Nonequilibrium phenomena in superfluid systems: atomic nuclei, liquid helium, ultracold gases, and neutron stars

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Microscopic Models of Induced Fission Dynamics

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Based on recent developments of time-dependent nuclear density functional theory (TD-DFT) and the timedependent generator coordinate method (TD-GCM), significant advances in microscopic description of various aspects of induced fission dynamics have been reported. These include studies of the effect of fluctuations on fission observables, dynamics of neck formation and rupture, the energy dissipation mechanism and total kinetic energy distribution, fragment distributions and properties of fragments beyond scission. Finitetemperature effects have been considered in TD-DFT, while the TD-GCM has been generalized to include time-dependent generator states. With the coherent superposition of TD-DFT trajectories in the generalized TD-GCM, fission dynamics is described fully quantum mechanically in an approach that extends beyond the adiabatic approximation and includes quantum fluctuations.

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