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High-Energy Nuclear Collisions and the QCD Phase Structure

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One of the most exciting goals for the field of high-energy nuclear collisions is to understand the phase structure of matter with partonic degrees of freedom especially the transition from hadronic phase to partonic phase, the quark-gluon plasma (QGP). It is believed that the QGP phase dominates the evolution briefly during the early time of the Universe. In high-energy nuclear collisions at RHIC, the new form of matter, strongly interaction quark-gluon plasma (sQGP), has been formed [1]. The question now is what is the structure of the QCD phase diagram.

In this talk, we will report a systematic study of the freeze-out properties and collectivities as a function of collision energies. These studies were performed with the AMPT and URQMD models. The region where the hadronic interaction dominant in the QCD phase diagram will be identified within the model studies.

References:

[1] J. Adams, et al., STAR Collaboration, Nucl. Phys. A757, 102(2005)

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