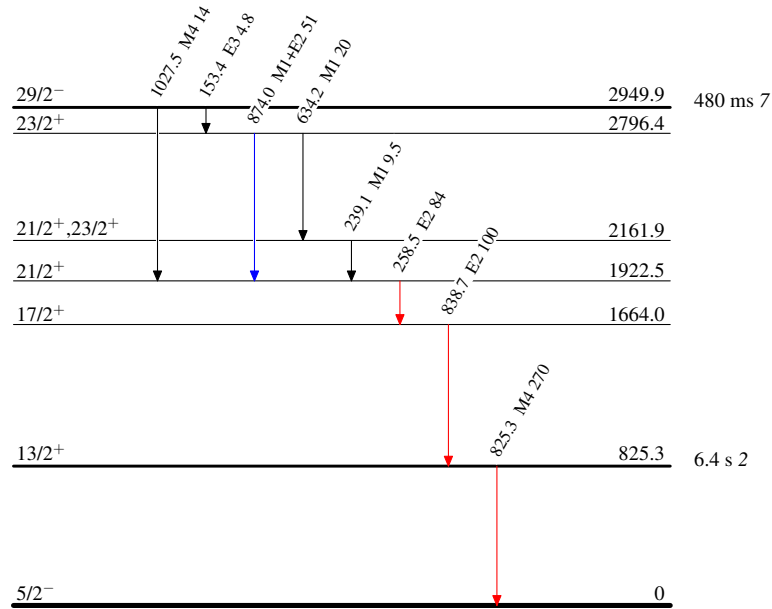[x] γ ray not placed in level scheme.

$^{204}\text{Hg}(\alpha,5n\gamma)$ 1977Li04,1979Mc02

Level Scheme

Intensities: Relative I_γ

Legend

$I_\gamma < \ \ 2\% \times I_\gamma^{max}$
$I_\gamma < 10\% \times I_\gamma^{max}$
$I_\gamma > 10\% \times I_\gamma^{max}$

$29/2^-$	2949.9	480 ms 7
$23/2^+$	2796.4	
$21/2^+,23/2^+$	2161.9	
$21/2^+$	1922.5	
$17/2^+$	1664.0	
$13/2^+$	825.3	6.4 s 2
$5/2^-$	0	

1027.5 M4 14
153.4 E3 4.8
874.0 M1+E2 51
634.2 M1 20
239.1 M1 9.5
258.5 E2 84
838.7 E2 100
825.3 M4 270

$^{203}_{82}\text{Pb}_{121}$