

Anatomy of neck configuration in fission decay *

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The anatomy of neck configuration in the fission decay of Uranium and Thorium isotopes is investigated in a microscopic study using Relativistic mean field theory [1, 2]. The study includes ^{236}U and ^{232}Th in the valley of stability and exotic neutron rich isotopes ^{250}U , ^{256}U , ^{260}U , ^{240}Th , ^{250}Th , ^{256}Th likely to play important role in the r-process nucleosynthesis in stellar evolution. Following the static fission path [3, 4, 5, 6], the neck configurations are generated and their composition in terms of the number of neutrons and protons are obtained showing the progressive rise in the neutron component with the increase of mass number. Strong correlation between the neutron multiplicity in the fission decay and the number of neutrons in the neck [7, 8] is seen. The maximum neutron-proton ratio is about 5 for ^{260}U and ^{256}Th suggestive of the break down of liquid-drop picture and inhibition of the fission decay [9] in still heavier isotopes. Neck as precursor of a new mode of fission decay like multi-fragmentation fission [9] may also be inferred from this study.

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