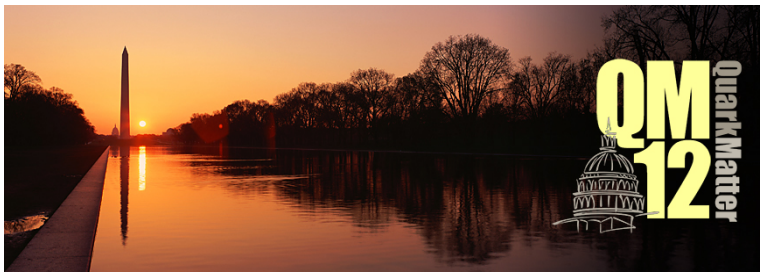

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Time evolution of the sQGP from new solutions of relativistic hydrodynamics

Thursday, August 16, 2012 4:00 PM (2 hours)

The time evolution of the strongly interacting quark gluon plasma (sQGP) created in relativistic heavy ion collisions can be described by hydrodynamical models. Hadrons are created at the freeze-out of this fluid, thus their distributions reveal information about the final state. To access the time evolution and the initial state, one needs either additional information about the Equation of State (EoS) of this matter, or one needs to analyze penetrating probes, such as direct photon observables. [1] In this talk we review recent hydrodynamic solutions, and show new exact, analytic solutions of hydrodynamics with arbitrary temperature dependent EoS. We investigate special cases of this class of solutions, in particular, we present exact hydrodynamical solutions with the Equation of State determined from lattice QCD calculations. [2] We calculate direct photon spectra, elliptic flow and HBT radii and compare them to recent direct photon measurements performed by the PHENIX experiment at RHIC [3]. The first family of rotating solutions of relativistic and non-relativistic hydrodynamics are also shown [4]. The effect of the total angular momentum of the system on the elliptic flow and HBT radii is also reviewed. It is an important result that elliptic flow may be generated by the rotation of the system.

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[3]
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"New simple explicit solutions of perfect fluid hydrodynamics and phase-space evolution"
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