

Microscopic Description of the Fission Process

Witold Nazarewicz

Department of Physics and Astronomy and FRIB/NSCL
Michigan State University, MI 48824, USA

We carry out a programmatic study of the fission process in nuclei, based on the nuclear density functional theory and its extensions. Our principal goal is to obtain a comprehensive understanding of the nuclear fission process by taking advantage of state-of-the-art theoretical techniques, going far beyond the existing mean-field methods, and advanced computational tools. In this presentation, I will outline a methodology — based on the multi-dimensional minimization of collective action for fission combined with stochastic Langevin dynamics — to calculate microscopically mass and charge distributions of spontaneous fission yields [1]. In the second part, I will study the emergence of fragments in fissioning heavy nuclei using the spatial nucleon localization measure [2].

- [1] J. Sadhukhan, W. Nazarewicz, and N. Schunck, *Phys. Rev. C* 93, 011304(R) (2016).
- [2] C.L. Zhang, B. Schuetrumpf, and W. Nazarewicz, arXiv:1607.00422 (2016).