^{254}Es ε decay (39.3 h)

History			
Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	NDS 156, 1 (2019)	31-Jan-2019

Parent: ^{254}Es: E=84.2 *25*; $J^\pi=2^+$; $T_{1/2}$=39.3 h *2*; Q(ε)=649 *12*; %ε decay=0.076 *7*

^{254}Es-E,J^π,$T_{1/2}$: From ^{254}Es Adopted Levels. Proposed configuration=π7/2[633]⊗ν3/2[622],$K^\pi=2^+$ (1975Go05).

^{254}Es-Q(ε): From 2017Wa10.

^{254}Es-%ε decay: %ε=0.076 *7* from ε/β^-=0.078 *6* (measured by 1963Ph01 for the decay of 39.3-h ^{254}Es).

The expected 4^+ member of the g.s. band in ^{254}Cf at about 160 keV can also be populated weakly by second-forbidden β transition. The systematics of known negative-parity levels in even-A Cf isotopes suggests that these levels are higher than the Q(ε) value of 649 keV. According to the theoretical calculations, energy of the 2^+ bandhead of γ-vibrational band is calculated as 553 keV by 2012Jo05, ≈1 MeV by 2002Pr01, and ≈700 keV by 1965Be40. From experimentally known values of the 2^+ member of the γ-vibrational band at 1032 keV in ^{250}Cf, 805 keV in ^{252}Cf, expected value for the 2^+ γ-vibrational band member in ^{254}Cf is ≈600 keV, which could be populated in the decay of ^{254m}Es, but no γ rays from such a state have been seen e.g. in the detailed α and β^- study of ^{254m}Es decay by 1973Ah04.

1955Ha35 had shown population of ^{254}Cf from the ε decay of ^{254}Es. The branching ratio for this decay mode was determined by 1963Ph01.

^{254}Cf Levels

E(level)	J^π	$T_{1/2}$	Comments
0	0^+	60.5 d *2*	$T_{1/2}$: from Adopted Levels. Assumed that the ground state of ^{254}Cf is populated indirectly by γ transitions from higher levels.
(50 *SY*)	[2^+]		E(level),J^π: level not seen experimentally. Energy and J^π here is from systematics of known 2^+ g.s. band members in A=244-252 Cf isotopes. Since the 84.2 level in ^{254}Es is likely $K^\pi=2^+$, π7/2[633]⊗ν 3/2[622] state, high log *ft* value of ≈10 is consistent with K-forbiddenness for the ε transition.

ε radiations

E(decay)	E(level)	Iε†	Log *ft*	Comments
(683‡ *12*)	(50)	0.076 *7*	9.9	εK=0.7000 *18*; εL=0.2180 *13*; εM+=0.0820 *6* Iε: assumed all the ε feeding to this level.

† Absolute intensity per 100 decays.

‡ Existence of this branch is questionable.