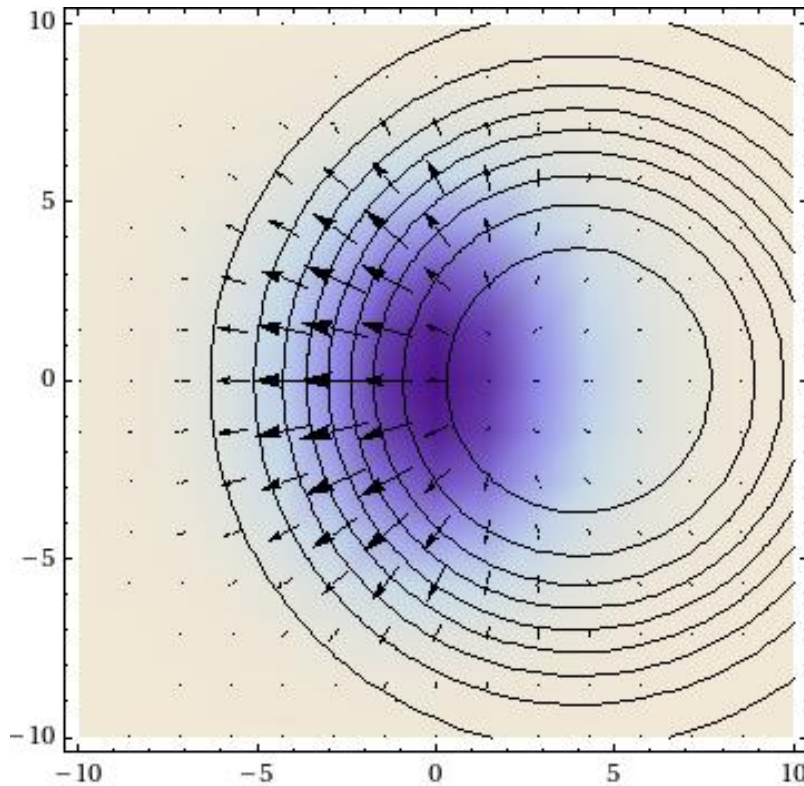


## Directed flow from color glass condensate

R.J. Fries and G. Chen

The initial state of nuclear collisions at very high energies is thought to be a phase of Quantum Chromodynamics (QCD) called the Color Glass Condensate. We use a generalization of the McLerran-Venugopalan (MV) model and an expansion of the classical gluon field around the time of collision ( $t=0$ ) to calculate the evolution of the energy momentum tensor in Color Glass Condensate.

In the past reporting period we have used this technique to investigate the early flow of energy which is encoded in the Poynting vector of the Yang-Mills energy momentum tensor. We have found, as shown in Fig. 1 that there is an unexpected (i.e. not driven by gradients of the energy density) flow component which is odd in rapidity. This phenomenon could translate to a significant directed flow ( $v_1$ ) in the final observables. Such directed flow has been observed in heavy ion collisions and exhibits the right sign and roughly the right shape compared to our results. Since the origin of this directed flow is more elusive in other approaches this could be an important signature for the existence of color glass condensate at RHIC and LHC energies.



**FIG. 1.** The energy flow field (black arrows) in the transverse plane of the collision, showing preference for energy flow to the right at rapidity  $\eta=1$ . Blue shade: energy density of the fireball; black contours: baryon density of one of the colliding nuclei going into the plane.