Contribution ID: **327** Type: **Parallel**

Lattice QCD based equation of state at finite baryon density

Tuesday, May 24, 2011 4:20 PM (20 minutes)

The effects of non-zero baryon density are expected to become important
in hydrodynamic modeling of heavy collisions below the highest energy at RHIC. Recent calculations in effective models and in QCD using Dyson Schwinger equation suggest that the transition in QCD remains a crossover up to baryon chemical potentials of about 800MeV [1]. If so, the equation of state relevant for hydrodynamic models can be calculated on the lattice using Taylor expansion. However, there are large cutoff effects in present lattice calculations for non-zero chemical potentials.

We employ the lattice QCD data on Taylor expansion coefficients [2] to extend our previous parametrization of the equation of state [3] to finite baryon density. When we take into account lattice spacing and quark mass dependence of the hadron masses [3], the Taylor coefficients at low temperature are equal to those of hadron resonance gas. Therefore we require require that the equation of state is smoothly connected to the hadron resonance gas equation of state at low temperatures. Some preliminary results were reported in [4]. We also show how the hydrodynamical evolution is affected by this equation of state in the energy range relevant for SPS and the RHIC energy scan.

[1] T.K. Herbst et al, Phys. Lett. B696 (2011);
C.S. Fischer et al, arXiv:1104.1564

[2] M. Cheng et al, Phys. Rev. D79 (2009) 074505;
C Miao and C. Schmidt,PoS LATTICE2008 (2008) 172

[3] P.Huovinen and P.Petreczky, Nucl.Phys. A837 (2010) 26

[4] P.Huovinen and P.Petreczky, J. Phys. Conf. Ser. 230 (2010) 012012

Primary author: Dr HUOVINEN, Pasi (Johann Wolfgang Goethe-Universität)

Presenter: Dr HUOVINEN, Pasi (Johann Wolfgang Goethe-Universität)

Session Classification: QCD Phase diagram

Track Classification: QCD phase diagram