^{204}Pb(α,5nγ) 1986Fa04

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

E=63 MeV; 99.9% enriched, self-supported target; measured γ, γ(θ), γ(t), γγ(t), α(K)exp; shell model description.

^{203}Po Levels

E(level)[†]	Jπ[‡]	$T_{1/2}$[‡]	Comments
0.0[#]	5/2⁻	36.7 min *5*	$T_{1/2}$: From Adopted Levels.
62.5[@] *4*	3/2⁻		
639.7[&] *4*	(7/2⁻)		
641.8[a] *4*	13/2⁺	45 s *2*	$T_{1/2}$: From 1986Fa04. The reported values were: 45 s *1* (639.4γ(t)), 45 s *1* (641.8γ(t)), and 44 s *2* (577.2γ(t)).
1056.9 *6*	(7/2,9/2)⁻		
1255.1[b] *6*	17/2⁺		
1380.0 *6*	(17/2⁺)		Jπ: (9/2⁺) in Adopted Levels.
1721.2[c] *8*	21/2⁺		
1976.5 *8*	(21/2⁺)		Jπ: (9/2)⁺ in Adopted Levels.
2057.2[d] *9*	25/2⁺		
2079.1 *9*	21/2⁺		
2159.0 *10*		>200 ns	$T_{1/2}$: From 182.5γ(t), 596.5γ(t) and 738.2γ(t).
2276.6 *10*			
2406.6 *9*	25/2⁺		
2488.4 *9*	23/2⁺		
2502.7 *9*	23/2⁺		
2526.3[e] *10*	27/2⁺		
2792.6[f] *9*	25/2⁻	12 ns *2*	$T_{1/2}$: From 1986Fa04, using 304.3γ(t), 335γ(t), 288γ(t) and 767γ(t).
2825.0[f] *12*	29/2⁻	7 ns *2*	$T_{1/2}$: From 1986Fa04, using 298.7γ(t).
2870.9[e] *10*	29/2⁺		
3017.7 *10*	(29/2⁺)		
3070.5 *12*	29/2		
3111.9 *12*			
3236.1 *12*	31/2⁺		
3241.2 *12*	(33/2⁺)		
3381.9 *13*			
3430.7 *10*	29/2⁻		
3717.5 *12*			
3881.6 *12*	31/2⁻		
4358.5 *13*	(35/2⁻)		

[†] From a least-squares fit to Eγ. ΔEγ=0.5 keV were used.
[‡] From 1989Fa04.
[#] Configuration=$\nu(f_{5/2}^{-1})$.
[@] Configuration=$\nu(p_{3/2}^{-1})$.
[&] Dominant configuration=$\nu(f_{5/2}^{-1})\otimes 2^+$.
[a] Configuration=$\nu(i_{13/2}^{-1})$.
[b] Dominant configuration=$\nu(i_{13/2}^{-1})\otimes 2^+$.
[c] Dominant configuration=$\nu(i_{13/2}^{-1})\otimes 4^+$.
[d] Admixture between configuration=$\nu(i_{13/2}^{-1})\otimes 6^+$ and configuration=$\nu(i_{13/2}^{-1})\otimes 8^+$.
[e] Dominant configuration=$\nu(i_{13/2}^{-1})\otimes 8^+$.
[f] Dominant configuration=$\nu(f_{5/2}^{-3},i_{13/2}^{-2})$.

^{204}Pb(α,5nγ) 1986Fa04 (continued)

γ(^{203}Po)

E_γ [†]	I_γ [†]	E_i(level)	J^π_i	E_f	J^π_f	Mult. [#]	α [@]	Comments
(2.1[‡])		641.8	13/2$^+$	639.7	(7/2$^-$)			
(62.5[‡])		62.5	3/2$^-$	0.0	5/2$^-$			
140.7		3381.9		3241.2	(33/2$^+$)			Mult.: A_2=−0.34 *7*, A_4=0.17 *10*.
182.5	9.8	2159.0		1976.5	(21/2$^+$)			Mult.: A_2=0.14 *5*, A_4=−0.14 *8*.
219.4	4.3	2276.6		2057.2	25/2$^+$			Mult.: A_2≈0.
290.0	4.9	2792.6	25/2$^-$	2502.7	23/2$^+$	(E1)	0.0342	α(K)=0.0278 *9*; α(L)=0.00484 *15*; α(M)=0.00113 *4*; α(N+..)=0.00037 *1* Mult.: α(K)exp<0.12; A_2=0.05 *8*, A_4=0.13 *12*.
298.7	1.0	2825.0	29/2$^-$	2526.3	27/2$^+$	(E1)	0.0319	α(K)=0.0260 *8*; α(L)=0.00450 *14*; α(M)=0.00106 *4*; α(N+..)=0.00035 *1* Mult.: α(K)exp<0.06; A_2<0.
304.3	8.1	2792.6	25/2$^-$	2488.4	23/2$^+$	E1	0.0306	α(K)=0.0249 *8*; α(L)=0.00431 *13*; α(M)=0.00101 *3*; α(N+..)=0.00033 *1* Mult.: α(K)exp<0.05; A_2=−0.23 *9*, A_4=0.10 *13*.
335.6	51	2057.2	25/2$^+$	1721.2	21/2$^+$	E2	0.092	α(K)=0.0526 *16*; α(L)=0.0294 *9*; α(M)=0.00757 *23*; α(N+..)=0.00255 *8* Mult.: α(K)exp=0.0534 (used as normalization for the conversion electron measurement); A_2=0.34 *3*, A_4=−0.03 *5*.
349.0	3.3	2406.6	25/2$^+$	2057.2	25/2$^+$	M1	0.350	α(K)=0.285 *9*; α(L)=0.0497 *15*; α(M)=0.0117 *4*; α(N+..)=0.00392 *12* Mult.: α(K)exp=0.22 *10*; A_2=0.27 *7*, A_4=−0.01 *11*.
357.9	6.6	2079.1	21/2$^+$	1721.2	21/2$^+$	M1	0.327	α(K)=0.266 *8*; α(L)=0.0464 *14*; α(M)=0.0109 *4*; α(N+..)=0.00366 *11* Mult.: α(K)exp=0.21 *6*; A_2=0.38 *5*, A_4=0.03 *7*.
365.2	3.5	3236.1	31/2$^+$	2870.9	29/2$^+$	M1	0.310	α(K)=0.252 *8*; α(L)=0.0439 *14*; α(M)=0.0103 *3*; α(N+..)=0.00346 *11* Mult.: α(K)exp=0.21 *5*; A_2=−0.49 *6*, A_4=−0.04 *10*.
370.3	4.5	3241.2	(33/2$^+$)	2870.9	29/2$^+$	E2	0.0699	α(K)=0.0423 *13*; α(L)=0.0206 *7*; α(M)=0.00528 *16*; α(N+..)=0.00178 *6* Mult.: α(K)exp<0.05; A_2=0.44 *9*, A_4=−0.08 *13*.
385.7	5.0	2792.6	25/2$^-$	2406.6	25/2$^+$	E1	0.0179	α(K)=0.0146 *5*; α(L)=0.00248 *8*; α(M)=0.00058 *2*; α(N+..)=0.00019 *1* Mult.: α(K)exp<0.02; A_2=0.24 *2*, A_4=0.10 *2*, non stretched E1.
409.2	1.4	2488.4	23/2$^+$	2079.1	21/2$^+$	M1	0.228	α(K)=0.185 *6*; α(L)=0.0323 *10*; α(M)=0.00759 *23*; α(N+..)=0.00254 *8* Mult.: α(K)exp=0.20 *8*; A_2<0.
417.2	5.4	1056.9	(7/2,9/2)$^-$	639.7	(7/2$^-$)	E2(+M1)	0.13 *9*	α(K)=0.10 *8*; α(L)=0.022 *9*; α(M)=0.0053 *19*; α(N+..)=0.0018 *7* Mult.: α(K)exp=0.030 *15*.
450.9	5.3	3881.6	31/2$^-$	3430.7	29/2$^-$	M1	0.176	α(K)=0.143 *5*; α(L)=0.0248 *8*; α(M)=0.00584 *18*; α(N+..)=0.00196 *6* Mult.: α(K)exp=0.13 *2*; A_2>0.
466.1	83.9	1721.2	21/2$^+$	1255.1	17/2$^+$	E2	0.0385	α(K)=0.0258 *8*; α(L)=0.0095 *3*; α(M)=0.00239 *8*; α(N+..)=0.00081 *3* Mult.: α(K)exp=0.022 *5*; A_2=0.34 *1*, A_4=−0.06 *2*.
469.1	15.4	2526.3	27/2$^+$	2057.2	25/2$^+$	M1	0.158	α(K)=0.129 *4*; α(L)=0.0223 *7*; α(M)=0.00525 *16*; α(N+..)=0.00176 *6* Mult.: α(K)exp=0.095 *20*; A_2=−0.39 *15*, A_4=−0.04 *8*.
476.9	1.5	4358.5	(35/2$^-$)	3881.6	31/2$^-$	(E2)	0.0364	α(K)=0.0246 *8*; α(L)=0.0088 *3*; α(M)=0.00222 *7*; α(N+..)=0.00075 *2* Mult.: α(K)exp<0.02; A_2≈0.
544.2	4.0	3070.5	29/2	2526.3	27/2$^+$	(M1)	0.107	α(K)=0.087 *3*; α(L)=0.0150 *5* Mult.: A_2=−0.53 *9*, A_4=−0.10 *15*.

Continued on next page (footnotes at end of table)

^{204}Pb(α,5nγ) 1986Fa04 (continued)

γ(^{203}Po) (continued)

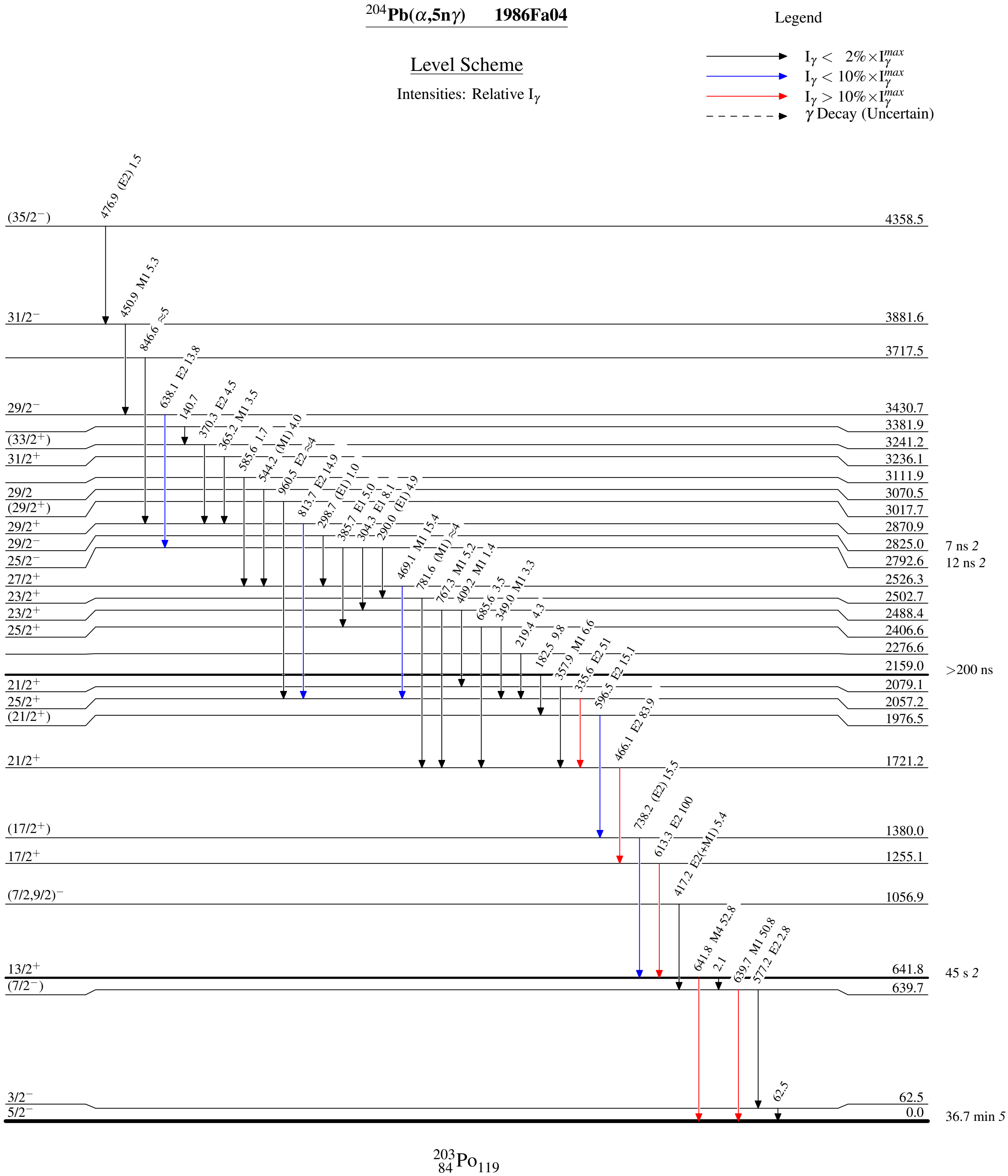
E_γ †	I_γ †	E_i(level)	J_i^π	E_f	J_f^π	Mult.#	α@	Comments
577.2	2.8	639.7	(7/2$^-$)	62.5	3/2$^-$	E2	0.0233	α(K)=0.0167 *5*; α(L)=0.00492 *15* Mult.: α(K)exp<0.01.
585.6	1.7	3111.9		2526.3	27/2$^+$			Mult.: A_2≈0.
596.5	15.1	1976.5	(21/2$^+$)	1380.0	(17/2$^+$)	E2	0.0216	α(K)=0.0157 *5*; α(L)=0.00448 *14* Mult.: A_2=0.16 *3*, A_4=0.05 *5*.
613.3	100	1255.1	17/2$^+$	641.8	13/2$^+$	E2	0.0203	α(K)=0.0148 *5*; α(L)=0.00414 *13* Mult.: α(K)exp=0.0202; A_2=0.35 *2*, A_4=−0.04.
638.1	13.8	3430.7	29/2$^-$	2792.6	25/2$^-$	E2	0.0186	α(K)=0.0137 *5*; α(L)=0.00370 *11* Mult.: A_2=0.024 *3*, A_4=−0.04 *4*.
639.7	50.8	639.7	(7/2$^-$)	0.0	5/2$^-$	M1	0.0700	α(K)=0.0570 *17*; α(L)=0.0098 *3* Mult.: α(K)exp<0.06, A_2=0.02 *1*, A_4=0.00 *1*.
641.8	52.8	641.8	13/2$^+$	0.0	5/2$^-$	M4	0.86	α(K)=0.577 *18*; α(L)=0.213 *7* Mult.: α(K)exp=0.61 *2*; A_2=0, used as a normalization for the angular distribution measurements.
685.6	3.5	2406.6	25/2$^+$	1721.2	21/2$^+$			
738.2	15.5	1380.0	(17/2$^+$)	641.8	13/2$^+$	(E2)	0.0137	α(K)=0.0103 *3*; α(L)=0.00250 *8* Mult.: α(K)exp<0.02; A_2=0.14 *3*, A_4=−0.09 *5*.
767.3	5.2	2488.4	23/2$^+$	1721.2	21/2$^+$	M1	0.0436	α(K)=0.0355 *11*; α(L)=0.00607 *19* Mult.: α(K)exp=0.033 *7*; A_2<0.
781.6	≈4	2502.7	23/2$^+$	1721.2	21/2$^+$	(M1)	0.0415	α(K)=0.0338 *11*; α(L)=0.00578 *18* Mult.: α(K)exp=0.015 *7*; A_2=−0.44 *14*, A_4=0.12 *22*.
813.7	14.9	2870.9	29/2$^+$	2057.2	25/2$^+$	E2	0.0112	α(K)=0.0086 *3*; α(L)=0.00195 *6* Mult.: α(K)exp=0.015 *5*; A_2=0.39 *4*, A_4=−0.04 *5*.
846.6	≈5	3717.5		2870.9	29/2$^+$			
960.5	≈4	3017.7	(29/2$^+$)	2057.2	25/2$^+$	E2	0.00804	α=0.00804; α(K)=0.00630 *19*; α(L)=0.00131 *4* Mult.: α(K)exp=0.03 *2*; A_2>0.

† From 1986Fa04. ΔEγ were not given by the authors.

‡ From level-energy differences.

\# From γ(θ), α(K)exp and observed multiple decay branches in 1986Fa04.

@ 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.



^{204}Pb(α,5nγ) 1986Fa04
Level Scheme
Intensities: Relative Iγ
Legend
Iγ < 2%×Iγ max
Iγ < 10%×Iγ max
Iγ > 10%×Iγ max
γ Decay (Uncertain)
(35/2−) 4358.5
31/2− 3881.6
3717.5
29/2− 3430.7
3381.9
(33/2+) 3241.2
31/2+ 3236.1
3111.9
29/2 3070.5
(29/2+) 3017.7
29/2+ 2870.9
29/2− 2825.0 7 ns 2
25/2− 2792.6 12 ns 2
27/2+ 2526.3
23/2+ 2502.7
23/2+ 2488.4
25/2+ 2406.6
2276.6
2159.0 >200 ns
21/2+ 2079.1
25/2+ 2057.2
(21/2+) 1976.5
21/2+ 1721.2
(17/2+) 1380.0
17/2+ 1255.1
(7/2,9/2)− 1056.9
13/2+ 641.8 45 s 2
(7/2−) 639.7
3/2− 62.5
5/2− 0.0 36.7 min 5
476.9 (E2) 1.5
450.9 M1 5.3
846.6 ≈5
638.1 E2 13.8
140.7
370.3 E2 4.5
365.2 M1 3.5
585.6 1.7
544.2 (M1) 4.0
960.5 E2 ≈4
813.7 E2 14.9
298.7 (E1) 1.0
385.7 E1 5.0
304.3 E1 8.1
290.0 (E1) 4.9
469.1 M1 15.4
781.6 (M1) ≈4
767.3 M1 5.2
409.2 M1 1.4
685.6 3.5
349.0 M1 3.3
219.4 4.3
182.5 9.8
357.9 M1 6.6
335.6 E2 51
596.5 E2 15.1
466.1 E2 83.9
738.2 (E2) 15.5
613.3 E2 100
417.2 E2(+M1) 5.4
641.8 M4 52.8
2.1
639.7 M1 50.8
577.2 E2 2.8
62.5
$^{203}_{84}Po_{119}$