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A full-microscopic approach for sub-Coulomb-barrier reactions.

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In this presentation, we will discuss a method for fully microscopic description of scattering states and many-body quantum tunneling by combining time-dependent Hartree-Fock (TDF), antisymmetrized molecular dynamics (AMD), and the generator coordinate method (GCM). In ordinary TDHF and AMD, the motion along the reaction path is classical, making it difficult to discuss quantum effects such as tunneling. To overcome this limitation, we propose a new framework combining time-dependent microscopic models with GCM. In the presentation, we will explain this framework and demonstrate numerical calculations showing that this approach can describe quantum phenomena such as sub-Coulomb-barrier tunneling.

[1] M. Kimura and Y. Taniguchi, PTEP 2024, 093D01 (2024).

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