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A Monte-Carlo Model Simulating an Evolving and Fluctuating Heavy Ion Collision Yield

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The relativistic heavy ion collisions undergo extremely hot and dense phases, which are postulated to resemble parts of the cosmological early stages. This suggests that the collisions could provide a QCD laboratory, in which phenomena of strong interactions are studied. The investigations of colour interactions in the collisions are made in a Monte-Carlo computational model which implements dynamical interactions. The dynamics are in present work modelled as a superposition of parameterized hydrodynamics and a media-modulated hard state. In the simulations, observations are differentiated in terms of density, position, and production modes; in combination with a higher order analysis. The heavy ion yield appears to have been reproduced to great detail in present model. The reproduction of both elliptic-, and triangular flow speaks of a fluctuating-, and density-characterized first order geometric mode, in addition to higher order features. In the simulations, it seems that the particle fragmentation is density characterized, thus providing a channel for pressure differentiated observations. Therefore it is concluded that the present computational model is reproducing the heavy ion yield to higher orders, thus supporting observables which differentiates strong phenomena within the simulated evolving matter.

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