ROLE OF THE MASS ASYMMETRY, TRIAXIALITY AND PAIRING ON THE FISSION BARRIER HEIGHTS IN THE EVEN AND ODD SUPERHEAVY NUCLEI

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There is some of the key parameters, without it one can not describe properly the fission process, namely: elongation, mass asymmetry, non-axiality and pairing interaction. I will discuss the importance of those variables in our recent global fission barrier calculation. I'm going to dedicate a special attention to odd nuclei.

With help of the adiabatic approximation we have determined fission barriers for 1305 superheavy nuclei. To do this energy landscapes are calculated within multidimensional microscopic-macroscopic model based on the deformed Woods-Saxon single-particle potential. For each nucleus the potential energy is calculated for more than 50 million different shapes represented by a “traditional” spherical harmonics expansion. However, in some cases, girds consisting of more than 1.5 billion points are used. To omit the problem of searching for saddle by using minimization method which we know, must not be always fully correct, the saddle points were searched using “imaginary water flow” technique. For odd nuclei at each grid point we are looking for a low laying configuration blocking particles on levels from the 10-th below to 10-th above the Fermi level.

Part of the results is consistent with previous observations as strong effect of the non-axiality, while others like the influence of the mass asymmetry already on the first saddle are less known. Strong staggering effect and the impact of odd particles is especially intriguing.