

Multinucleon Transfer Reaction with Time-Dependent Covariant Density Functional Theory

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The synthesis of superheavy nuclei is of fundamental importance not only for nuclear physics but also for chemistry and other areas. Multinucleon transfer reactions are regarded as a possible pathway to synthesize superheavy nuclei and have become the frontier of nuclear physics. In this work, the multinucleon transfer reaction was investigated using time-dependent covariant density functional theory (TDCDFT). First, the cross-sections of several multinucleon transfer reactions were calculated by TD-CDFT combined with the particle number projection method. The theoretical results can reproduce the data well and show advantages in the quasifission channels compared with the GRAZING model. Then the ternary quasifission in the collision of actinide nuclei was explored, and it was found that the octupole deformation plays an important role in the ternary quasifission. Finally, a possible way of synthesizing new neutron-rich heavy nuclei was predicted.