

$^{212}\text{Fr}$   $\varepsilon$  decay    1973GoXM

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

Parent:  $^{212}\text{Fr}$ : E=0.0;  $J^\pi=5^+$ ;  $T_{1/2}=20.0$  min 6;  $Q(\varepsilon)=5144$  9; % $\varepsilon$ +% $\beta^+$  decay=57 2

$^{212}\text{Fr}$ -% $\varepsilon$ +% $\beta^+$  decay:  $\varepsilon+\beta^+=57\%$  2 ([1950Hy27](#)).

Others: [1972HaWF](#), [1972KhZU](#).

$\alpha$ : [Additional information 1](#).

 $^{212}\text{Rn}$  Levels

The decay scheme is that proposed by [1972HaWF](#) and is based on energy matching and  $\gamma\gamma$  coincidence data.

E(level) <sup>†</sup>	$J^\pi$ <sup>‡</sup>	$T_{1/2}$ <sup>‡</sup>
0.0	$0^+$	23.9 min 12
1274.8 20	$2^+$	
1502.5 20	$4^+$	
1640.8 20	$6^+$	
2304 3	$5^{(+)}$	
2688.1 25	$(5^+)$	

<sup>†</sup> From a least-squares fit to  $E\gamma$  data.

<sup>‡</sup> From the Adopted Levels.

 $\varepsilon, \beta^+$  radiations

Note that there is an negative intensity balance at the 1274.8-keV level of  $-13$  12. Since more than 10% of the  $\gamma$ -ray intensity has not been placed in the level scheme, and since the level scheme shows a lack of intensity balance at the 1274.8-keV level, the  $I\varepsilon$ ,  $I\beta^+$  and  $\log ft$  given are approximate values.

E(decay)	E(level)	$I\beta^+$ <sup>†</sup>	$I\varepsilon$ <sup>†</sup>	$\log ft$	$I(\varepsilon+\beta^+)$ <sup>†</sup>	Comments
(2456 9)	2688.1	$\approx 0.63$	$\approx 26$	$\approx 6.3$	$\approx 27$	av $E\beta=660.0$ 41; $\varepsilon K=0.7747$ 4; $\varepsilon L=0.1510$ 1; $\varepsilon M+=0.05084$ 4
(2840 10)	2304	$\approx 0.2$	$\approx 5$	$\approx 7.2$	$\approx 5$	av $E\beta=827.8$ 42; $\varepsilon K=0.7558$ 6; $\varepsilon L=0.1460$ 2; $\varepsilon M+=0.04907$ 5
(3503 9)	1640.8	$\approx 2.5$	$\approx 19$	$\approx 6.8$	$\approx 21$	av $E\beta=1119.2$ 41; $\varepsilon K=0.7024$ 10; $\varepsilon L=0.13413$ 19; $\varepsilon M+=0.04501$ 7
(3642 9)	1502.5	$\approx 2.6$	$\approx 16$	$\approx 6.9$	$\approx 19$	av $E\beta=1180.3$ 41; $\varepsilon K=0.6883$ 10; $\varepsilon L=0.13121$ 20; $\varepsilon M+=0.04402$ 7

<sup>†</sup> Absolute intensity per 100 decays.

 $\gamma(^{212}\text{Rn})$ 

$I\gamma$  normalization: from  $\Sigma I(\gamma+ce)$  to g.s. = 57 % 2, with ground state  $\varepsilon+\beta^+$  feeding taken to be negligible considering  $\Delta J=5$ .  
All data are from [1973GoXM](#).

$E_\gamma$	$I_\gamma$ <sup>‡</sup>	$E_i$ (level)	$J_i^\pi$	$E_f$	$J_f^\pi$	Mult. <sup>†</sup>	$\alpha$	Comments
<sup>x</sup> 97.5	6.5 13							
138.30 10	18.2 9	1640.8	$6^+$	1502.5 4 <sup>+</sup>	E2	2.13	$\alpha(K)=0.316$ 5; $\alpha(L)=1.340$ 20; $\alpha(M)=0.361$ 6; $\alpha(N)=0.0939$ 14; $\alpha(O)=0.0190$ 3 $\alpha(P)=0.00213$ 3	

Continued on next page (footnotes at end of table)

**$^{212}\text{Fr}$   $\varepsilon$  decay    1973GoXM (continued)** **$\gamma(^{212}\text{Rn})$  (continued)**

$E_\gamma$	$I_\gamma^{\ddagger}$	$E_i(\text{level})$	$J_i^\pi$	$E_f$	$J_f^\pi$	Mult. <sup>†</sup>	$\alpha$	Comments
227.72 10	100	1502.5	4 <sup>+</sup>	1274.8	2 <sup>+</sup>	E2	0.333	Mult.: $\alpha(K)\exp=0.34$ 5 (from $I(\text{ce}(K))=6.1$ 9; $\alpha(K)\exp$ relative to $\alpha(K)(227.72\gamma \text{ E2})=0.126$ ); $K/L23=0.23$ 4, $L2/L3=1.77$ 14, $K:M:N=10:11.0$ $20:3.1$ 6.
<sup>x</sup> 309.1 2	2.4 2							$\alpha(K)=0.1252$ 18; $\alpha(L)=0.1539$ 22; $\alpha(M)=0.0409$ 6; $\alpha(N)=0.01066$ 15; $\alpha(O)=0.00218$ 3 $\alpha(P)=0.000253$ 4
<sup>x</sup> 311.5 2	3.2 3							Mult.: $K/L2=1.10$ , $K:M:N=10:3.4$ 3:1.6 4 .
<sup>x</sup> 322.5 2	1							
<sup>x</sup> 358.2	0.5							
<sup>x</sup> 422.0 5	1.9 2							
<sup>x</sup> 532.0 5	6.6 7							
<sup>x</sup> 564.4 5	2.3 2							
<sup>x</sup> 620.1 5	1.9 2							
801.9 15	8.4 9	2304	5 <sup>(+)</sup>	1502.5	4 <sup>+</sup>			
<sup>x</sup> 824.0 15	1.8 2							
<sup>x</sup> 902.2 15	1.6 2							
1047.3 20	17.0 17	2688.1	(5 <sup>+</sup> )	1640.8	6 <sup>+</sup>			
<sup>x</sup> 1178.4 20	3.2 4							
1185.6 20	33 4	2688.1	(5 <sup>+</sup> )	1502.5	4 <sup>+</sup>			
1274.8 20	108 10	1274.8	2 <sup>+</sup>	0.0	0 <sup>+</sup>	E2	0.00514	$\alpha(K)=0.00410$ 6; $\alpha(L)=0.000785$ 12; $\alpha(M)=0.000188$ 3; $\alpha(N)=4.89\times 10^{-5}$ 7; $\alpha(O)=1.058\times 10^{-5}$ 16 $\alpha(P)=1.499\times 10^{-6}$ 22

<sup>†</sup> From the Adopted Gammas. For cases were support is derived from this dataset, details are provided in the comments.

<sup>‡</sup> For absolute intensity per 100 decays, multiply by 0.53 6.

<sup>x</sup>  $\gamma$  ray not placed in level scheme.

$^{212}\text{Fr} \epsilon$  decay    1973GoXMDecay Scheme

## Legend

Intensities:  $I_\gamma$  per 100 parent decays