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**New Development on Modelling Fluctuations and Fragmentation in Heavy-Ion Collisions**[1] HAO LIN, PAWEL DANIELEWICZ, National Superconducting Cyclotron Laboratory, Michigan State University — During heavy-ion collisions (HIC), colliding nuclei form an excited composite system. Instabilities present in the system may deform the shape of the system exotically, leading to a break-up into fragments. Many experimental efforts have been devoted to the nuclear multifragmentation phenomenon, while traditional HIC models, lacking in proper treatment of fluctuations, fall short in explaining it. In view of this, we are developing a new model to implement realistic fluctuations into transport simulation. The new model is motivated by the Brownian motion description of colliding particles. The effects of two-body collisions are recast in one-body diffusion processes. Vastly different dynamical paths are sampled by solving Langevin equations in momentum space. It is the stochastic sampling of dynamical paths that leads to a wide spread of exit channels. In addition, the nucleon degree of freedom is used to enhance the fluctuations. The model has been tested in reactions such as $^{112}$Sn + $^{112}$Sn and $^{58}$Ni + $^{58}$Ni, where reasonable results are yielded. An exploratory comparison on the $^{112}$Sn + $^{112}$Sn reaction at 50MeV/nucleon with two other models, the stochastic mean-field (SMF) and the antisymmetrized molecular dynamics (AMD) models, has also been conducted.

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