documentstyle[preprint,aps]revtex

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Analysis of the (N,xN') reactions by quantum molecular dynamics plus statistical decay model

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abstract We propose a model based on quantum molecular dynamics (QMD) incorporated with statistical decay model (SDM) to describe various nuclear reactions in an unified way. In this first part of the work, the basic ingredients of the model are defined and the model is applied systematically to the nucleon(N)-induced reactions. It has been found that our model can give a remarkable agreement in the energy-angle double differential cross sections of (N, xN') type reactions for incident energies from 100 MeV to 3 GeV with a fixed parameter set. An unified description of the major three reaction mechanisms of (N, xN') reactions, i.e. compound, pre-equilibrium and spallation processes, is given with our model.