Bimodal fission of Hs formed in the reaction $^{26}Mg+^{248}Cm$

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Today the properties of spontaneous and low energy fission of nuclei up to element with Z=104 are well studied

The phenomenon of bimodal fission has been observed for the case of spontaneous and low energy fission of nuclei in the Fm-Rf region. Bimodality means the co-existence of two different modes of fission both with symmetric mass but two different total kinetic energy (TKE) characteristics in the same nucleus. This behavior of TKE distributions strongly differs from the Gaussian shape distributions found in fission of all other actinides. It is important to note that bimodal fission appears for Fm isotopes (Z=100) and more heavy elements when two fission fragments are close to spherical proton (Z=50) and/or neutron (N=82) shells.

Mass and energy distributions of fission fragments for spontaneous and low energy fission of nuclei will be discussed. The dependence of fragment characteristics (symmetric and asymmetric mass, low and high kinetic energy, bimodal) on nucleon composition of the compound nucleus and on the structure of fission fragments will be investigated. A special attention will be paid on the properties of mass-energy distribution of fission fragments obtained in the reaction $^{26}Mg+^{248}Cm$ at excitation energy of 35 MeV. At this energy shell effects should become more effective in fission, the TKE distribution of symmetric fragments obtained in the reaction $^{26}Mg+^{248}Cm$ differs strongly from a Gaussian shape. Besides a low-energy component, a high-energy component not foreseen in the LDM arises. This is attributed to the fact that both fission fragments are close to the spherical neutron shell N = 82. It means that for the compound nucleus hassium formed in the reaction $^{26}Mg+^{248}Cm$ the phenomenon of bimodal fission was observed for the first time.