

Microscopic description of induced fission dynamics

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The dynamics of induced fission is described 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 integrated and employed in a study of the charge distribution of yields and total kinetic energy for induced fission. The saddle-to-scission dynamics, the timescale for the formation of a neck between the nascent fragments, and the subsequent mechanism of scission into two or more independent fragments are explored.

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Primary author(s) : Prof. VRETENAR, Dario (Dario Vretenar Physics Department, University of Zagreb, Croatia)

Presenter(s) : Prof. VRETENAR, Dario (Dario Vretenar Physics Department, University of Zagreb, Croatia)

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