^{253}Cf α decay   1968Be21

		History	
Type	Author	Citation	Literature Cutoff Date
Full Evaluation	C. D. Nesaraja	NDS 195,718 (2024)	12-Oct-2023

Parent: ^{253}Cf: E=0.0; J^π=(7/2$^+$); $T_{1/2}$=17.81 d *8*; Q(α)=6126 *4*; %α decay=0.31 *4*

^{253}Cf-Q(α): From 2021Wa16.

^{253}Cf-J^π,$T_{1/2}$: From Adopted Levels of ^{253}Cf (2013Br09).

^{253}Cf-%α decay: From 1966Rg01.

1968Be21: ^{253}Cf was produced from thermal neutron induced reaction of ^{252}Cf at the High Flux Isotope Reactor (HFIR) at the Oak Ridge National Laboratory. It was then followed by chemical separation. Alpha-particle energy spectra were measured using a silicon-gold surface barrier detector. Collimators between the source and the detector were used to minimize alpha-particle and fission-fragment scattering from the detector edges. FWHM≈15 keV for the 6.119 MeV α particle decay ^{252}Cf. Measured Eα and Iα.

1966Rg01: Alpha decay was studied from decay of ^{253}Cf from samples of the Par and Barbel thermonuclear explosions. The samples were chemically treated and purified. α spectra were measured with gold-silicon surface-barrier detectors. Measured Eα.

J(^{253}Cf g.s.)=(7/2$^+$), therefore, the favored α branch (HF=1.25 *18*) is unlikely to go to the ^{249}Cm g.s with J=1/2$^{(+)}$. It most probably feeds the 50-keV (7/2$^+$) state.

^{249}Cm Levels

E(level)[†]	J^π	$T_{1/2}$	Comments
0.0	1/2$^+$	64.15 min *3*	$T_{1/2}$: from Adopted Levels.
50 *6*	(7/2$^+$)	23 μs	$T_{1/2}$: From delayed coin (1966As12). It is noted that evaluator is unable to verify this value as this private communication is not available.
111 *7*	(9/2$^+$)		

[†] From Eα and Qα(^{253}Cf).

α radiations

Eα[‡]	E(level)	Iα[#@]	HF[†]
5920 *5*	111	5.3 *19*	11 *6*
5980 *4*	50	94.7 *9*	1.3 *4*

[†] The nuclear radius parameter r$_0$(^{249}Cm)=1.509 *12* is deduced from interpolation of radius parameters of the adjacent even-even nuclides in 2020Si16.

[‡] Recommended value from 1991Ry01, based on adjusted values from 1968Be21, 1966Rg01.

[#] Recommended value from 1991Ry01, based on measurements of 1968Be21 and 1966Rg01.

[@] For absolute intensity per 100 decays, multiply by 0.0031 *4*.