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## Particle production and Freezeout Parametrs including excluded volume corrections at NICA energies

The Hadron Resonance Gas (HRG) model is an excellent model for analyzing the hadron ratios that measured in the central Au-Au collisions over a wide range of nucleon-nucleon center-of-mass energies,  $\sqrt{s_{NN}} = 7.7-200$  GeV as introduced by the STAR Beam Energy Scan I (BES-I). The freezeout parameters (temperature and baryon chemical potential) are estimated from fits of simulation ratios generated by Ultra Relativistic Quantum Molecular Dynamic (UrQMD) model to HRG model calculations assuming a new novel of excluded volume correction at NICA energies (4-11 GeV). We compared the results with other studies and with the lattice QCD calculations. Different freezeout conditions are faced with the estimating data set. We find that the estimated freezeout parameters using single hard-core value and point-like particles of the thermal model are almost similar. This implies that the excluded volume correction leads to no effect on the estimated parameters. The effect of including new resonances is also analyzed. At vanishing chemical potential, a limiting temperature was deduced,  $T_{lim} = (157.5 \pm 4)$  MeV.

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