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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 — While nuclear multifragmentation has been observed and studied experimentally for decades, conventional transport models for heavy-ion collisions, due to a lack of proper treatment of fluctuations, cannot probe the various exit channels corresponding to different fragmentation configurations. In view of this, we have developed a new model to take into account realistic fluctuations. The new model, motivated by the Brownian description of colliding particles, recasts the effects of two-body collisions in terms of one-body diffusion processes. A wide range of dynamical paths are sampled by solving Langevin equations in momentum space. It is the stochastic sampling of dynamical paths that leads to a greater spread of exit channels. Good agreement in comparisons of final rapidity distribution and transverse flow in the Au + Au reactions with other transport models under controlled conditions is achieved, confirming the validity of the model. Its potential for describing nuclear multifragmentation is demonstrated in the study of $^{112,124}Sn$ + $^{112,124}Sn$ at 50 MeV/u, and results are compared with those from the stochastic mean-field (SMF) and the antisymmetrized molecular dynamics models (AMD) models.

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