CLUSTERING MECHANISM IN FISSION AND CCT CHANNEL FORMATION

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In the microscopic description of complex nuclear fission process allowing the arbitrary shapes on the way to fission is very important. The ten-dimensional deformation space used in [1] is large enough to display the influence of the strong magic shells on the potential energy surface (PES). The non-restricted axial shape parameterization described in [2,3] gives us a unique possibility to look for exotic local minima on the potential energy landscape corresponding to the different clusters formation. General theoretic approach to the study of the both: binary partition and tri-partition by means of the fine multimodal PES landscape calculation does not require any specific change of the deformed nuclear microscopic potential parameters of the Saxon-Woods type.

The calculations show that the new ternary fission channel called Collinear Cluster Tripartition (CCT) [4,5] could be explained by formation of at least two magic deformed clusters inside the nuclear system. CCT local energy minima lay higher than binary ones and they could be understood as the most favorable deformation values on the static pass to fission within the tripartition PES channel. At high elongation values both fissioning systems ^{252}Cf and ^{236}U demonstrate possibility of several two-necked shape families corresponding to the different magic shells of future fission fragments. The new theoretical results for the clustering within the symmetrical fission valley could help to understand the variety of CCT fission channels obtained in the recent experiments [4,5].

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