



Contribution ID: 97

Type: **Invited**

Time-Dependent Hartree-Fock Theory for Multinucleon Transfer Reactions

Tuesday, 14 May 2019 14:30 (30 minutes)

Heavy-ion multinucleon transfer reactions at around the Coulomb barrier offer unique opportunity to study a variety of non-equilibrium nuclear dynamics, such as energy dissipation, nucleon transfer, shape evolution, fusion, and so on. Besides the fundamental interest into the underlying reaction mechanism, it possesses substantial importance as a means for producing new, neutron-rich heavy nuclei, whose properties are crucial to figure out the detailed scenario of the r-process nucleosynthesis. Aiming at prediction of optimal reactions for producing yet-unknown neutron-rich unstable nuclei, I have extensively developed and applied methods based on the microscopic framework of the time-dependent Hartree-Fock (TDHF) theory. In this talk, I will review our recent works and progress, showing how the theory works in practice, making possible comparisons with available experimental data.

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Session Classification: Session IX (Parallel Session)