

^{216}Fr α decay (0.70 μs) 1996Li37

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	K. Auranen and E. A. Mccutchan		NDS 168, 117 (2020)	1-Aug-2020

Parent: ^{216}Fr : E=0.0; $J^\pi=(1^-)$; $T_{1/2}=0.70 \mu\text{s}$ 2; $Q(\alpha)=9174$ 3; % α decay=100.0

$^{216}\text{Fr-T}_{1/2}$: from 1970Bo13.

1996Li37: ^{216}Fr activity was measured in secular equilibrium with ^{224}Pa ($T_{1/2}=0.8$ s) and ^{220}Ac ($T_{1/2}=26$ ms). ^{224}Pa was produced by $^{209}\text{Bi}(^{18}\text{O}, 3n)$, E=96 MeV. Measured α particles, γ rays, $\alpha\gamma$ coin, conversion electrons, α -ce and $\alpha\gamma$ -ce coin. Detectors not given. However, α - and γ -ray spectra suggest that Si(Au) surface barrier and germanium detectors, respectively, were used.

Others: 2003Ni10, 2007Ku30.

α : Additional information 1.

 ^{212}At Levels

E(level) [†]	J^π [‡]	$T_{1/2}$ [‡]
0.0	(1 ⁻)	0.314 s 3
160.3 1	(2 ⁻)	
205.3 2	(3 ⁻)	

[†] From E γ .

[‡] From the Adopted Levels.

 α radiations

E α [†]	E(level)	I α ^{†#} @	HF [‡]	Comments
8811 15	205.3	≈0.2	≈263	E α : observed in coincidence with 45.0 γ . I α : reported as ≈ 0.2 for 100 total decays from both the 1 ⁻ , 0.70 μs g.s and the 133-keV, 71 ns isomer measured in equilibrium with the ^{220}Ac parent (1996Li37).
8861 15	160.3	0.5 2	135 55	E α : observed in coincidence with 160.3 γ . I α : reported as 0.5 2 for 100 total decays from both the 1 ⁻ , 0.70 μs g.s and the 133-keV, 71 ns isomer measured in equilibrium with the ^{220}Ac parent (1996Li37).
9004 5	0.0	99 1	1.65 11	E α : others: 9005 keV 12 (1970Bo13), 9004 keV 5 (2007Ku30). I α : reported as 99 1 for 100 total decays from both the 1 ⁻ , 0.70 μs g.s and the 133-keV, 71 ns isomer measured in equilibrium with the ^{220}Ac parent (1996Li37).

[†] From 1996Li37.

[‡] Using $r_0(^{212}\text{At})=1.5522$ 49, average of $r_0(^{214}\text{Rn})=1.5655$ 13, $r_0(^{212}\text{Rn})=1.5433$ 36, $r_0(^{212}\text{Po})=1.5658$ 59, and $r_0(^{210}\text{Po})=1.5340$ 25 (2020Si16).

Intensities are given in 1996Li37 as normalized to 100 total decays from both the 1⁻, 0.70 μs g.s and the 133-keV, 71 ns isomer measured in equilibrium with the ^{220}Ac parent. Evaluators have renormalized the intensities here to be for 100 decays of the ground state; original values from 1996Li37 given in the comments.

@ Absolute intensity per 100 decays.

^{216}Fr α decay (0.70 μs) 1996Li37 (continued) $\gamma(^{212}\text{At})$

I γ normalization: gamma-ray intensities deduced by evaluators from measured absolute α intensities and γ feedings.

E γ [†]	I γ [#]	E $_i$ (level)	J $^\pi_i$	E $_f$	J $^\pi_f$	Mult. [‡]	α	Comments
45.0 <i>I</i>	≈0.008	205.3	(3 $^-$)	160.3	(2 $^-$)	M1	24.0	$\alpha(L)=18.2\ 3; \alpha(M)=4.32\ 7; \alpha(N)=1.120\ 18; \alpha(O)=0.240\ 4;$ $\alpha(P)=0.0331\ 6$
160.3 <i>I</i>	0.17 5	160.3	(2 $^-$)	0.0 (1 $^-$)		M1	3.16	I γ : deduced by evaluators from measured α feeding. $\alpha(K)=2.56\ 4; \alpha(L)=0.457\ 7; \alpha(M)=0.1083\ 16;$ $\alpha(N)=0.0281\ 4; \alpha(O)=0.00601\ 9$ $\alpha(P)=0.000830\ 12$ Mult.: K x ray/I $\gamma(160.3\gamma)=3\ I$ (1996Li37). I γ : deduced by evaluators from measured α and γ feeding.

[†] From 1996Li37.

[‡] From the Adopted Gammas. For cases where values are derived from this dataset, additional support is given in the comments.

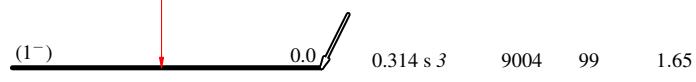
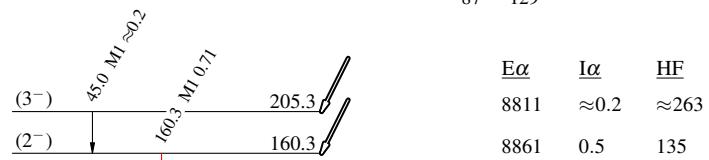
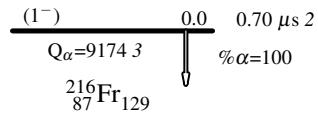
Absolute intensity per 100 decays.

 ^{216}Fr α decay (0.70 μs) 1996Li37Decay Scheme

Legend

Intensities: I $_{(\gamma+ce)}$ per 100 parent decays

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

 $^{212}_{85}\text{At}_{127}$