Pt(α,xnγ) 1974Pr09,1977Ke18,1978Me11

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Huang Xiaolong, Zhou Chunmei	NDS 104, 283 (2005)	1-Jan-2002

Other: 1980SaZY.
1974Pr09: ^{196}Pt(α,3nγ) E=34-50 MeV, 30% ^{196}Pt target, excit, $\gamma\gamma$-coin.
1977Ke18: ^{195}Pt(α,2nγ) E=23,25,27 MeV, 87% ^{195}Pt target, excit, $\gamma\gamma$-coin.
1978Me11: ^{198}Pt(α,5nγ) E=55,57 MeV, 86% ^{198}Pt target, $\gamma\gamma$-coin.

^{197}Hg Levels

E(level)[†]	J$^\pi$[‡]	$T_{1/2}$[@]	Comments
0.0	$1/2^-$	64.14 h *5*	
133.91 *10*	$5/2^-$	8.07 ns *16*	
152.20 *19*	$3/2^-$		
298.91[&] *14*	$13/2^+$	23.8 h *1*	
307.66 *15*	$(5/2)^-$		
308.50 *19*	$(3/2)^-$		
477.70 *17*	$(9/2^+)$[#]		
508.9 *4*			
557.7 *3*	$(5/2^-,7/2^-)$		
652.88[&] *17*	$17/2^+$		
715.31 *14*	$9/2^-$		
829.06 *20*	$11/2^+$		
903.6 *4*	$(7/2^-)$		
921.56 *25*			
940.7 *3*			
1026.26 *22*	$15/2^+$		
1032.0 *3*			
1128.51? *25*			
1174.96 *21*	$(13/2^+)$[#]		
1259.3 *4*			
1273.68[&] *20*	$21/2^+$		
1344.03 *25*			691γ excit suggests J=17/2 (1977Ke18).
1381.61 *25*	$13/2^-$		
1537.0 *3*	$(19/2^+)$		
1634.44 *25*	$(21/2^+)$		
1634.5 *4*			
1682.38[a] *22*	$21/2^-$		
1702.3 *4*	$(17/2^+)$		
1833.2[a] *3*	$25/2^-$	1.13 ns *6*	$T_{1/2}$: (ce(L) 151γ)(t) pulsed beam (1978Me11).
1956.0 *3*			
2037.2[&] *3*	$25/2^+$		
2096.1 *4*			263γ excit suggests J=27/2 (1977Ke18).
2161.8[a] *5*	$29/2^-$		
2196.3? *4*			
2228.8 *5*			
2295.8 *3*	$(23/2^+)$		
2710.6[&] *4*	$29/2^+$		
2768.8[a] *5*	$33/2^-$		
3045.3[&] *4*	$33/2^+$	≤0.2 ns	$T_{1/2}$: (ce(K) 335γ)(t) pulsed beam (1978Me11).
3464.1[&] *5*	$37/2^+$		
4061.3[&] *5*	$41/2^+$		

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Pt(α,xnγ) 1974Pr09,1977Ke18,1978Me11 (continued)

^{197}Hg Levels (continued)

† From level scheme and Eγ's by using least-squares fit to data.
‡ Based on relative excitation functions, angular distributions, $\gamma\gamma$-coin, ce spectra, ce(t), band systematics; except (9/2$^+$) for E(level)=477.7 and (13/2$^+$) for E(level)=117496 from relative excitation functions.
# Based mainly on relative excitation functions.
@ From Adopted Levels, except as noted.
& Band(A): Regular quadrupole band 1. ΔJ=2 sequence up to 41/2$^+$ PROPOSED; E2 cascade is consistent with Iγ, α(K)exp, $\gamma(\theta)$ data.
a Band(B): Regular quadrupole band 2. ΔJ=2 sequence based on 21/2$^-$ STATE. INTERPRETED AS 197HG2cL i13/2 neutron coupled to 5$^-$,7$^-$,9$^-$ core states.

$\gamma(^{197}Hg)$

A_2,A_4 coefficient extracted from $\gamma(\theta)$ spectra at 6 angles (θ=90°−160°) (1977Ke18), consistent with A_2 coefficient of 1974Pr09, 1978Me11 where comparison could be made.

E$_\gamma$†	I$_\gamma$†#@	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$	Mult.&a	αc	Comments
133.9 *1*	22	133.91	5/2$^-$	0.0	1/2$^-$	E2	1.728	α(K)= 0.421; α(L)= 0.974; α(M)= 0.253; α(N+..)= 0.0797 Mult.: from ce ratio data; see ^{197}Hg IT decay.
148.8d *3*	0.2	1174.96	(13/2$^+$)	1026.26	15/2$^+$			
150.8 *2*	9.4	1833.2	25/2$^-$	1682.38	21/2$^-$	E2	1.097	α(K)= 0.329; α(L)= 0.572; α(M)= 0.1484; α(N+..)= 0.0466 $\gamma(\theta)$: A_2=0.38 *7* (1977Ke18), 0.37 *5* (1978Me11), 0.37 *10* (1974Pr09). B(E2)(25/2$^-$ to 21/2$^-$)=0.31 *2*; analogs: 0.38 *2* (^{195}Hg), 0.33 *1* (^{193}Hg), 0.35 *3* (^{191}Hg).
152.2 *2*	3.3	152.20	3/2$^-$	0.0	1/2$^-$	M1	2.478	α(K)= 2.030; α(L)= 0.343; α(M)= 0.0797; α(N+..)= 0.0257 Mult.: from α(L)exp and ce ratio data; see ^{197}Tl ε decay. $\gamma(\theta)$: A_2=0.02 *8* (1977Ke18).
(165.0 *1*)		298.91	13/2$^+$	133.91	5/2$^-$	M4	348	α(K)= 77.0; α(L)= 191.7; α(M)= 59.0; α(N+..)= 20.10 Mult.: from ce ratios and conversion coef; see ^{197}Hg IT decay.
173.7 *2*	1.9	307.66	(5/2)$^-$	133.91	5/2$^-$	M1	1.709	α(K)= 1.401; α(L)= 0.2359; α(M)= 0.0548; α(N+..)=0.01761 Mult.: from α(K)exp=1.5 *2* (1961Ju05) via ^{197}Tl ε decay. $\gamma(\theta)$: A_2=0.04 *12* (1977Ke18).
178.8 *1*	16.4	477.70	(9/2$^+$)	298.91	13/2$^+$			$\gamma(\theta)$: A_2=0.06 *7* (1977Ke18).
197d	≈1	1026.26	15/2$^+$	829.06	11/2$^+$			
249.2 *3*	1.1	557.7	(5/2$^-$,7/2$^-$)	308.50	(3/2)$^-$			
252.9 *2*	1.8	1634.5		1381.61	13/2$^-$			
262.9 *2*	2.5	2096.1		1833.2	25/2$^-$			$\gamma(\theta)$: A_2=−0.2 *2* (1977Ke18).
273.6 *2*	2.9	1956.0		1682.38	21/2$^-$			
290.3 *3*	0.7	1634.44	(21/2$^+$)	1344.03				
307.7 *2*	8.2	307.66	(5/2)$^-$	0.0	1/2$^-$	(E2)	0.0999	α(K)= 0.0598; α(L)= 0.0300; α(M)=0.00761; α(N+..)=0.00238

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Pt(α,xnγ) 1974Pr09,1977Ke18,1978Me11 (continued)

$\gamma(^{197}Hg)$ (continued)

E_γ[†]	I_γ[†#@]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[&a]	α[c]	Comments
								Doublet $\gamma(\theta)$: A_2=−0.36 *8* (1977Ke18). Mult.: from doublet α(K)exp and ce ratio data; see ^{197}Tl ε decay.
308.5 *2*	5.0	308.50	$(3/2)^-$	0.0	$1/2^-$	(M1)	0.348	α(K)= 0.285; α(L)= 0.0476; α(M)=0.01105; α(N+..)=0.00352
328.6 *3*	≈5.6	2161.8	$29/2^-$	1833.2	$25/2^-$	E2	0.0825	α(K)= 0.0511; α(L)=0.02355; α(M)=0.00594; α(N+..)=0.00186 α(K)exp=0.047 *9* (1978Me11). $\gamma(\theta)$: A_2=0.40 *10* (1974Pr09), 0.36 *5* (1978Me11).
334.7[‡] *2*	22 *4*	3045.3	$33/2^+$	2710.6	$29/2^+$	E2	0.0783	α(K)= 0.0489; α(L)=0.02202; α(M)=0.00555; α(N+..)=0.00174 α(K)exp=0.043 *9* (1978Me11). $\gamma(\theta)$: A_2=0.34 *5* (1978Me11). B(E2)($33/2^+$ to $29/2^+$)>0.06; analogs: >0.12 (^{195}Hg), 0.25 *1* (^{193}Hg), 0.27 *2* (^{191}Hg).
345.9 *3*	0.8	1174.96	$(13/2^+)$	829.06	$11/2^+$			
351.4 *2*	3.7	829.06	$11/2^+$	477.70	$(9/2^+)$	M1+E2	0.16[b] *9*	α(K)= 0.12 *8*; α(L)= 0.026 *8*; α(M)= 0.0062 *16*; α(N+..)= 0.0020 *5* α(K)=0.0436, α(L)=0.01848, α(M)=0.00465, α(N+..)=0.00145, α=0.0682 if mult=E2; α(K)=0.2007, α(L)=0.0334, α(M)=0.00774, α(N+..)=0.00247, α=0.244 if mult=M1. $\gamma(\theta)$: A_2=−0.36 *13* (1977Ke18).
354.0 *1*	100	652.88	$17/2^+$	298.91	$13/2^+$	E2	0.0668	α(K)= 0.0429; α(L)=0.01800; α(M)=0.00452; α(N+..)=0.00142 $\gamma(\theta)$: A_2=0.37 *5* (1974Pr09), 0.30 *2* (1977Ke18), 0.33 *5* (1978Me11).
358.7[d] *3*	0.2	1702.3	$(17/2^+)$	1344.03				
373.5 *3*	1.4	1026.26	$15/2^+$	652.88	$17/2^+$			
375.0 *3*	0.9	508.9		133.91	$5/2^-$			
395.6 *3*	1.3	2228.8		1833.2	$25/2^-$			
405.5 *3*	≈1	557.7	$(5/2^-,7/2^-)$	152.20	$3/2^-$			
408.7 *1*	24	1682.38	$21/2^-$	1273.68	$21/2^+$	E1	0.01378	α(K)=0.01140; α(L)=0.00183; α(M)=0.00042; α(N+..)=0.00013 E_γ: other: 408.7 *2* (1978Me11). α(K)exp≤0.015 (1977Ke18) ce(K)/Iγ normalized to α(K)(426γ, E2, ^{196}Hg). $\gamma(\theta)$: A_2=0.39 *6* (1977Ke18), 0.20 *10* (1974Pr09).
413.2 *2*	7.7	1128.51?		715.31	$9/2^-$			
418.8[‡] *2*	14 *3*	3464.1	$37/2^+$	3045.3	$33/2^+$	E2	0.0424	α(K)= 0.0290; α(L)=0.01010; α(M)=0.00251; α(N+..)=0.00079 α(K)exp=0.035 *7* (1978Me11). $\gamma(\theta)$: A_2=0.38 *5* (1978Me11).
430.2 *3*	0.8	1259.3		829.06	$11/2^+$			
463.0 *2*	2	940.7		477.70	$(9/2^+)$			$\gamma(\theta)$: A_2=0.2 *2* (1977Ke18).
511[d]	≈0.5	1537.0	$(19/2^+)$	1026.26	$15/2^+$			
522.2 *3*	≈2.5	1174.96	$(13/2^+)$	652.88	$17/2^+$			
527.4[d] *3*	0.35	1702.3	$(17/2^+)$	1174.96	$(13/2^+)$			
530.1 *2*	5.0	829.06	$11/2^+$	298.91	$13/2^+$	M1+E2	0.05[b] *3*	α(K)= 0.04 *3*; α(L)= 0.008 *4*

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Pt(α,xnγ) 1974Pr09,1977Ke18,1978Me11 (continued)

$\gamma(^{197}Hg)$ (continued)

E_γ[†]	I_γ[†#@]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[&a]	α[c]	Comments
								α(K)=0.01727, α(L)=0.00479, α=0.0236 if mult=E2; α(K)=0.0674, α(L)=0.01112, α=0.0822 if mult=M1. $\gamma(\theta)$: A_2=−0.45 *10* (1977Ke18).
554.3 *2*	1.6	1032.0		477.70	(9/2$^+$)			
581.4 *1*	14	715.31	9/2$^-$	133.91	5/2$^-$	E2	0.01908	α(K)=0.01423; α(L)=0.00365 $\gamma(\theta)$: A_2=0.27 *5* (1977Ke18).
595.1 *3*	≈2.1	903.6	(7/2$^-$)	308.50	(3/2)$^-$	E2	0.01810	α(K)=0.01356; α(L)=0.00342 $\gamma(\theta)$: A_2=0.40 *10* (1977Ke18).
597.2[‡] *2*	3.4 *7*	4061.3	41/2$^+$	3464.1	37/2$^+$	E2	0.01796	α(K)=0.01346; α(L)=0.00338 α(K)exp=0.020 *4* (1978Me11). $\gamma(\theta)$: A_2=0.31 *10* (1978Me11).
607.0[‡] *2*	10 *2*	2768.8	33/2$^-$	2161.8	29/2$^-$	E2	0.01731	α(K)=0.01301; α(L)=0.00323 α(K)exp=0.012 *2* (1978Me11). $\gamma(\theta)$; A_2=0.38 *5* (1978Me11).
613.9 *2*	3.3	921.56		307.66	(5/2)$^-$			$\gamma(\theta)$: A_2=0.2 *2* (1977Ke18).
620.8 *1*	40	1273.68	21/2$^+$	652.88	17/2$^+$	E2	0.01646	α(K)=0.01243; α(L)=0.00303 $\gamma(\theta)$: A_2=0.28 *3* (1977Ke18), 0.35 *5* (1978Me11), 0.46 *15* (1974Pr09).
[x]624.5 *2*	1.9							
659.3 *2*	2.9	2196.3?		1537.0	(19/2$^+$)			
666.3 *2*	5.6	1381.61	13/2$^-$	715.31	9/2$^-$	E2	0.01408	α(K)=0.01076; α(L)=0.00250 $\gamma(\theta)$: A_2=0.33 *11* (1977Ke18).
673.4[‡] *2*	24 *5*	2710.6	29/2$^+$	2037.2	25/2$^+$	E2	0.01376	α(K)=0.01053; α(L)=0.00243 $\gamma(\theta)$: A_2=0.36 *5* (1978Me11).
676.0 *3*	2.0	1702.3	(17/2$^+$)	1026.26	15/2$^+$	M1+E2	0.029[b] *15*	α(K)= 0.023 *13*; α(L)= 0.0041 *18* α(K)=0.01045, α(L)=0.00240, α=0.0136 if mult=E2; α(K)=0.0359, α(L)=0.00586, α=0.0437 if mult=M1. $\gamma(\theta)$: A_2=−1.0 *3* (1977Ke18).
691.1 *2*	7.9	1344.03		652.88	17/2$^+$			
697[d]	≈2	1174.96	(13/2$^+$)	477.70	(9/2$^+$)			
727.3 *2*	9.9	1026.26	15/2$^+$	298.91	13/2$^+$	M1+E2	0.024[b] *13*	α(K)= 0.019 *11*; α(L)= 0.0034 *15* α(K)=0.00903, α(L)=0.00198, α=0.0117 if mult=E2; α(K)=0.0297, α(L)=0.00484, α=0.0361 if mult=M1. $\gamma(\theta)$: A_2=−1.0 *1* (1977Ke18).
763.5 *2*	3.9	2037.2	25/2$^+$	1273.68	21/2$^+$	E2	0.01052	α(K)=0.00820; α(L)=0.00175 $\gamma(\theta)$: A_2=0.3 *2* (1974Pr09), 0.5 *2* (1977Ke18), 0.38 *5* (1978Me11).
876.0 *2*	3.0	1174.96	(13/2$^+$)	298.91	13/2$^+$			$\gamma(\theta)$: A_2=0.4 *1* (1977Ke18).
884.1 *2*	5.6	1537.0	(19/2$^+$)	652.88	17/2$^+$	M1+E2	0.015[b] *7*	α(K)= 0.012 *6*; α(L)= 0.0021 *9* α(K)=0.00616, α(L)=0.00122, α=0.00778 if mult=E2; α(K)=0.01796, α(L)=0.00292, α=0.0218 if mult=M1. $\gamma(\theta)$: A_2=−0.7 *2* (1977Ke18).
981.6 *2*	7.9	1634.44	(21/2$^+$)	652.88	17/2$^+$	E2	0.00632	α(K)=0.00505; α(L)=0.00096 $\gamma(\theta)$: A_2=0.44 *9* (1977Ke18).
1022.1 *2*	2.8	2295.8	(23/2$^+$)	1273.68	21/2$^+$	M1+E2	0.010[b] *5*	α(K)= 0.009 *4*; α(L)= 0.0014 *6* α(K)=0.00468, α(L)=0.00087, α=0.00584 if mult=E2;

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Pt(α,xnγ) 1974Pr09,1977Ke18,1978Me11 (continued)

$\gamma(^{197}Hg)$ (continued)

E_γ †	I_γ †#@	E_i(level)	J_i^π	E_f	J_f^π	Comments
						α(K)=0.01240, α(L)=0.00201, α=0.0151 if mult=M1. $\gamma(\theta)$: A_2=−1.0 *2* (1977Ke18).
1049.1[d] *3*	0.25	1702.3	(17/2$^+$)	652.88	17/2$^+$	
1404.1[d] *3*	0.34	1702.3	(17/2$^+$)	298.91	13/2$^+$	

† From 1977Ke18, except as noted.
‡ Observed via (α,5nγ) reaction, not (α,3nγ) or (α,2nγ).
# Relative intensities normalized to Iγ(354γ)=100 for ^{195}Pt(α,2nγ), 87% ^{195}Hg target, at Eα=27 MeV and θ=125° to incident beam (1977Ke18), except as noted.
@ Uncertainty=10% to 30%.
& α(K)exp=ce(K)/Iγ (1978Me11) normalized to α(K)(354γ,621γ)=E2 theory.
[a] Inferred from α(K)exp and A_2 coef, except as noted.
[b] From α=[α(M1)+α(E2)]/2 and $\Delta\alpha$=[α(M1)-α(E2)]/2.
[c] Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.
[d] Placement of transition in the level scheme is uncertain.
[x] γ ray not placed in level scheme.

Pt(α,xnγ) 1974Pr09,1977Ke18,1978Me11

Level Scheme

Intensities: Relative I_γ

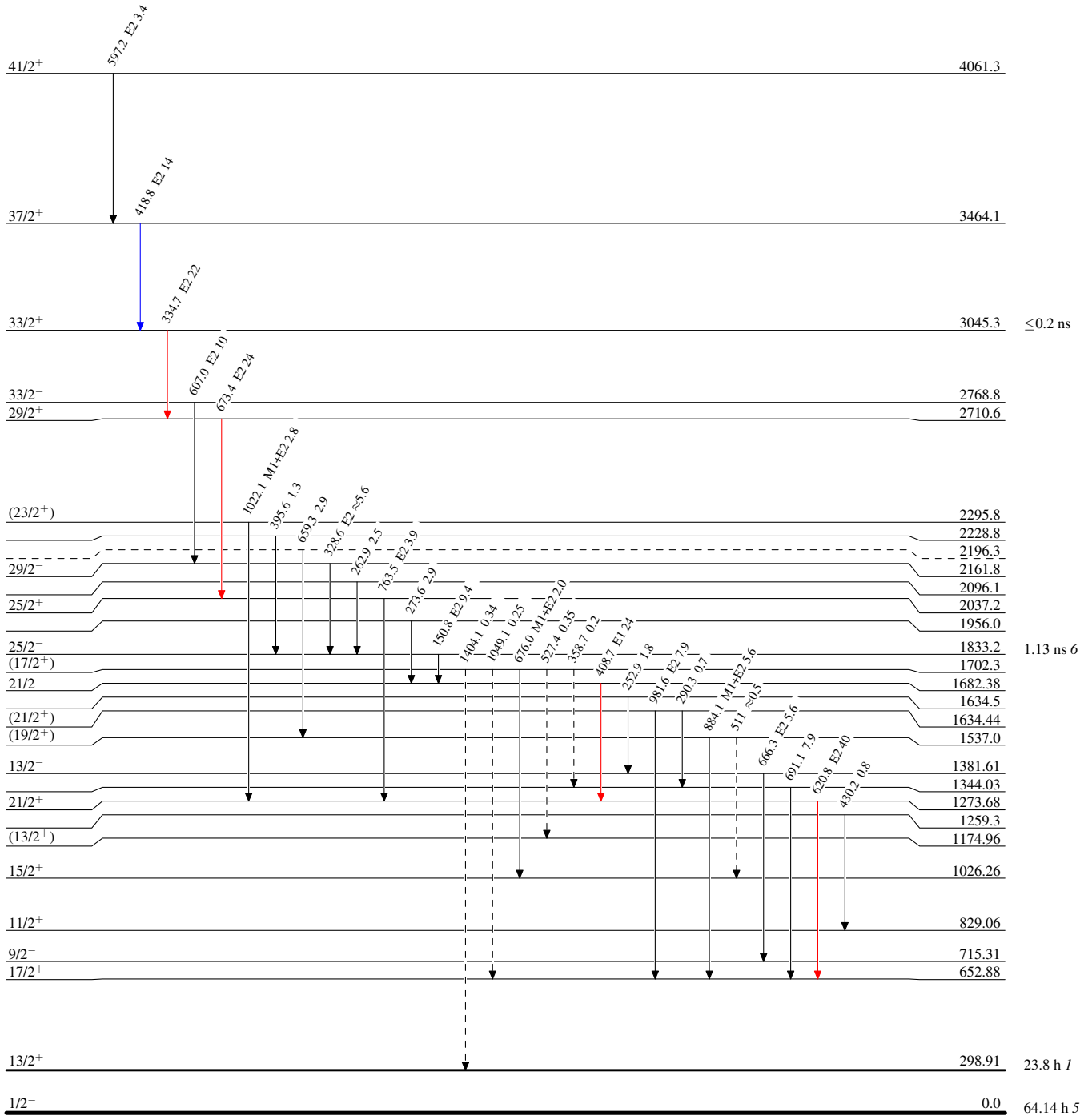
Legend

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

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

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

γ Decay (Uncertain)



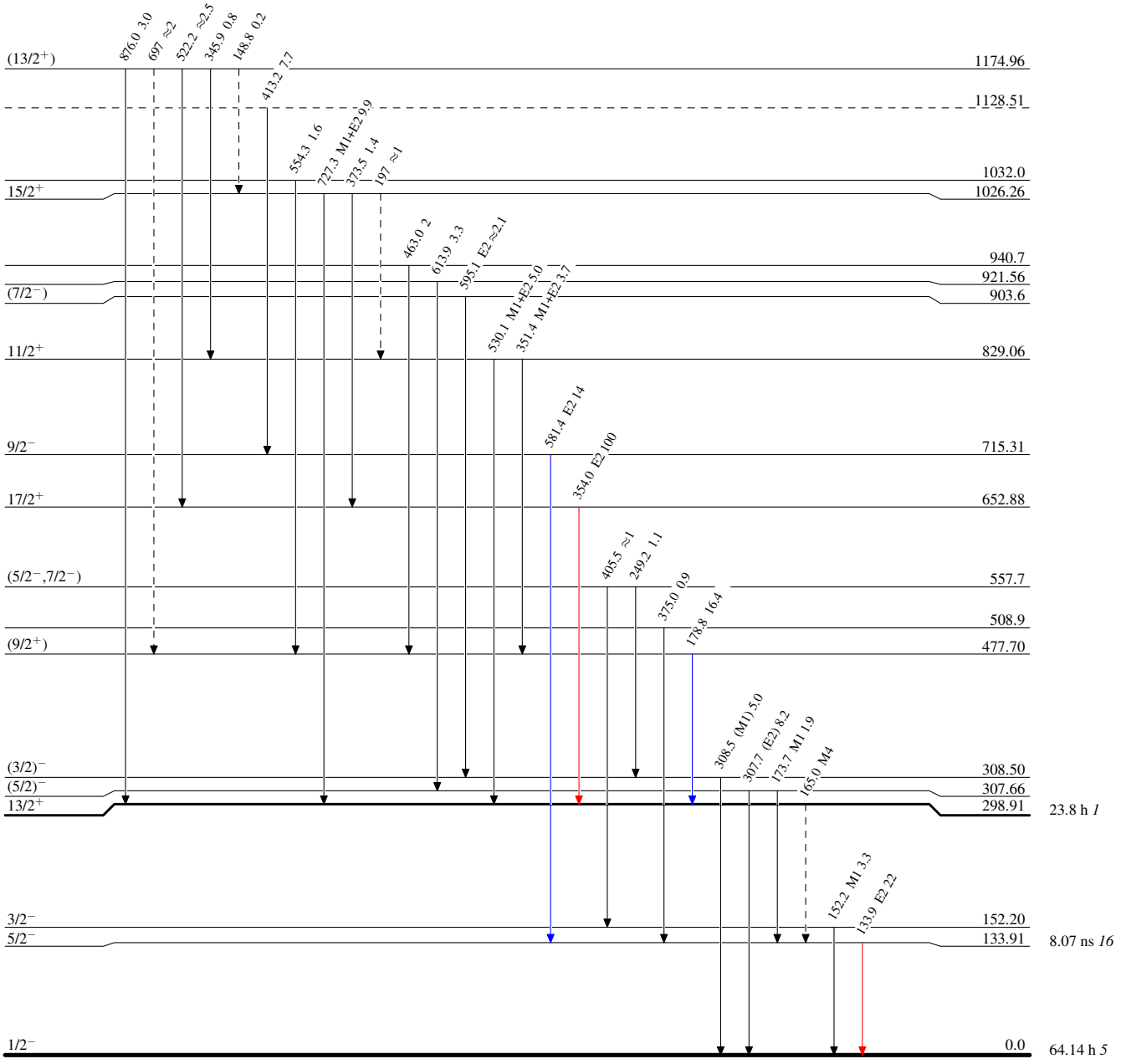
$^{197}_{80}Hg_{117}$

Pt(α,xnγ) 1974Pr09,1977Ke18,1978Me11

Level Scheme (continued)

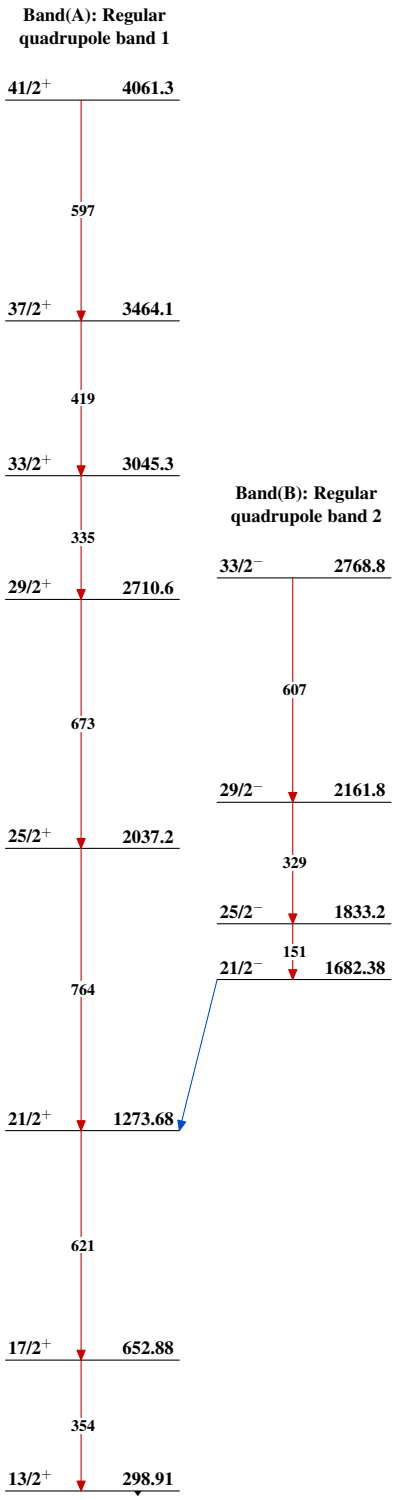
Intensities: Relative I_γ

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



$^{197}_{80}Hg_{117}$

Pt(α,xnγ) 1974Pr09,1977Ke18,1978Me11



$^{197}_{80}Hg_{117}$