

^{236}Am ε decay (3.6 min) 2005As01

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Shaofei Zhu	NDS 182, 2 (2022).	1-Apr-2022

Parent: ^{236}Am : $E=0.0$; $J^\pi=5^-$; $T_{1/2}=3.6$ min 2; $Q(\varepsilon)=3139$ SY; $\% \varepsilon + \% \beta^+$ decay ≈ 100.0

^{236}Am - J^π , $T_{1/2}$: From the Adopted Levels of ^{236}Am .

^{236}Am - $Q(\varepsilon)$: From 2021Wa16.

^{236}Am - $\% \varepsilon + \% \beta^+$ decay: $\% \alpha = 0.004$ 1 for α decay with $E_\alpha = 6150$ keV of g.s. or isomer of ^{236}Am (2004Sa05).

2005As01: ^{236}Am produced in $^{235}\text{U}(^6\text{Li}, 5n)$ reaction at $E=43\text{--}48$ MeV; mass-separated with a resolution of $M/\Delta M \approx 800$; implanted and transported to a measuring position with a short coaxial Ge detector (ORTEC LOAX) and a 35% n-type Ge detector (ORTEC GMX); Measured E_γ , I_γ , I_β , $\gamma\gamma$, γ -x ray coin, γ -x ray(t) coin, lifetimes. Also reported in 2004Sa05, 2002As08, 2002AsZX and 2000AsZY.

Other: 1998St02.

α : Additional information 1.

 ^{236}Pu Levels

E(level) [†]	J^π [‡]	$T_{1/2}$	Comments
0.0	0 ⁺		
44.63 10	2 ⁺		
147.45 10	4 ⁺		
305.80 11	6 ⁺		
866.00 15	5 ⁻		J^π : from the consistency of the expected decay branches to the g.s. $K^\pi=0^+$ band by Alaga rule and the measured values; proposed as the 5 ⁻ member of the $K^\pi=0^-$ octupole vibrational band in ^{236}Pu (2005As01).
1185.45 15	5 ⁻	1.2 μs 3	J^π : from M1 γ to 5 ⁻ and $\log ft=4.86$ from 5 ⁻ level; possible configuration $(\pi 5/2[523]\pi 5/2[642])$ with $K^\pi=5^-$. $T_{1/2}$: from 2005As01 by K x ray(γ)(t) coin analysis.

[†] Deduced by the evaluator from a least-squares fit to γ -ray energies.

[‡] From Adopted Levels, additional support provided in the comments.

 ε, β^+ radiations

E(decay)	E(level)	$I\beta^+$ [‡]	$I\varepsilon$ [‡]	$\log ft$	$I(\varepsilon + \beta^+)$ ^{†‡}	Comments
(1953 SY)	1185.45	0.28 2	94 6	4.86 4	94 6	av $E\beta=445.2$ 44; $\varepsilon K=0.7640$; $\varepsilon L=0.1722$ 1; $\varepsilon M+=0.06087$ 4 $I(\varepsilon + \beta^+)$: 97 +3-8 in 2005As01.
(2273 [#] SY)	866.00	<0.093	<11	>5.9	<11	av $E\beta=584.2$ 44; $\varepsilon K=0.7626$ 1; $\varepsilon L=0.1693$ 1; $\varepsilon M+=0.05970$ 4 $I(\varepsilon + \beta^+)$: 3 +8-3 in 2005As01.
(2833 [#] SY)	305.80	<0.2	<8	>6.3	<8	av $E\beta=826.6$ 44; $\varepsilon K=0.7510$ 4; $\varepsilon L=0.1637$ 2; $\varepsilon M+=0.05755$ 5 $I(\varepsilon + \beta^+)$: 0.1 +80-1 in 2005As01.
(2991 [#] SY)	147.45	<0.61	<16	>6.0	<17	av $E\beta=895.1$ 44; $\varepsilon K=0.7455$ 4; $\varepsilon L=0.1619$ 2; $\varepsilon M+=0.05687$ 5

[†] From 2005As01 based on γ -ray intensity imbalance at each level assumig no missing $I\varepsilon$, which is estimated to be 1% -1+8.

[‡] For absolute intensity per 100 decays, multiply by ≈ 1 .

[#] Existence of this branch is questionable.

^{236}Am ε decay (3.6 min) **2005As01** (continued) $\gamma(^{236}\text{Pu})$

I γ normalization: From **2005As01**. Authors do not explicitly state method for determining the absolute intensity.

$E_\gamma^\dagger$	$I_\gamma^{\ddagger\#}$	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Mult. ‡	α	Comments
(44.63 10)		44.63	2 ⁺	0.0	0 ⁺	E2	741 13	$\alpha(\text{L})=538$ 10; $\alpha(\text{M})=150.1$ 27; $\alpha(\text{N})=41.2$ 7; $\alpha(\text{O})=9.69$ 17; $\alpha(\text{P})=1.515$ 27; $\alpha(\text{Q})=0.00326$ 6 E_γ : from Adopted Gammas. Not measured in 2005As01 due to high internal conversion.
(102.82 2)		147.45	4 ⁺	44.63	2 ⁺	[E2]	13.87 19	$\alpha(\text{L})=10.06$ 14; $\alpha(\text{M})=2.82$ 4; $\alpha(\text{N})=0.775$ 11; $\alpha(\text{O})=0.1826$ 26; $\alpha(\text{P})=0.0291$ 4 $\alpha(\text{Q})=0.0001055$ 15 E_γ : from Adopted Gammas. Not measured in 2005As01 due to high internal conversion, and overlapping with the 103.7-keV Pu K $_{\alpha 1}$ x ray.
158.35 2	69 10	305.80	6 ⁺	147.45	4 ⁺	E2	2.139 30	$\alpha(\text{K})=0.1927$ 27; $\alpha(\text{L})=1.413$ 20; $\alpha(\text{M})=0.394$ 6; $\alpha(\text{N})=0.1084$ 15; $\alpha(\text{O})=0.0256$ 4 $\alpha(\text{P})=0.00414$ 6; $\alpha(\text{Q})=2.465 \times 10^{-5}$ 35 E_γ : from Adopted Gammas; other: 158.46 10 (2005As01).
319.50 11	100 15	1185.45	5 ⁻	866.00	5 ⁻	M1(+E2)	0.6 4	$\alpha(\text{K})_{\text{exp}}=0.87$ 21 $\alpha(\text{K})=0.4$ 4; $\alpha(\text{L})=0.12$ 4; $\alpha(\text{M})=0.030$ 9; $\alpha(\text{N})=0.0081$ 23; $\alpha(\text{O})=0.0020$ 6; $\alpha(\text{P})=3.6 \times 10^{-4}$ 13 $\alpha(\text{Q})=1.8 \times 10^{-5}$ 14 Mult., δ : from $\alpha(\text{K})_{\text{exp}}=0.87$ 21 with %E2<26 (2005As01).
560.3 2	66 13	866.00	5 ⁻	305.80	6 ⁺	[E1]	0.01156 16	$\alpha(\text{K})=0.00931$ 13; $\alpha(\text{L})=0.001699$ 24; $\alpha(\text{M})=0.000408$ 6; $\alpha(\text{N})=0.0001103$ 15 $\alpha(\text{O})=2.72 \times 10^{-5}$ 4; $\alpha(\text{P})=5.02 \times 10^{-6}$ 7; $\alpha(\text{Q})=2.94 \times 10^{-7}$ 4
718.6 2	154 24	866.00	5 ⁻	147.45	4 ⁺	[E1]	0.00727 10	$\alpha(\text{K})=0.00589$ 8; $\alpha(\text{L})=0.001045$ 15; $\alpha(\text{M})=0.0002502$ 35; $\alpha(\text{N})=6.77 \times 10^{-5}$ 9 $\alpha(\text{O})=1.671 \times 10^{-5}$ 23; $\alpha(\text{P})=3.11 \times 10^{-6}$ 4; $\alpha(\text{Q})=1.888 \times 10^{-7}$ 26
879.7 2	152 22	1185.45	5 ⁻	305.80	6 ⁺	[E1]	0.00506 7	$\alpha(\text{K})=0.00412$ 6; $\alpha(\text{L})=0.000717$ 10; $\alpha(\text{M})=0.0001712$ 24; $\alpha(\text{N})=4.63 \times 10^{-5}$ 6 $\alpha(\text{O})=1.145 \times 10^{-5}$ 16; $\alpha(\text{P})=2.144 \times 10^{-6}$ 30; $\alpha(\text{Q})=1.334 \times 10^{-7}$ 19
^x 1021.6 3	39 7							E_γ : observed but not placed in K x- γ (t) coin spectrum, possibly originated from a level fed by 1185.5 level and feeding a 44.63 or 147.45 level, but unlikely fed by a 119-keV E1 γ ray from 1185.5-keV level, and weakly fed by direct ε decay (2005As01).
1037.8 2	81 12	1185.45	5 ⁻	147.45	4 ⁺	[E1]	0.00380 5	$\alpha(\text{K})=0.00309$ 4; $\alpha(\text{L})=0.000532$ 7; $\alpha(\text{M})=0.0001268$ 18; $\alpha(\text{N})=3.43 \times 10^{-5}$ 5; $\alpha(\text{O})=8.50 \times 10^{-6}$ 12 $\alpha(\text{P})=1.596 \times 10^{-6}$ 22; $\alpha(\text{Q})=1.010 \times 10^{-7}$ 14

[†] From **2005As01**.

[‡] From Adopted Gammas, unless otherwise noted.

[#] For absolute intensity per 100 decays, multiply by ≈ 0.2 .

^x γ ray not placed in level scheme.

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Decay Scheme

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

Legend

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

