Light nuclei production in relativistic heavy ion collisions from the AMPT model

Kai-Jia Sun and C.M. Ko

Based on an improved multiphase transport (AMPT) model [1,2], which gives a good description of proton production with a smooth quark matter to hadronic matter transition in relativistic heavy ion collisions, we have studied deuteron and triton production from the coalescence of nucleons at the kinetic freezeout of these collisions [3]. For Au+Au collisions at center-of-mass energies $\sqrt{s_{NN}}$ from 7.7 GeV to 200 GeV available at the Relativistic Heavy Ion Collider (RHIC), we have found that the ratio $N_t N_p / N_d^2$ of the yield N_p of protons, N_d N_d of deuterons, and N_t of tritons is essentially a constant as a function of collision energy as shown by the solid squares in Fig.1. Our result confirms the expectation in

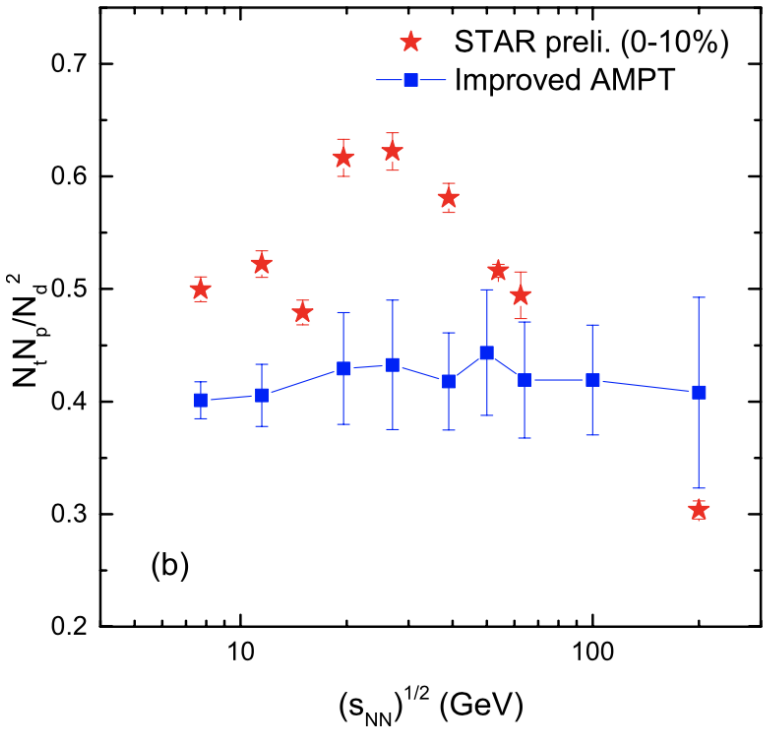

Fig. 1. The yield ratio $\boldsymbol{N_t N_p / N_d^2}$ as functions of the collision energy $\sqrt{\boldsymbol{s_{NN}}}$ in central Au+Au collisions. Results from the AMPT model are shown by solid squares, and experimental data from Ref. [6] are shown by solid stars.

Refs.[4,5] that without a first-order quark to hadronic matter phase transition in the produced matter or its approach to the critical point of the QCD matter, this yield ratio does not show any non-monotonic behavior in its collision energy dependence, which is, however, seen in the data from the STAR experiments [6] shown by the solid stars in Fig.1.

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