^{210}Fr α decay 2005Ku06

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	F. G. Kondev	NDS 201,346 (2025)	21-Jan-2025

Parent: ^{210}Fr: E=0.0; $J^\pi=6^+$; $T_{1/2}$=3.18 min *6*; Q(α)=6671 *5*; %α decay=71 *4*

^{210}Fr-Q(α): From 2021Wa16.

^{210}Fr-μ=4.38 μ_N *5* (2008Go11), consistent with the $\pi(h^{+1}_{9/2})\otimes\nu(f^{-1}_{5/2})$ configuration.

2005Ku06: ^{210}Fr is produced in ^{209}Bi(^{12}C,7n)^{214}Ac reaction at E=7.1 and 9.1 MeV per nucleon and subsequent α decay of ^{214}Ac. Detectors: Velocity filter SHIP. Residues were implanted into position-sensitive 16-strip PIPS Si-detector. A Ge Clover was placed behind Si detector; Measured: Eγ, Eα, Iγ, Iα, $\alpha\gamma$ coin.

^{206}At Levels

E(level)[†]	J^π	$T_{1/2}$	Comments
0.0	$(6)^+$	30.5 min *6*	J^π,$T_{1/2}$: From Adopted Levels. configuration: $\pi(h^{+1}_{9/2})\otimes\nu(f^{-1}_{5/2})$, same as the parent state.
5.7? *3*			E(level): From γ-ray energy differences. No direct decay to the ground state was observed.
31.05? *22*			E(level): From γ-ray energy differences. No direct decay to the ground state was observed.
126.30 *10*			
137.57? *23*			
148.00 *10*			
201.0? *4*			
322.30? *10*			
340.40 *10*			
444.2 *5*			
657.3? *3*			

[†] From a least-squares fit to Eγ.

α radiations

Eα[†]	E(level)	Iα[†#]	HF[‡]	Comments
5899 *5*	657.3?	0.010 *5*	31 *16*	Eα: From Q(α) and the corresponding level energy.
6112 *7*	444.2	0.0017 *9*	1.69×10^3 *90*	
6212 *4*	340.40	0.022 *3*	369 *56*	
6227 *5*	322.30?	0.010 *2*	9.7×10^2 *21*	
6347 *5*	201.0?	0.0041 *13*	7.7×10^3 *25*	Eα: From Q(α) and the corresponding level energy.
6400 *4*	148.00	0.034 *7*	1.53×10^3 *34*	
6409 *4*	137.57?	0.014 *4*	4.1×10^3 *12*	
6420 *4*	126.30	0.030 *5*	2.13×10^3 *39*	
6545 *5*	0.0	99.87 *3*	2.06 *14*	Iα,HF: Could include contributions to the 5.7 level.

[†] From 2005Ku06, except where noted. Iα values were extracted from α-γ coin data, but no corrections for conversion electrons summing effects were applied.

[‡] Using $r_0(^{206}At)$=1.4726 *61* unweighted average of 1.4755 *52* (^{204}Po), 1.4568 *22* (^{206}Po), 1.4861 *29* (^{206}Rn) and 1.4718 *31* (^{208}Rn) from 2020Si16.

[#] For absolute intensity per 100 decays, multiply by 0.71 *4*.

^{210}Fr α decay 2005Ku06 (continued)

$\gamma(^{206}At)$

Iγ normalization: Since the decay scheme is uncertain and there are no conversion coefficient data, normalization to absolute Iγ was not applied.

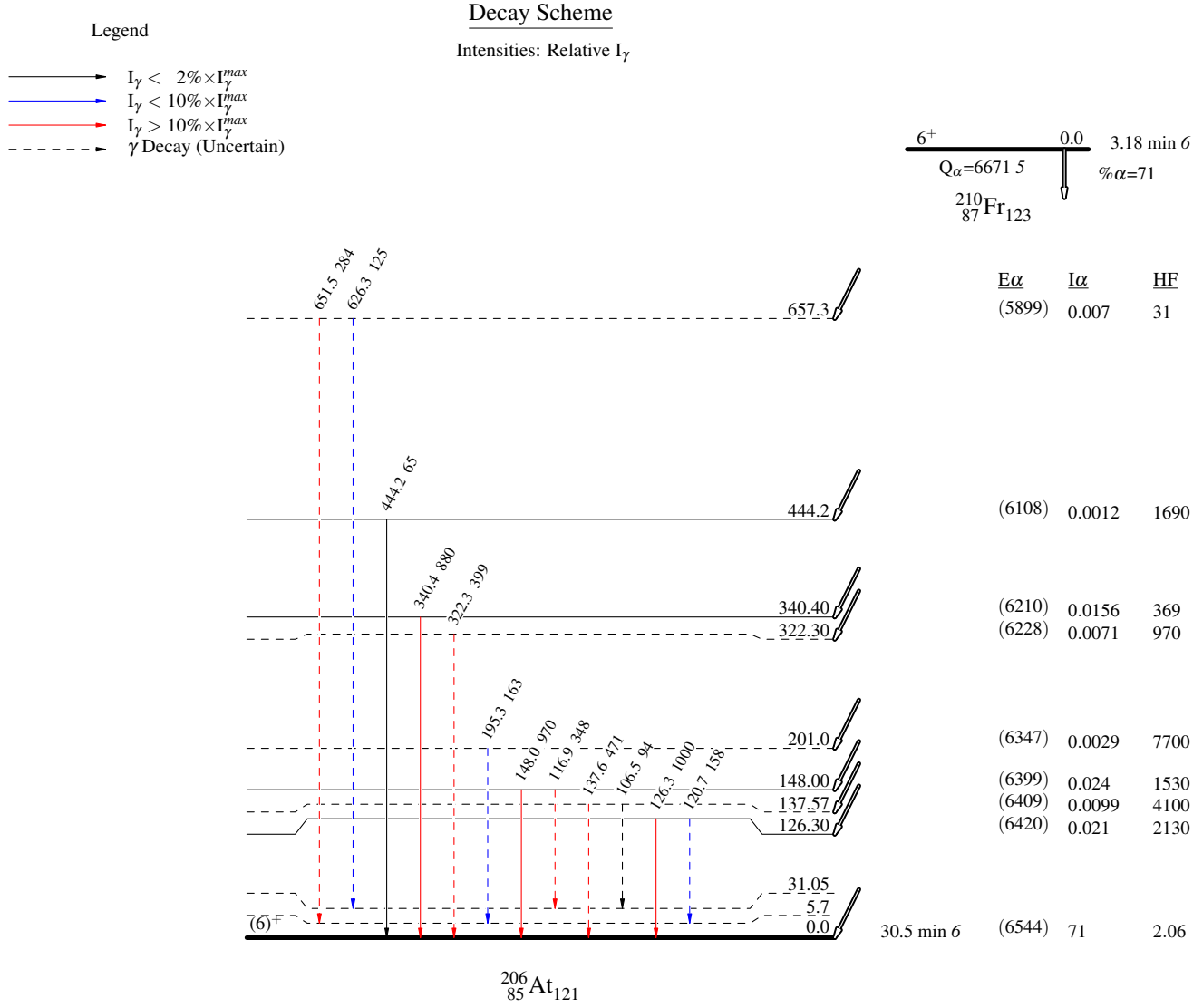
E_γ †	I_γ †	E_i(level)	E_f	J^π_f	E_γ †	I_γ †	E_i(level)	E_f	J^π_f
[x]100.9 *2*					195.3‡ *2*	163 *47*	201.0?	5.7?	
106.5‡ *2*	94 *29*	137.57?	31.05?		322.3‡ *1*	399 *65*	322.30?	0.0	$(6)^+$
116.9‡ *3*	348 *75*	148.00	31.05?		340.4 *1*	8.8×10^2 *10*	340.40	0.0	$(6)^+$
120.7‡ *3*	158 *48*	126.30	5.7?		444.2 *5*	65 *33*	444.2	0.0	$(6)^+$
126.3 *1*	1000	126.30	0.0	$(6)^+$	626.3‡ *3*	125 *43*	657.3?	31.05?	
137.6‡ *3*	471 *71*	137.57?	0.0	$(6)^+$	651.5‡ *3*	284 *23*	657.3?	5.7?	
148.0 *1*	9.7×10^2 *13*	148.00	0.0	$(6)^+$					

† From 2005Ku06.
‡ Placement of transition in the level scheme is uncertain.
[x] γ ray not placed in level scheme.

^{210}Fr α decay 2005Ku06

Decay Scheme

Intensities: Relative I_γ



	Eα	Iα	HF
657.3	(5899)	0.007	31
444.2	(6108)	0.0012	1690
340.40	(6210)	0.0156	369
322.30	(6228)	0.0071	970
201.0	(6347)	0.0029	7700
148.00	(6399)	0.024	1530
137.57	(6409)	0.0099	4100
126.30	(6420)	0.021	2130
0.0	(6544)	71	2.06