# Microscopic models of induced fission dynamics

D. Vretenar[1]
[1] *Physics Department, University of Zagreb, Croatia*

The dynamics of low-energy induced fission is explored using a consistent microscopic framework that combines the time-dependent generator coordinate method (TDGCM) and time-dependent nuclear density functional theory (TDDFT). While the former presents a fully quantum mechanical approach that describes the entire fission process as an adiabatic evolution of collective degrees of freedom, the latter models the dissipative dynamics of the final stage of fission by propagating nucleons independently toward scission and beyond. The two methods, based on the same nuclear energy density functional and pairing interaction, are employed in a study of the charge distribution of yields and total kinetic energy for induced fission [1]. The TDDFT is also used to model the saddle-to-scission dynamics, the formation of the neck between the nascent fragments, and the subsequent mechanism of scission into two or more independent fragments [2,3]. In the final phase of the fission process, the timescale of neck formation coincides with the assembly of two alpha-like clusters. At the instant of scission, the neck ruptures between the alpha-like clusters, which separate because of the Coulomb repulsion and are eventually absorbed by the two emerging fragments.

[1] Z. X. Ren, J. Zhao, D. Vretenar, T. Nikšić, P. W. Zhao, and J. Meng, Phys. Rev. C 105, 044313 (2022).
[2] Z. X. Ren, D. Vretenar, T. Nikšić, P. W. Zhao, J. Zhao, and J. Meng, Phys. Rev. Lett. 128, 172501 (2022).
[3] B. Li, D. Vretenar, Z. X. Ren, T. Nikšić, J. Zhao, P. W. Zhao, and J. Meng, Phys. Rev. C 107, 014303 (2023).