

^{235}Pu ε decay 1973Ja03

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	E. Browne, J. K. Tuli	NDS	122, 205 (2014)	1-Feb-2014

Parent: ^{235}Pu : E=0; $J^\pi=(5/2^+)$; $T_{1/2}=25.3$ min 5; $Q(\varepsilon)=1139$ 21; $\% \varepsilon + \% \beta^+$ decay=99.997 1

^{235}Pu -Q(ε): From 2012Wa38.

 ^{235}Np Levels

The levels at 756, 779 and 819 were suggested in 1973Ja03 that they belong to the $3/2[521]$ rotational band; however, ($^3\text{He},d$) and (α,t) results suggest that this bandhead is at 565 keV. Analogy with ^{231}Th β^- decay suggests that the main ε branches should feed the $3/2[651]$ and $3/2[532]$ rotational bands in ^{235}Np , in addition to the well established $5/2[642]$ and $5/2[523]$ rotational bands.

E(level)	$J^\pi^\dagger$	$T_{1/2}$	Comments
0	$5/2^+$	396.1 d 12	$T_{1/2}$: from Adopted Levels.
34.23 10	$(7/2^+)$		
49.10 10	$(5/2^-)$	6.9 ns 3	$T_{1/2}$: from K x ray-49 γ (t) delayed coincidence (1971Go07).
79.1 4	$(9/2^+)$		
756.4 3	$(3/2,5/2,7/2)$		
779.46 22	$(3/2,5/2,7/2)$		
819.0 4	$(5/2^+,7/2)$		
936.8 3	$(5/2^+,7/2)$		
944.51 22	$(3/2,5/2,7/2)$		

† From Adopted Levels.

 ε, β^+ radiations

$\beta^+ < 0.01\%$ from limit on $\gamma^\pm$ (1973Ja03).

E(decay)	E(level)	$I\varepsilon^\dagger$	Log ft	$I(\varepsilon + \beta^+)^\dagger$	Comments
(194 21)	944.51	0.28 5	5.70 19	0.28 5	$\varepsilon K=0.41$ 10; $\varepsilon L=0.42$ 7; $\varepsilon M+=0.17$ 3
(202 21)	936.8	0.041 8	6.60 19	0.041 8	$\varepsilon K=0.43$ 8; $\varepsilon L=0.40$ 6; $\varepsilon M+=0.17$ 3
(320 21)	819.0	0.019 4	7.53 13	0.019 4	$\varepsilon K=0.623$ 18; $\varepsilon L=0.272$ 13; $\varepsilon M+=0.105$ 6
(360 21)	779.46	0.13 2	6.84 10	0.13 2	$\varepsilon K=0.649$ 13; $\varepsilon L=0.254$ 9; $\varepsilon M+=0.097$ 4
(383 21)	756.4	0.48 8	6.34 10	0.48 8	$\varepsilon K=0.661$ 11; $\varepsilon L=0.246$ 8; $\varepsilon M+=0.093$ 4
(1090 21)	49.10	4.3 8	6.46 9	4.3 8	$\varepsilon K=0.7532$ 8; $\varepsilon L=0.1820$ 6; $\varepsilon M+=0.06473$ 24
(1105 21)	34.23	37 10	5.54 12	37 10	$\varepsilon K=0.7538$ 8; $\varepsilon L=0.1817$ 6; $\varepsilon M+=0.06457$ 23
(1139 21)	0	57 10	5.38 8	57 10	$\varepsilon K=0.7549$ 7; $\varepsilon L=0.1809$ 5; $\varepsilon M+=0.06422$ 21

† For absolute intensity per 100 decays, multiply by 0.99997 1.

 $\gamma(^{235}\text{Np})$

I_γ normalization: from $\varepsilon(K)/\varepsilon=0.72$ and $I_\gamma(49\gamma)=1.74$ per 100 K x ray.

$K\alpha_1$ x ray=34% 5, $K\alpha_2$ x ray=22% 3, $K\beta$ x ray=17% 3; L x ray=39% 5, calculated by evaluator using the computer program radlst.

K x ray and L x ray intensities not reported by 1973Ja03.

Continued on next page (footnotes at end of table)

^{235}Pu ε decay **1973Ja03** (continued) $\gamma(^{235}\text{Np})$ (continued)

$E_\gamma^\ddagger$	$I_\gamma^\#$	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Mult.	δ	$\alpha^\dagger$	Comments
34.2 1	192 36	34.23	(7/2 ⁺)	0	5/2 ⁺	(M1+E2)	≈ 0.12	≈ 152	$\alpha(\text{L}) \approx 113.6$; $\alpha(\text{M}) \approx 28.5$; $\alpha(\text{N}+..) \approx 9.99$ $\alpha(\text{N}) \approx 7.74$; $\alpha(\text{O}) \approx 1.88$; $\alpha(\text{P}) \approx 0.351$; $\alpha(\text{Q}) \approx 0.0217$ δ : by analogy with 33.2 γ in ^{237}Np .
(44.7) 49.1 1	1967 50	79.1 49.10	(9/2 ⁺) (5/2 ⁻)	34.23 0	(7/2 ⁺) 5/2 ⁺	E1		0.833 13	$\alpha(\text{L}) = 0.624$ 10; $\alpha(\text{M}) = 0.1559$ 24; $\alpha(\text{N}+..) = 0.0525$ 8 $\alpha(\text{N}) = 0.0414$ 7; $\alpha(\text{O}) = 0.00953$ 15; $\alpha(\text{P}) = 0.001529$ 23; $\alpha(\text{Q}) = 5.38 \times 10^{-5}$ 8 I_γ : 1.74 27 photons per 100 K x ray (in coin measurement), 2.67 7 (in singles measurement) (1971Go01).
(79.0) 722.2 5		79.1 756.4	(9/2 ⁺) (3/2,5/2,7/2)	0 34.23	5/2 ⁺ (7/2 ⁺)				
739.8 4	10 2	819.0	(5/2 ⁺ ,7/2)	79.1	(9/2 ⁺)				
745.1 3	75 7	779.46	(3/2,5/2,7/2)	34.23	(7/2 ⁺)				
756.4 3	399 14	756.4	(3/2,5/2,7/2)	0	5/2 ⁺				
779.6 3	31 3	779.46	(3/2,5/2,7/2)	0	5/2 ⁺				
785.0 4	6 2	819.0	(5/2 ⁺ ,7/2)	34.23	(7/2 ⁺)				Could also be placed de-exciting the 834-keV 5/2 ⁺ state.
819.0 @ 6	1 1	819.0	(5/2 ⁺ ,7/2)	0	5/2 ⁺				
858.0 5	9 3	936.8	(5/2 ⁺ ,7/2)	79.1	(9/2 ⁺)				
902.6 4	15 2	936.8	(5/2 ⁺ ,7/2)	34.23	(7/2 ⁺)				
910.1 3	137 4	944.51	(3/2,5/2,7/2)	34.23	(7/2 ⁺)				
936.7 4	9 3	936.8	(5/2 ⁺ ,7/2)	0	5/2 ⁺				
^x 940.7 3	95 4								
944.7 3	95 4	944.51	(3/2,5/2,7/2)	0	5/2 ⁺				

[†] Additional information 1.[‡] From 1973Ja03. Others: 1996Gu11, 1971Ke22, 1971Go01.[#] For absolute intensity per 100 decays, multiply by 0.0012 2.

@ Placement of transition in the level scheme is uncertain.

^x γ ray not placed in level scheme.

^{235}Pu ϵ decay 1973Ja03

Decay Scheme

Intensities: I_γ per 100 parent decays

- Legend
- $\longrightarrow$ $I_\gamma < 2\% \times I_\gamma^{\max}$
 - $\longrightarrow$ $I_\gamma < 10\% \times I_\gamma^{\max}$
 - $\longrightarrow$ $I_\gamma > 10\% \times I_\gamma^{\max}$
 - $\cdots \longrightarrow$ γ Decay (Uncertain)

