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Transport model approach for clusters in heavy-ion collision dynamics

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Clusters are the dominant products in heavy-ion collisions (HICs) in a wide energy range from the Fermi energy domain to higher energies of several hundred MeV/nucleon. Correlations in such highly excited nuclear many-body systems are of particular interest, and strong correlations can affect the global dynamical evolution of HICs. Also studies of EOS of symmetric and asymmetric nuclear matter by HIC observables require a good understanding of cluster correlations. For example, a recent analysis of the SpiRIT data for Sn+Sn collisions at 270 MeV/nucleon indicates that the triton-to-proton ratio as a function of the rapidity carries information on symmetry energy at high densities. On the theoretical side, the description of HIC dynamics is a highly challenging problem, and one usually relies on transport models. Since transport models are based on one-body dynamics (plus two-nucleon collision term), they have to be extended in some way to include clusters, such as with a cluster recognition or coalescence prescription and with a more dynamical way by extending the collision term. I will give an overview on these subjects, including theoretical efforts to improve transport models and collaborations to understand implications of experimental data

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