

^{209}Fr ε decay [1996Xu02](#)

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	J. Chen [#] and F. G. Kondev		NDS 126, 373 (2015)	30-Sep-2013

Parent: ^{209}Fr : $E=0.0$; $J^\pi=9/2^-$; $T_{1/2}=50.5$ s 7; $Q(\varepsilon)=5161$ 25; $\% \varepsilon + \% \beta^+$ decay=11 3

^{209}Fr - $J^\pi, T_{1/2}$: From Adopted Levels of ^{209}Fr .

^{209}Fr - $Q(\varepsilon)$: From [2012Wa38](#).

^{209}Fr - $\% \varepsilon + \% \beta^+$ decay: From Adopted Levels of ^{209}Fr . Other: $\% \varepsilon + \% \beta^+ = 3.0$ 15 in [1996Xu02](#).

[1996Xu02](#): ^{209}Fr activities were produced by bombarding a 1.7 mg/cm² self-supporting ^{197}Au foil with a 102 MeV ^{16}O beam from the SFC accelerator of IMP at Lanzhou. γ -rays were detected with two coaxial HPGe (GMX) detectors and x-rays were detected with a planar HPGe detector. Measured E_γ , I_γ , $I(\text{x-ray})$, $\gamma\gamma$ -coin, $\gamma(\text{x-ray})$ -coin. Deduced levels, J^π , configurations, ε - and β^+ -branching ratios.

Other: [1980Li22](#).

The decay scheme is incomplete and multipolarities for many transitions are not known, so no $\varepsilon + \beta^+$ branchings and $\log ft$ values were deduced.

 ^{209}Rn Levels

$E(\text{level})^\dagger$	$J^\pi^\ddagger$	$E(\text{level})^\dagger$	$J^\pi^\ddagger$	$E(\text{level})^\dagger$	$J^\pi^\ddagger$
0	$5/2^-$	797.90 1	$9/2^-$	1383.2 3	
110.27 17	$1/2^-$	867.70 18	$(7/2, 9/2^-)$	1388.2 3	
382.33 17	$(3/2^-)$	1020.7 4		1465.5 4	$13/2^-$
547.10 20	$(7/2^-)$	1174.0 3	$13/2^+$	1588.4 4	
652.60 21	$(5/2^-)$	1327.49 21	$(5/2^-, 7/2, 9/2^-)$	1767.0 4	
690.1 3	$(1/2^-, 3/2^-)$	1352.7 3		1931.3 4	

[†] From a least-squares fit to E_γ .

[‡] From Adopted Levels.

 $\gamma(^{209}\text{Rn})$

$E_\gamma^\dagger$	$I_\gamma^\dagger$	$E_i(\text{level})$	J_i^π	E_f	J_f^π
110.3 2	9 2	110.27	$1/2^-$	0	$5/2^-$
178.6 2	3 1	1767.0		1588.4	
215.1 2	15 1	867.70	$(7/2, 9/2^-)$	652.60	$(5/2^-)$
272.1 2	4 1	382.33	$(3/2^-)$	110.27	$1/2^-$
330.6 2	6 3	1020.7		690.1	$(1/2^-, 3/2^-)$
376.1 2	29 2	1174.0	$13/2^+$	797.90	$9/2^-$
382.3 2	3 1	382.33	$(3/2^-)$	0	$5/2^-$
414.4 2	10 2	1588.4		1174.0	$13/2^+$
529.5 2	4 2	1327.49	$(5/2^-, 7/2, 9/2^-)$	797.90	$9/2^-$
547.1 2	100 3	547.10	$(7/2^-)$	0	$5/2^-$
652.6 3	38 4	652.60	$(5/2^-)$	0	$5/2^-$
667.6 3	4 1	1465.5	$13/2^-$	797.90	$9/2^-$
690.1 3	15 3	690.1	$(1/2^-, 3/2^-)$	0	$5/2^-$
797.8 2	111 4	797.90	$9/2^-$	0	$5/2^-$
805.6 2	15 5	1352.7		547.10	$(7/2^-)$
836.1 2	6 2	1383.2		547.10	$(7/2^-)$
841.1 2	6 2	1388.2		547.10	$(7/2^-)$
867.7 2	8 3	867.70	$(7/2, 9/2^-)$	0	$5/2^-$
1327.7 3	5 2	1327.49	$(5/2^-, 7/2, 9/2^-)$	0	$5/2^-$
1384.2 3	16 6	1931.3		547.10	$(7/2^-)$

[†] from [1996Xu02](#). I_γ were normalized to $I_\gamma(547.1\gamma)=100$.

^{209}Fr ϵ decay 1996Xu02

Decay Scheme

Legend

Intensities: Relative I_γ

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

$\nearrow$ $9/2^-$ 0.0 $50.5 \text{ s } 7$
 $Q_\epsilon = 5161.25$
 $^{209}\text{Fr}_{122}$
 87

