

²⁵²Cf α decay

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	M. J. Martin	NDS 122, 377 (2014)	1-Sep-2014

Parent: ²⁵²Cf: E=0.0; J ^{π} =0⁺; T_{1/2}=2.645 y 8; Q(α)=6216.87 4; % α decay=96.908 8
²⁵²Cf-Q(α):

²⁴⁸Cm Levels

E(level)	J ^{π}	T _{1/2}	Comments
0.0 [†]	0 ⁺		
43.40 [†] 3	2 ⁺	126 ps 10	T _{1/2} : from (α)(ce)(t) (1970To08).
143.6 [†] 4	4 ⁺		
298.1 [†] 5	6 ⁺		
505.0 [†] 5	8 ⁺		

[†] Band(A): K ^{π} =0⁺ g.s. band.

α radiations

(α)(H, θ): see 1975AIYO.

E α [†]	E(level)	I α ^{#@}	HF [‡]	Comments
5616	505.0	$\approx 6 \times 10^{-5}$	≈ 2800	E α , I α : from 1970Ba18.
5826.3	298.1	0.0020	1180	I α , HF: the measured I α value and that deduced from I γ are not consistent. I α =0.0020 (1970Ba18) whereas from I γ =0.0020 6 (1963Le17) and α , the requirement of an intensity balance At the 298 level gives I α =0.0075 23. Conversely, from I α , one deduces I γ =0.00054. Note that HF=1180 for I α =0.0020 and 320 100 for I α =0.0075 23. Note further that 1963Le17 quote HF=1170 350, so there is an inconsistency In 1963Le17. The evaluator adopts the I α value of 1970Ba18 and the I γ (155 γ) value deduced from I α .
5976.6	143.6	0.25 12	62 30	I α : from an intensity balance At the 144 level. Measured values of I α are 0.28 (1958As64) and 0.2 (1970Ba18).
6075.64 11	43.40	15.0 9	3.39 21	I α : from an intensity balance At the 43 level. Measured values of I α are 15.5 (1955As42) and 15.8 (1970Ba18).
6118.10 4	0.0	84.1 4	1.0	I α : from 1976BaZZ. Others: 84.0 (1970Ba18), 84.5 (1955As42).

[†] The energies of the 6118- and 6076-keV α 's are from 1986Ry04. The original energies have been decreased by 0.14 and 0.13 keV, respectively, as recommended by 1991Ry01. All other energies are the measurements of 1970Ba18; the original energies are increased here by 1.6 keV by recalibrating the energies at 6118.10 keV for the highest energy α (transition to the g.s. of ²⁴⁸Cm).

[‡] r₀(²⁴⁸Cm)=1.5012 6 is calculated from the requirement that HF(6118.1 α)=1.0.

[#] I α values can be obtained from directly measured α intensities or from intensity balance arguments using the measured I γ values and theoretical conversion coefficients. The evaluator has chosen, In each case, the approach where intensities with quoted uncertainties are available.

[@] For absolute intensity per 100 decays, multiply by 0.96908 8.

^{252}Cf α decay (continued) $\gamma(^{248}\text{Cm})$

L x ray=7.8 4 per 100 α decays (1971Wa28). See 1971Wa28 for measured energies and intensities of L X-ray components and for deduced L subshell-fluorescence yields. See also 1964Ha14 for L fluorescence yield, obtained from L x ray intensity in singles, $\gamma\gamma$ and $\alpha\gamma$ spectra.

L x ray and M x ray radiations were observed by 1990Po14.

K x ray=0.007 per 100 α decays (1955As42).

No photons with $E_\gamma > 400$ were observed: $I(E_\gamma > 400) < 0.002$, and no electrons with $E(\text{ce}) > 400$ were observed: $I(E(\text{ce}) > 400) < 0.00006$ per 100 α decays (1963Bj03).

No photons with $E_\gamma > 225$ were observed: $I_\gamma(E_\gamma > 225) < 0.002$ per α decays (1963Le17).

E_γ	$I_\gamma^\#$	$E_i(\text{level})$	$\frac{J_i^\pi}{J_i^\pi}$	E_f	$\frac{J_f^\pi}{J_f^\pi}$	Mult. [†]	α^\ddagger	Comments
43.399 25	0.0153 9	43.40	2 ⁺	0.0	0 ⁺	E2	1000 15	E_γ : from 1971Wa28. Others: 42 (1955As42), 43.4 (1956Ho54). I_γ : I_γ per 100 α decays (1971Wa28). Other: 0.014 (1955As42).
100.2 4	0.013 6	143.6	4 ⁺	43.40	2 ⁺	E2	18.4 3	E_γ : from 1964As10. I_γ : from 1955As42.
155.1 2	0.00054	298.1	6 ⁺	143.6	4 ⁺	E2	2.73 5	E_γ : from Adopted Gammas. $E_\gamma=160 15$ is reported by 1963Le17 in α decay. I_γ : see comment on $I_\alpha(5826\alpha)$.
(207.4 2)	$\approx 3 \times 10^{-5}$	505.0	8 ⁺	298.1	6 ⁺	E2	0.864 13	E_γ, I_γ : this transition is not seen in α decay. E_γ is from Adopted Gammas, and I_γ is from $I(\gamma+\text{ce})=I_\alpha$ with α As given.

[†] From Adopted Gammas.

[‡] From Adopted Gammas for the corresponding adopted energy.

[#] For absolute intensity per 100 decays, multiply by 0.97.

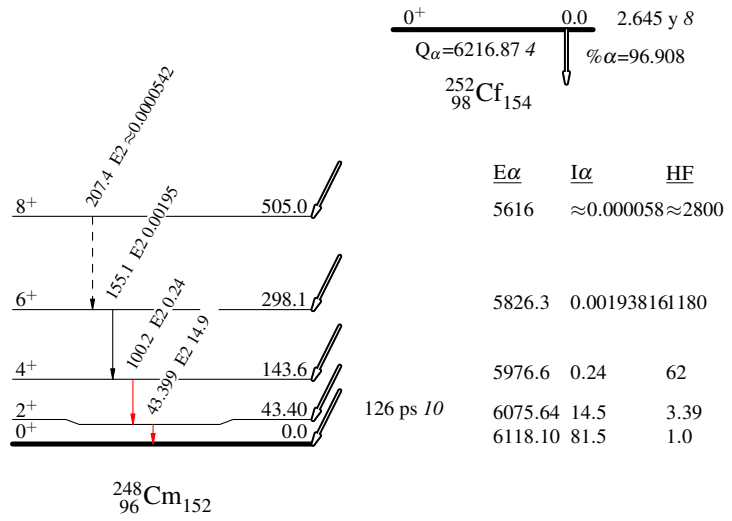
^{252}Cf α decay

Decay Scheme

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

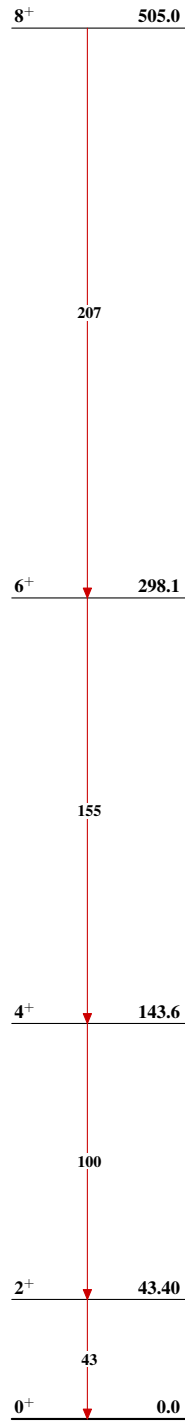
Legend

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



${}^{252}\text{Cf}$ α decay

Band(A): $K^\pi=0^+$ g.s.
band

 ${}^{248}_{96}\text{Cm}_{152}$