^{204}Pb(α,4nγ), ^{198}Pt(^{12}C,6nγ) 1990Fa03

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	C. J. Chiara and F. G. Kondev	NDS 111,141 (2010)	1-Oct-2009

1990Fa03: ^{204}Pb(α,4nγ) E(α)=52-54 MeV; 6-mg/cm^2 thick target enriched to 99.9 % in ^{204}Pb; one intrinsic Ge, severalGe(Li) and Si(Li) detectors; measured γ(t), $\gamma\gamma$(t), $\gamma(\theta)$, ce, excitation functions; $\gamma\gamma$ coin using ^{198}Pt(^{12}C,6nγ) and a metallic ^{198}Pt target, 2-mg/cm^2 thick.

Others: 1970Ya03: ^{204}Pb(α,4nγ) E(α)=50 MeV; 20-mg/cm^2 thick low-enrichment in ^{204}Pb target; oneGe(Li) detector; measured γ(t). 1976Be12: ^{206}Pb(α,6nγ), ^{197}Au(^{10}B,3nγ); severalGe(Li) and Si(Li) detectors; measured γ(t), $\gamma\gamma$(t), $\gamma(\theta)$, and Ce(t). 1982Ha16: ^{204}Pb(α,4nγ) E(α)=50 MeV; 100$-\mu$g/cm^2 ^{204}Pb target on a 170$-\mu$g/cm^2 Ni backing; measured Ce(θ,t,H).

The decay scheme is based mainly on 1990Fa03.

^{204}Po Levels

E(level)[†]	J$^\pi$[‡]	T$_{1/2}$[#]	Comments
0	0$^+$		
684.30 *10*	2$^+$		
1200.58 *14*	4$^+$		
1255.20 *23*	2$^+$		
1552.37 *22*	4$^+$		
1626.79 *18*	6$^+$		
1638.91 *19*	8$^+$	150 ns *10*	T$_{1/2}$: Others: 190 ns *20* (1970Ya03), 140 ns (1976Be12). g-factor=+0.923 *13* (1973Br14) deduced using the stroboscopic resonance technique. The value was corrected for Knight (1.2% 4) and diamagnetic (−1.79%) shifts. Configuration=(π h$_{9/2}$)$^{+2}$.
1962.6 *5*	6$^+$		
2041.82 *23*	5$^-$		Main Configuration=((ν i$_{13/2}$)$^{-1}$(ν f$_{5/2}$)$^{-1}$).
2227.31 *21*	9$^-$	15 ns *4*	T$_{1/2}$: From 1976Be12. Others:<22 ns (1990Fa03) and≈20 ns (1970Ya03). Main Configuration=((ν i$_{13/2}$)$^{-1}$(ν f$_{5/2}$)$^{-1}$).
2290.2 *4*	7$^-$		Main Configuration=((ν i$_{13/2}$)$^{-1}$(ν f$_{5/2}$)$^{-1}$).
2302.9 *5*	(6$^-$)		
2471.1 *4*			E(level): Quoted (probably in error) as 2427.9 in Fig. 4 of 1990Fa03.
2527.4 *3*	10$^+$		
2539.0 *3*	9$^+$		
2620.5 *5*	11$^-$		Main Configuration=((π h$_{9/2}$)$^{+1}$(π i$_{13/2}$)$^{+1}$).
2788.7 *4*	10$^+$		
2827.6 *6*	10$^-$		
2895.1 *6*	(11$^+$)		
2905.03 *23*	11$^-$		Main Configuration=((ν p$_{3/2}$)$^{-1}$(ν f$_{5/2}$)$^{-2}$(ν i$_{13/2}$)$^{-1}$).
2946.3 *5*	10$^-$		
3083.4 *6*	11$^+$		
3125.5 *4*	12$^+$		Possible Configuration=(ν i$_{13/2}$)$^{-2}$.
3133.3 *6*	11$^+$		
3227.3 *3*	12$^-$		
3387? *3*			
3387.3 *5*	13$^-$	9 ns *3*	T$_{1/2}$: Value deduced using 261.8γ(t) and 598.1γ(t) (1990Fa03). Main Configuration=((π h$_{9/2}$)$^{+2}$(ν f$_{5/2}$)$^{-1}$(ν i$_{13/2}$)$^{-1}$).
3439.2 *5*	13$^-$		
3459.0 *7*	12$^-$		
3528.2 *4*	13$^-$		
3564.0 *6*	15$^-$	13 ns *2*	T$_{1/2}$: Other: 13 ns *3* (1976Be12) and 11 ns *1* (1982Ha16). g-factor=0.41 *2* deduced using the in-beam time differential perturbed angular distribution technique from $\gamma(\theta$,t) of ^{204}Po implanted in nickel foil (1982Ha16). For calibration of the internal magnetic field, 1982Ha16 assumed g-factor=0.91 for the 6$^+$ state in ^{208}Po. Main Configuration=((π h$_{9/2}$)$^{+2}$(ν f$_{5/2}$)$^{-1}$(ν i$_{13/2}$)$^{-1}$).
3576? *3*			

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^{204}Pb(α,4nγ), ^{198}Pt(^{12}C,6nγ) **1990Fa03 (continued)**

^{204}Po Levels (continued)

E(level)[†]	J^{π}[‡]	E(level)[†]	J^{π}[‡]	E(level)[†]	J^{π}[‡]	E(level)[†]	J^{π}[‡]
3649? *5*		4168.6 *7*	(16^-)	4362.2 *8*	13^-	4978.1 *11*	
3723.2 *7*		4174.9 *6*	15^-	4383.2 *7*	(17^-)	5155.1 *12*	
3767.4 *9*	13^-	4186.5 *12*		4437.6 *8*	(16^+)	5295.1 *12*	(19^-)
3898.6 *9*	14^-	4202.9 *6*	15^-	4471.1 *7*	17^-	5911.1 *16*	(20)
3975.3 *7*	15^-	4212.2 *6*	(14^+)	4532.4 *8*			
4096? *5*		4312.7 *8*	16^-	4615.4 *9*	(18^-)		
4137.3 *9*		4358.6 *10*	(16^-)	4819.4 *10*			

[†] From a least-squares fit to Eγ.

[‡] From 1990Fa03, based on deduced transition multipolarities using $\gamma(\theta)$ and α(K)exp.

[#] From 1990Fa03, unless otherwise specified.

γ(^{204}Po)

α(K)exp was normalized to 0.0119 for 684.3-keV E2.

E_{γ}[†]	I_{γ}[‡]	E_i(level)	J^{π}_i	E_f	J^{π}_f	Mult.[#]	Comments
(12.1 *2*)		1638.91	8^+	1626.79	6^+		E_{γ}: From adopted gammas.
93.1 *5*	≈6	2620.5	11^-	2527.4	10^+		
106.4 *5*	0.7 *2*	2895.1	(11^+)	2788.7	10^+	(M1)	Mult.: 1990Fa03 do not present the evidence for this assignment.
124.8 *3*	3.1 *5*	3564.0	15^-	3439.2	13^-	(E2)	Mult.: $A_2>0$.
158.7 *5*	≈3	4978.1		4819.4			
211.9 *5*	2.3 *3*	3439.2	13^-	3227.3	12^-	(M1)	Mult.: α(K)exp=0.55; A_2=0.32 *25*, A_4=−0.2 *4*.
225.4 *4*	2.2 *4*	4437.6	(16^+)	4212.2	(14^+)	(E2)	Mult.: α(K)exp=0.44; A_2=0.18 *18*, A_4=−0.11 *25*.
232.2 *5*	0.5 *1*	4615.4	(18^-)	4383.2	(17^-)	M1	Mult.: α(K)exp=0.94; A_2=−0.60 *8*, A_4=0.24 *12*.
249.7 *3*	4.9 *5*	2788.7	10^+	2539.0	9^+	M1	Mult.: α(K)exp=0.54; A_2=−0.15 *8*, A_4=−0.41 *14*.
261.1 *4*	<1	2302.9	(6^-)	2041.82	5^-		
261.8 *3*	6	3387.3	13^-	3125.5	12^+	E1	Mult.: α(K)exp=0.04; A_2=0.13 *18*, A_4=−0.0 *3*.
≈262		3649?		3387?			
281.4 *5*	1.6 *3*	3227.3	12^-	2946.3	10^-	E2	Mult.: α(K)exp=0.16; A_2=0.1 *3*, A_4=−0.0 *5*.
287.0 *5*	≈5	4819.4		4532.4			
294.7 *5*	0.7 *2*	3083.4	11^+	2788.7	10^+	M1	Mult.: α(K)exp=0.39; A_2≈0.
296.2 *4*	1.6 *3*	4471.1	17^-	4174.9	15^-	E2	Mult.: α(K)exp=0.05.
308.4 *5*	0.9 *2*	3767.4	13^-	3459.0	12^-	M1	Mult.: α(K)exp=0.20; A_2=−0.52 *8*, A_4=0.05 *12*.
322.2 *2*	3.3 *3*	3227.3	12^-	2905.03	11^-	M1	Mult.: α(K)exp=0.27; A_2=−0.37 *16*, A_4=0.2 *3*.
327.6 *2*	1.1 *2*	2290.2	7^-	1962.6	6^+		
335.9 *5*	1.8 *3*	3723.2		3387.3	13^-		
336	<1	1962.6	6^+	1626.79	6^+		
344.6 *5*	0.5 *1*	3133.3	11^+	2788.7	10^+	M1	Mult.: α(K)exp=0.55; A_2=−0.15 *9*, A_4=0.15 *13*.
426.2 *1*	86 *5*	1626.79	6^+	1200.58	4^+	E2	Mult.: α(K)exp=0.02; A_2=0.08 *4*, A_4=−0.04 *7*. Note, that the A_2 value is not consistent with the adopted stretched E2 assignment.
439.6 *5*	1.5 *2*	3898.6	14^-	3459.0	12^-	E2	Mult.: α(K)exp=0.07.
447		4096?		3649?			
447.1 *5*	≈3	3975.3	15^-	3528.2	13^-	E2	Mult.: α(K)exp=0.08.
460.0 *5*	≈0.5	4358.6	(16^-)	3898.6	14^-	E2	Mult.: α(K)exp=0.06.
489.0 *5*	0.7 *2*	2041.82	5^-	1552.37	4^+		
516.3 *1*	93 *5*	1200.58	4^+	684.30	2^+	E2	Mult.: α(K)exp=0.02; A_2=0.12 *4*, A_4=−0.04 *6*.
534.2 *5*	15 *2*	3439.2	13^-	2905.03	11^-	E2	Mult.: α(K)exp=0.03; A_2=0.24 *9*, A_4=−0.16 *14*.

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^{204}Pb(α,4nγ), ^{198}Pt(^{12}C,6nγ) 1990Fa03 (continued)

γ(^{204}Po) (continued)

E$_\gamma$†	I$_\gamma$‡	E$_i$(level)	J$^\pi_i$	E$_f$	J$^\pi_f$	Mult.#	Comments
570.9 *2*	0.7 *2*	1255.20	2^+	684.30	2^+	M1+E2	Mult.: α(K)exp=0.03.
588.4 *1*	38 *2*	2227.31	9^-	1638.91	8^+	E1	Mult.: α(K)exp=0.006; A_2=−0.15 *4*, A_4=0.05 *6*.
≈598		3387?		2788.7	10^+		
598.1 *2*	11 *1*	3125.5	12^+	2527.4	10^+	E2	Mult.: α(K)exp=0.01; A_2=0.25 *9*, A_4=−0.06 *13*.
600.3 *5*	2.3 *4*	2827.6	10^-	2227.31	9^-	M1	Mult.: α(K)exp=0.09; A_2=−0.17 *9*, A_4=−0.00 *14*.
604.6 *4*	1.8 *3*	4168.6	(16^-)	3564.0	15^-	(M1)	Mult.: α(K)exp=0.22; A_2=−0.71 *14*, A_4=−0.05 *20*.
616.0 *10*	<1	5911.1	(20)	5295.1	(19^-)		
623.2 *3*	2.5 *3*	3528.2	13^-	2905.03	11^-	E2	Mult.: α(K)exp=0.01; A_2=0.5 *3*, A_4=0.6 *5*.
663.3 *4*	0.9 *2*	2290.2	7^-	1626.79	6^+		
677.7 *1*	23 *2*	2905.03	11^-	2227.31	9^-	E2	Mult.: α(K)exp=0.01; A_2=0.25 *4*, A_4=0.01 *6*.
678.3 *5*	≈0.5	4137.3		3459.0	12^-		
684 *1*	<1	5155.1		4471.1	17^-		
684.3 *1*	100	684.30	2^+	0	0^+	E2	Mult.: A_2=0.10 *15*, A_4=−0.04 *7*.
719.3 *5*	≈2	2946.3	10^-	2227.31	9^-	M1	Mult.: α(K)exp=0.05; A_2<0.
748.7 *5*	1.3 *2*	4312.7	16^-	3564.0	15^-	M1	Mult.: α(K)exp=0.02; A_2=−0.32 *19*, A_4=−0.4 *3*.
762.6	≈2	1962.6	6^+	1200.58	4^+		E$_\gamma$: 761.49 *3* from adopted gammas, probably a multiplet. Mult.: α(K)exp=0.03 would suggest M1+E2 assignment, but the adopted level scheme favors E2.
≈787	<1	3576?		2788.7	10^+		
787.6 *3*	2.6 *4*	4174.9	15^-	3387.3	13^-	E2	Mult.: α(K)exp=0.006; A_2=0.36 *19*, A_4=−0.05 *9*.
809.2 *4*	5.1 *5*	4532.4		3723.2			E$_\gamma$: Table II in 1990Fa03 cites 1983He08 and 1987Ra04 for this γ, but it was not reported in either work.
815.6 *4*	2.6 *5*	4202.9	15^-	3387.3	13^-	E2	Mult.: α(K)exp=0.006; A_2=0.37 *19*, A_4=−0.1 *3*.
819.2 *4*	2.3 *4*	4383.2	(17^-)	3564.0	15^-	(E2)	Mult.: α(K)exp=0.006.
824 *1*	<1	5295.1	(19^-)	4471.1	17^-	(E2)	
824.9 *4*	4.9 *5*	4212.2	(14^+)	3387.3	13^-	(E1)	
838.5 *5*	≈5	3459.0	12^-	2620.5	11^-	M1	Mult.: α(K)exp=0.04.
841.3 *2*	2.3 *3*	2041.82	5^-	1200.58	4^+	E1	Mult.: α(K)exp=0.004; A_2≈0.
844.3 *3*	1.7 *3*	2471.1		1626.79	6^+	E1	Mult.: α(K)exp=0.005; A_2<0.
868.0 *2*	1.0 *2*	1552.37	4^+	684.30	2^+	(E2)	Mult.: α(K)exp=0.008.
888.5 *2*	23 *2*	2527.4	10^+	1638.91	8^+	E2	Mult.: α(K)exp=0.005; A_2=0.06 *5*, A_4=0.14 *7*. Note that the measured A_2 value is not consistent with the assigned multipolarity.
900.1 *2*	13 *2*	2539.0	9^+	1638.91	8^+	M1	Mult.: α(K)exp=0.02; A_2<0.
903.2 *4*	2.0 *3*	4362.2	13^-	3459.0	12^-	M1+E2	Mult.: α(K)exp=0.02; A_2=−0.81 *19*, A_4=0.7 *3*.
907.7 *5*	0.8 *2*	3528.2	13^-	2620.5	11^-	(E2)	Mult.: α(K)exp=0.01; A_2<0. Note that the measured A_2 value is not consistent with the assigned multipolarity.
1103 *1*	<1	4186.5		3083.4	11^+		
1149.9 *5*	1.5 *3*	2788.7	10^+	1638.91	8^+	(E2)	Mult.: No evidence is presented by 1990Fa03 for the mult assignment.

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† From 1990Fa03, unless otherwise specified. ΔEγ were estimated by the evaluators.

‡ From 1990Fa03 at E(α)=52 MeV. ΔIγ were estimated by the evaluators based on the statement in 1990Fa03 that ΔIγ=5% for strong lines and 20% for the weaker ones.

From 1990Fa03, based on $\gamma(\theta)$ and α(K)exp, unless otherwise specified.

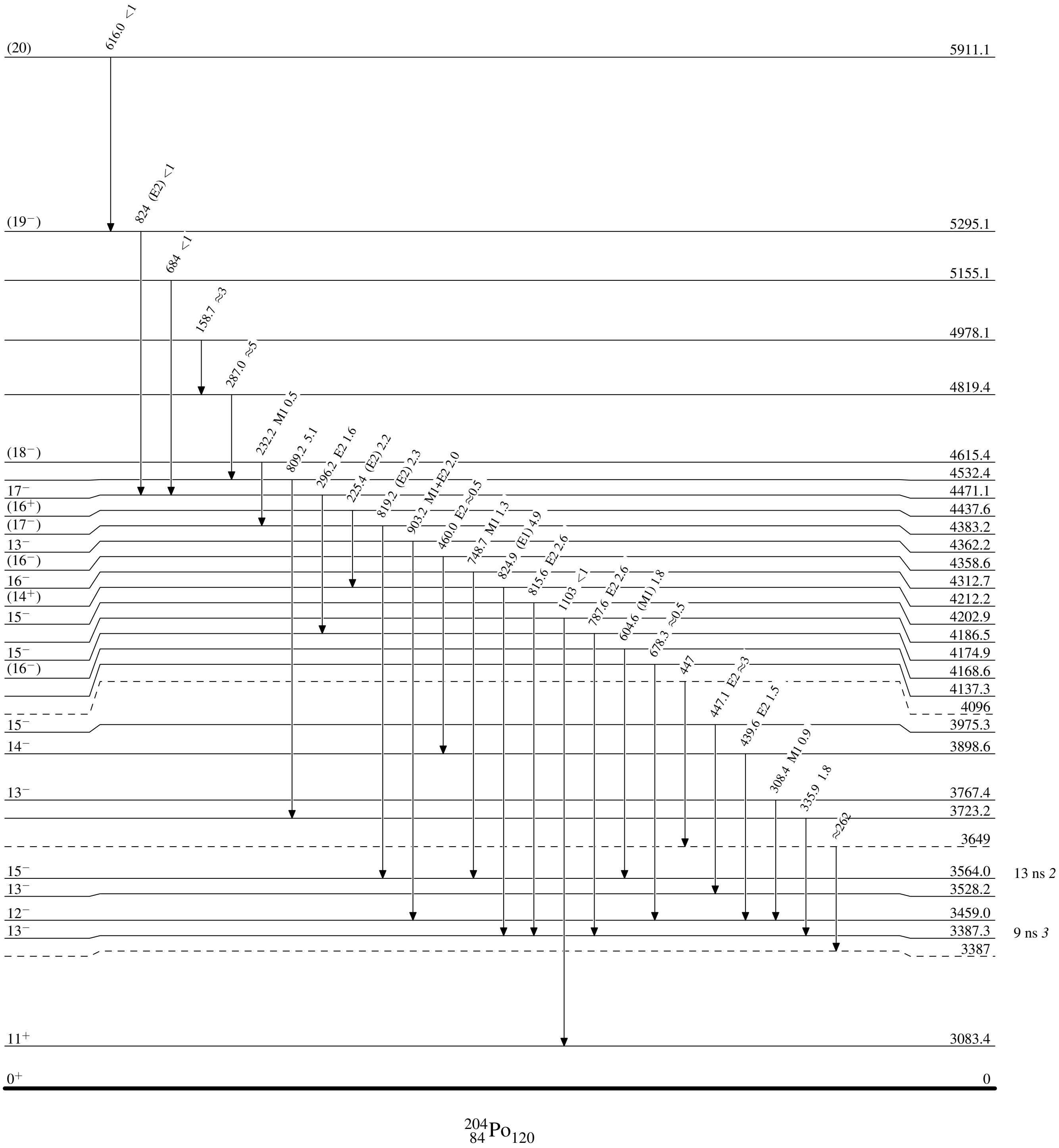
^{204}Pb(α,4nγ), ^{198}Pt(^{12}C,6nγ) 1990Fa03

Level Scheme

Intensities: Type not specified

Legend

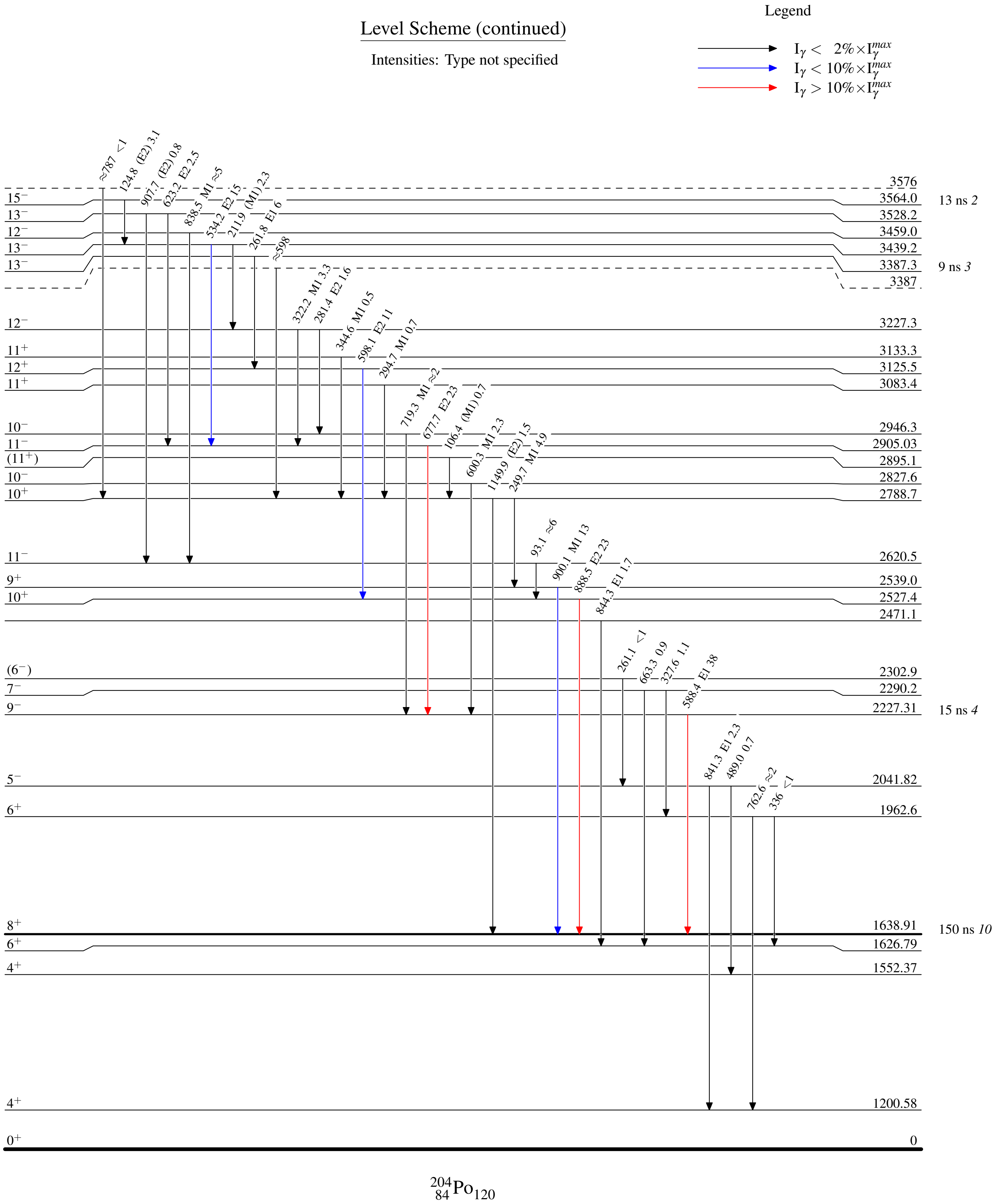
- → $I_\gamma < 2\% \times I_\gamma^{max}$
- → $I_\gamma < 10\% \times I_\gamma^{max}$
- → $I_\gamma > 10\% \times I_\gamma^{max}$



^{204}Pb(α,4nγ), ^{198}Pt(^{12}C,6nγ) 1990Fa03

Level Scheme (continued)

Intensities: Type not specified



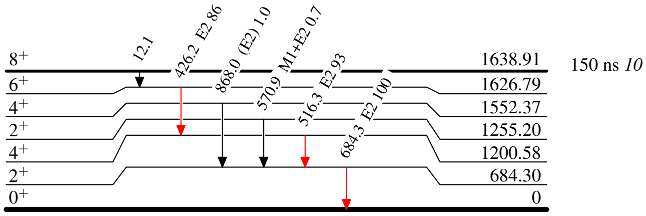
^{204}Pb(α,4nγ), ^{198}Pt(^{12}C,6nγ) 1990Fa03

Level Scheme (continued)

Intensities: Type not specified

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)



$^{204}_{84}$Po$_{120}$