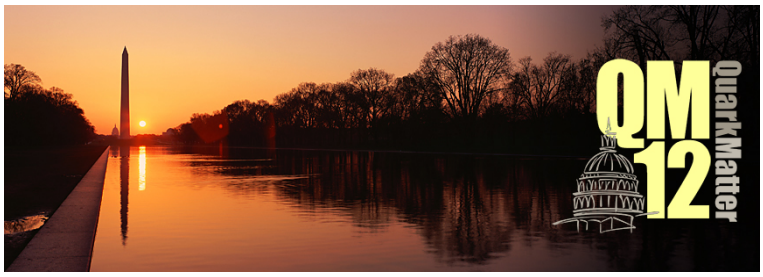

Contribution ID: **261** Type: **Oral Presentation**

The spectrum of quantum fluctuations and space-time evolution in the little bang

Wednesday, August 15, 2012 12:00 PM (20 minutes)

We outline significant recent progress in a program to include quantum corrections to the evolution of the classical color fields produced in high-energy ultra-relativistic heavy ion collisions. Previous work in this direction for a scalar \phi^4 theory [1] has now been extended to QCD. Leading contributions from unstable quantum modes can be resumed to all loop orders and expressed in terms of a gauge invariant spectrum of initial quantum fluctuations, which has been computed recently [2]. These fluctuations play a key role in decoherence of the high occupancy fields, and in their possible isotropization and flow, and in the matching of this initial dynamics to hydrodynamic flow, thereby potentially eliminating a big source of uncertainty in hydrodynamic simulations. We report on progress in the 3+1-D numerical computations implementing these pre-equilibrium dynamics.

[1] K.~Dusling, T.~Epelbaum, F.~Gelis and R.~Venugopalan,
%Role of quantum fluctuations in a system with strong fields: Onset of hydrodynamical flow,"
Nucl.\ Phys.\ A {\bf 850}, 69 (2011); T.~ Epelbaum and F. Gelis,
%Role of quantum fluctuations in a system with strong fields: Spectral properties and Thermalization,"
Nucl.\ Phys.\ A {\bf 872}, 210 (2011).

[2] K.~Dusling, F.~Gelis and R.~Venugopalan, %"The initial spectrum of fluctuations in the little bang,"
Nucl.\ Phys.\ A {\bf 872}, 161 (2011).

Primary author: GELIS, Francois

Co-authors: DUSLING, Kevin; VENUGOPALAN, Raju (Brookhaven National Laboratory)

Presenter: VENUGOPALAN, Raju (Brookhaven National Laboratory)

Session Classification: Parallel 4D: Pre-Equilibrium & Initial State (Chair T. Ludlam)

Track Classification: Pre-equilibrium and initial state dynamics