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Freeze-out conditions from lattice QCD

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Traditionally the freeze-out conditions in the heavy-ion collision experiments are obtained by comparing the experimentally measured hadron yields with that from the statistical hadron resonance gas model. In this talk we will present how the freeze-out chemical potentials and the freeze-out temperature can be obtained in a model independent way from ab-initio lattice QCD calculations by utilizing observables related to conserved charge fluctuations. We will show that the freeze-out strangeness and electric charge chemical potentials can be fixed by imposing strangeness neutrality and isospin asymmetry constraints in the lattice QCD calculations. Further, we will present how the freeze-out baryon chemical potential and the freeze-out temperature can be determined by comparing lattice QCD results for various ratios of conserved charge susceptibilities with the corresponding ratios of moments of conserve charge fluctuations that are currently being measured by the STAR experiment. A comparison of the freeze-out parameters obtained from the lattice QCD calculations with that from the hadron resonance gas model will also be presented.

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