^{208}Pb(α,5nγ),^{206}Pb(α,3nγ) 1985Ra18

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	F. G. Kondev, S. Lalkovski	NDS 112, 707 (2011)	1-Aug-2010

E(α)=40-64 MeV on ^{204,206,207,208}Pb targets and ^{207}Pb(^{3}He,3nγ) at E=27 MeV; measured Eγ, Iγ, γ(θ), γ(t), and γγ(t). ^{206}Pb(α,3n) at Eα=43 MeV and ^{207}Pb(^{3}He,3nγ) at 27.6 MeV; measured conversion electron coefficients; Detectors: small planar Ge(Li) detectors, large coaxial Ge(Li) detectors, and Si(Li) detectors; Deduced: Level scheme, J$^\pi$, $T_{1/2}$, transition rates, and configurations.

Others: 1973Ri06 (α,3nγ) E=38 MeV (preliminary report in 1982RaZV)
1985Ro07 (α,3nγ) E=44 MeV

^{207}Po Levels

E(level)†	J$^\pi$‡	$T_{1/2}$	Comments
0	5/2−	5.80 h *2*	J$^\pi$,$T_{1/2}$: From Adopted Levels. configuration: $(\pi\ h_{9/2})^{+2}_{0+}(\nu\ f_{5/2})^{-1}$.
814.50 *20*	9/2−		configuration: $(\pi\ h_{9/2})^{+2}_{2+}(\nu\ f_{5/2})^{-1}$.
1115.1 *3*	13/2+	49 μs *4*	g=−0.140 *2* (1973Ri06) $T_{1/2}$: From Adopted Levels. g: Corrected for Knight shift and diamagnetic shielding. configuration: $(\pi\ h_{9/2})^{+2}_{0+}(\nu\ i_{13/2})^{-1}$.
1274.1 *3*	13/2−		
1383.2 *4*	19/2−	2.8 s *1*	$T_{1/2}$: From 268γ(t), 300γ(t) and 814γ(t) in ^{207}Pb(^{3}He,3nγ). configuration: $(\pi\ h_{9/2})^{+2}_{8+}(\nu\ f_{5/2})^{-1}$.
1564.3 *4*	21/2−		configuration: $(\pi\ h_{9/2})^{+2}_{8+}(\nu\ f_{5/2})^{-1}$. The assignment is tentative.
1691.3 *4*	17/2+		
2313.5 *4*	21/2+		
2379.7 *4*	25/2+	43.0 ns *3*	g=0.433 *3* (1985Ro07) $T_{1/2}$: From 576.2γ(t), 622.2γ(t), and 749.2γ(t) in 1985Ro07. Systematics uncertainty due to time calibration and background subtraction has been included. Other: 40 ns *2* is reported in 1985Ra18, based on 37 ns *4* (66γ(t)), 42 ns *2* (181γ(t)), 40 ns *1* (576γ(t)), 40 ns *1* (622γ(t)), and 41 ns *1* (749γ(t)). g: Corrected for Knight shift and diamagnetic shielding. configuration: 67.5% $(\pi\ h_{9/2})^{+2}_{8+}(\nu\ i_{13/2})^{-1}$ + 32.5 % $(\pi\ h_{9/2})^{+2}_{6+}(\nu\ i_{13/2})^{-1}$.
2879.5 *5*	27/2+		
2963.7 *5*	27/2+		configuration: $((\pi\ h_{9/2})^{+1}\ (\pi\ i_{13/2})^{+1})_{11-}\ (\nu\ f_{5/2})^{-1}$.
3137.1 *5*	29/2+		configuration: $(\pi\ h_{9/2})^{+2}_{8+}(\nu\ i_{13/2})^{-1}$.
3381.3 *5*	31/2+		
3599.0 *5*	29/2−		
3602.5 *5*	31/2−		
3800.9 *6*	33/2−		
3919.6 *6*			
4346.4 *6*	35/2−		

† From a least-squares fit to Eγ.
‡ From 1985Ra18, based on deduced transition mult using γ(θ), α(K)exp and analogy to yrast cascades in adjacent nuclides.

^{208}Pb(α,5nγ),^{206}Pb(α,3nγ) 1985Ra18 (continued)

γ(^{207}Po)

E_γ‡	I_γ‡	E_i(level)	J^π_i	E_f	J^π_f	Mult.#	α†	$I_{(\gamma+ce)}$	Comments
(3.4)		3602.5	31/2⁻	3599.0	29/2⁻	[M1]		1.3 *2*	E_γ: Not observed. Existence inferred from 719.5γ-198.4γ coin. $I_{(\gamma+ce)}$: From Ti(465.4γ)/Ti(3.4γ)=2 in 1985Ra18.
66.2 *2*	0.8 *1*	2379.7	25/2⁺	2313.5	21/2⁺	E2	48.5 *10*		α(L)=36.0 *8*; α(M)=9.59 *20*; α(N+..)=2.96 *6* α(N)=2.45 *5*; α(O)=0.465 *10*; α(P)=0.0411 *9* Mult.: From α(exp)=55 *10*, deduced from an intensity balances in delayed spectrum.
109.1	<0.1	1383.2	19/2⁻	1274.1	13/2⁻	M3	453		α(K)=82.9 *12*; α(L)=265 *4*; α(M)=79.5 *12*; α(N+..)=25.8 *4* α(N)=21.2 *3*; α(O)=4.18 *6*; α(P)=0.430 *6* E_γ: Seen only as a ce line in ^{207}Pb(^{3}He,3nγ). Mult.: L12/L3=1.1.
173.3 *2*	1.2 *1*	3137.1	29/2⁺	2963.7	27/2⁺				
181.1 *2*	6.0 *3*	1564.3	21/2⁻	1383.2	19/2⁻	M1	2.05		α(K)=1.668 *24*; α(L)=0.294 *5*; α(M)=0.0694 *10*; α(N+..)=0.0221 *4* α(N)=0.0179 *3*; α(O)=0.00374 *6*; α(P)=0.000483 *7* Mult.: α(K)exp=1.78 *9*; A_2=−0.24 *3*, A_4=0.03 *4*.
198.4 *2*	9 *1*	3800.9	33/2⁻	3602.5	31/2⁻	M1	1.590		α(K)=1.291 *19*; α(L)=0.227 *4*; α(M)=0.0536 *8*; α(N+..)=0.01707 *25* α(N)=0.01381 *20*; α(O)=0.00289 *5*; α(P)=0.000373 *6* Mult.: α(K)exp=1.36 *7*; A_2=−0.17 *6*, A_4=0.03 *10*.
244.2 *2*	5.0 *3*	3381.3	31/2⁺	3137.1	29/2⁺	M1	0.891		α(K)=0.724 *11*; α(L)=0.1271 *18*; α(M)=0.0300 *5*; α(N+..)=0.00954 *14* α(N)=0.00772 *11*; α(O)=0.001615 *23*; α(P)=0.000209 *3* Mult.: α(K)exp=0.80 *8*; A_2=−0.22 *2*, A_4=0.08 *3*.
257.5 *2*	7.7 *6*	3137.1	29/2⁺	2879.5	27/2⁺	M1	0.769		α(K)=0.625 *9*; α(L)=0.1097 *16*; α(M)=0.0259 *4*; α(N+..)=0.00823 *12* α(N)=0.00666 *10*; α(O)=0.001393 *20*; α(P)=0.000180 *3* Mult.: α(K)exp=0.61 *6*; A_2=−0.23 *2*, A_4=0.05 *3*.
268.1 *2*	13.7 *7*	1383.2	19/2⁻	1115.1	13/2⁺	E3	1.168		α(K)=0.229 *4*; α(L)=0.691 *10*; α(M)=0.189 *3*; α(N+..)=0.0593 *9* α(N)=0.0489 *7*; α(O)=0.00945 *14*; α(P)=0.000897 *13* Mult.: α(K)exp=0.25 *3*; A_2≈0.
300.6 *2*	31.6 *16*	1115.1	13/2⁺	814.50	9/2⁻	M2	1.84		α(K)=1.372 *20*; α(L)=0.351 *5*; α(M)=0.0871 *13*; α(N+..)=0.0279 *4* α(N)=0.0226 *4*; α(O)=0.00470 *7*; α(P)=0.000589 *9* Mult.: α(K)exp=1.40 *7*; A_2≈0.
459.6 *2*	6.3 *5*	1274.1	13/2⁻	814.50	9/2⁻	E2	0.0394		α(K)=0.0264 *4*; α(L)=0.00977 *14*; α(M)=0.00247 *4*; α(N+..)=0.000774

Continued on next page (footnotes at end of table)

^{208}Pb(α,5nγ),^{206}Pb(α,3nγ) 1985Ra18 (continued)

γ(^{207}Po) (continued)

Eγ‡	Iγ‡	Ei(level)	J^π_i	Ef	J^π_f	Mult.#	α†	Comments
								11 α(N)=0.000634 *9*; α(O)=0.0001261 *18*; α(P)=1.363×10^{-5} *20* Mult.: α(K)exp=0.024 *3*; A$_2$=0.09 *5*, A$_4$=−0.03 *2*. The A$_2$ coefficient is not consistent with the proposed assignment, due to a loss of alignment.
465.4 *2*	2.6 *3*	3602.5	31/2$^-$	3137.1	29/2$^+$	E1	0.01192	α(K)=0.00980 *14*; α(L)=0.001622 *23*; α(M)=0.000379 *6*; α(N+..)=0.0001195 *17* α(N)=9.70×10^{-5} *14*; α(O)=2.00×10^{-5} *3*; α(P)=2.48×10^{-6} *4* Mult.: α(K)exp=0.009 *1*; A$_2$=−0.23 *2*, A$_4$=0.05 *3*.
499.8 *2*	24.0 *12*	2879.5	27/2$^+$	2379.7	25/2$^+$	M1	0.1276	α(K)=0.1040 *15*; α(L)=0.0179 *3*; α(M)=0.00422 *6*; α(N+..)=0.001344 *19* α(N)=0.001087 *16*; α(O)=0.000228 *4*; α(P)=2.94×10^{-5} *5* Mult.: α(K)exp=0.103 *5*; A$_2$=−0.33 *3*, A$_4$=0.09 *2*.
538.3 *2*	4.6 *5*	3919.6		3381.3	31/2$^+$	E1,E2		Mult.: α(K)exp=0.017 *2*; A$_2$=−0.26 *4*, A$_4$=0.06 *5*. The assignment is ambiguous.
545.5 *2*	11 *1*	4346.4	35/2$^-$	3800.9	33/2$^-$	M1	0.1011	α(K)=0.0825 *12*; α(L)=0.01420 *20*; α(M)=0.00334 *5*; α(N+..)=0.001063 *15* α(N)=0.000860 *12*; α(O)=0.000180 *3*; α(P)=2.33×10^{-5} *4* Mult.: α(K)exp=0.080 *4*; A$_2$=−0.09 *1*, A$_4$=0.04 *8*.
576.2 *2*	53 *3*	1691.3	17/2$^+$	1115.1	13/2$^+$	E2	0.0231	α(K)=0.01662 *24*; α(L)=0.00488 *7*; α(M)=0.001214 *17*; α(N+..)=0.000382 *6* α(N)=0.000312 *5*; α(O)=6.27×10^{-5} *9*; α(P)=7.06×10^{-6} *10* Mult.: α(K)exp=0.017 *2*; A$_2$=0.25 *1*, A$_4$=−0.09 *2*.
584.0 *2*	9.0 *7*	2963.7	27/2$^+$	2379.7	25/2$^+$	M1	0.0845	α(K)=0.0690 *10*; α(L)=0.01184 *17*; α(M)=0.00279 *4*; α(N+..)=0.000886 *13* α(N)=0.000717 *10*; α(O)=0.0001501 *21*; α(P)=1.94×10^{-5} *3* Mult.: α(K)exp=0.095 *5*; A$_2$=−0.31 *13*, A$_4$=0.08 *1*.
622.2 *2*	52 *3*	2313.5	21/2$^+$	1691.3	17/2$^+$	E2	0.0195	α(K)=0.01427 *20*; α(L)=0.00392 *6*; α(M)=0.000969 *14*; α(N+..)=0.000305 *5* α(N)=0.000249 *4*; α(O)=5.02×10^{-5} *7*; α(P)=5.73×10^{-6} *8* Mult.: α(K)exp=0.015 *2*; A$_2$=0.26 *1*, A$_4$=−0.08 *1*.
719.5 *2*	8.6 *7*	3599.0	29/2$^-$	2879.5	27/2$^+$	E1	0.00499 *7*	α=0.00499 *7*; α(K)=0.00413 *6*; α(L)=0.000657 *10*; α(M)=0.0001529 *22*; α(N+..)=4.83×10^{-5} *7* α(N)=3.91×10^{-5} *6*; α(O)=8.12×10^{-6} *12*; α(P)=1.025×10^{-6} *15* Mult.: α(K)exp=0.0045 *5*; A$_2$=−0.19 *3*, A$_4$=0.07 *4*.
749.2 *2*	5.4 *6*	2313.5	21/2$^+$	1564.3	21/2$^-$	E1	0.00462 *7*	α=0.00462 *7*; α(K)=0.00383 *6*; α(L)=0.000607 *9*; α(M)=0.0001412 *20*; α(N+..)=4.46×10^{-5} *7* α(N)=3.61×10^{-5} *5*; α(O)=7.50×10^{-6} *11*; α(P)=9.48×10^{-7} *14* Mult.: α(K)exp=0.0024 *3*; A$_2$=0.30 *2*, A$_4$=0.00 *3* consistent with ΔJ=0 transition.
757.4 *2*	6.0 *5*	3137.1	29/2$^+$	2379.7	25/2$^+$	E2	0.01281	α(K)=0.00976 *14*; α(L)=0.00231 *4*; α(M)=0.000564 *8*; α(N+..)=0.0001778 *25* α(N)=0.0001449 *21*; α(O)=2.95×10^{-5} *5*; α(P)=3.47×10^{-6} *5* Mult.: α(K)exp=0.011 *1*; A$_2$=0.30 *3*, A$_4$=−0.11 *5*.

Continued on next page (footnotes at end of table)

^{208}Pb(α,5nγ),^{206}Pb(α,3nγ) 1985Ra18 (continued)

γ(^{207}Po) (continued)

E_γ ‡	I_γ ‡	E_i(level)	J^π_i	E_f	J^π_f	Mult. #	α †	Comments
814.5 *2*	100	814.50	9/2$^-$	0	5/2$^-$	E2	0.01104	α(K)=0.00850 *12*; α(L)=0.00192 *3*; α(M)=0.000467 *7*; α(N+..)=0.0001474 *21* α(N)=0.0001200 *17*; α(O)=2.45×10^{-5} *4*; α(P)=2.91×10^{-6} *4* Mult.: α(K)exp=0.0086 *9*; A_2=0.01 *1*, A_4=0.02 *2*. The A_2 coefficient is not consistent with the proposed assignment, due to a loss of alignment.

† Additional information 1.

‡ From 1985Ra18. Uncertainties in Iγ were assigned by the evaluator on the basis of the authors′ spectrum, and the authors′ statement that the uncertainties range from 5-10%.

From α(K)exp and $\gamma(\theta)$ in 1985Ra18, except where noted otherwise. The authors do not state how the relative Iγ and Ice(K) were normalized.

^{208}Pb(α,5nγ),^{206}Pb(α,3nγ) 1985Ra18

Level Scheme

Intensities: Relative I_γ