

# Microscopic description of heavy ion collisions around the barrier

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We use microscopic dynamical approaches as the Time-Dependent Hartree-Fock (TDHF) theory to study how reaction mechanisms around the barrier are affected by nuclear structure in the perspective of upcoming low energy radioactive beams as the SPIRAL2 facility. TDHF is well suited for these studies because it treats self-consistently both structure and dynamics within the same formalism.

First, we focus on fusion of light and medium heavy nuclei and show the importance of dynamical effects such as transfer on fusion barriers. Then, applications to heavy systems allow us to study the well known fusion hindrance within this dynamical microscopic framework. In particular, we assess the question "How long are the collision partners in contact before the system separates in two fragments", which is of great importance both for the quest of super-heavy elements and in the physics of super-strong electric fields.