北京师范大学 京师核科学论坛

报告题目： Microscopic Models of Induced Fission Dynamics

时　　间：2025 年 02 月 26 日（周三） 下午 3：00

报告地点：京师科技大厦 B 座 13 层 1314 室

主 讲 人：Dario Vretenar 教授

报告人简介：

Dario Vretenar is professor of theoretical physics at the University of Zagreb and Head of the Nuclear Theory group. He has held postdoctoral and visiting research positions at the University of Bologna, Yale University, Technical University Munich, University of Tokyo, Peking University, and IPN Orsay. Vretenar's research interests include nuclear energy density functionals, low-energy nuclear effective field theory, nuclear weak interactions and astrophysical applications, algebraic structure models, and fission dynamics. Among his principal contributions is the development of algebraic models for high-spin physics, applications of relativistic energy density functionals to exotic nuclear structure and weak interaction processes, prediction of novel modes of collective excitations in nuclei far from stability, description of quantum shape phase transitions in nuclei, and the development of microscopic models for fission dynamics.

报告简介：

Nuclear fission presents an example of large-amplitude collective motion in self-bound mesoscopic systems, that exhibits both classical and quantal features. This process is relevant for the stability of superheavy elements, production of short-lived exotic nuclides far from stability, nuclear astrophysics, and the mechanism of nucleosynthesis. Based on recent developments of time-dependent nuclear density functional theory (TD-DFT) and the time-dependent 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. Finite-temperature 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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