Nuclear Theory

Microscopic Calculation of Heavy-Ion Potentials Based on TDHF

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We discuss the implementation and results of a recently developed microscopic method for calculating ion-ion interaction potentials and fusion cross-sections. The method uses the TDHF evolution to obtain the instantaneous many-body collective state using a density constraint. The ion-ion potential as well as the coordinate dependent mass are calculated from these states. The method fully accounts for the dynamical processes present in the TDHF time-evolution and provides a parameter-free way of calculating fusion cross-sections.

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