Abstract Submitted
for the TSF14 Meeting of
The American Physical Society

Relativistic Viscous Hydrodynamics for Nuclear Collisions and Applications to Thermalizing Color Glass SIDHARTH SOMANATHAN, RAINER FRIES, Cyclotron Institute and Department of Physics and Astronomy,Texas A&M University — There have been early theoretical arguments that collisions of nuclei at large energies can be described by relativistic hydrodynamics. The experimental heavy ion programs at RHIC and LHC have finally provided strong evidence that quark gluon plasma in those collisions, behaves like a liquid and cools and expands hydrodynamically. In recent years precision hydrodynamic calculations have become key tools for successful calculations of hard probes, heavy quarks, electromagnetic probes etc., in heavy ion collisions. We adopted the flux based algorithm called SHASTA to solve the relativistic hydrodynamical equations. The hydrodynamical equations are precisely the energy momentum conservation $\partial_\mu T^{\mu\nu} = 0$, continuity equations for other conserved currents, and equations for the time evolution of shear and bulk stress. To test the code we will present results for setups with analytic solutions, e.g. the Riemann shock problem and the boost-invariant Bjorken expansion. We find that our code performs well. Then we apply it to the time evolution of nuclear collisions using initial conditions from thermalizing gluon fields (color glass) recently obtained by Chen et al. We discuss implications of the initial flow fields found in that work on experimental observables.

Sidharth Somanathan
Texas A&M University, College Station

Date submitted: 25 Sep 2014 Electronic form version 1.4