Stony Brook University
The Graduate School

Doctoral Defense Announcement

Abstract
Classical strongly coupled quark-gluon plasma

By
Sung Tae Cho

In the first part of this thesis, we focus on the equilibrium properties of the SU(N) classical quark-gluon plasma (cQGP). We define the partition function of the cQGP through three expansions: A low density expansion, a cumulant expansion, and a high temperature expansion or loop expansion. We derive the equation of state of the cQGP and compare it to the SU(2) and SU(3) lattice data.

In the second part of the thesis, we address the non-equilibrium issues of the SU(2) cQGP. We derive generalized relations for the multiple color structure factors and compare them to results from molecular dynamics simulation. We use the classical Liouville equations to derive non-pertubative expressions for transport coefficients, e.g., the viscosity and diffusion constant.

In the third part of the thesis, we address the issue of the energy loss of heavy jet quarks in the SU(2) cQGP. We compare our results to molecular dynamics simulation results at intermediate and strong Coulomb coupling.

Date: October 22 2009
Time: 1:00 pm
Place: Physics Building, C-133
Program: Physics and Astronomy
Dissertation Advisor: Ismail Zahed