HAW09-2009-000093

Abstract for an Invited Paper
for the HAW09 Meeting of
the American Physical Society

Test of Ideal Hydrodynamical Limit at RHIC

HIROSHI MASUI, Lawrence Berkeley National Laboratory

Elliptic flow (v_2) is one of the most prominent observables to study collective properties of the hot and dense medium created in relativistic heavy ion collisions. It has been found that the ratio of v_2 to the initial spatial anisotropy ε scales as transverse number density $1/SdN/dy$ for different collision energies and systems from AGS ($\sqrt{s_{NN}} \sim 5$ GeV) to RHIC ($\sqrt{s_{NN}} = 200$ GeV). Eventually, the linear dependence of v_2/ε vs. $1/SdN/dy$ is expected to be saturated when the system reaches local thermal equilibrium. However, till now there is no sign of saturation of v_2/ε at top RHIC energy. It is natural to ask the question to what extent the system has reached the ideal hydrodynamical limit. It is also important to understand how the v_2/ε behaves at higher transverse number density. Compared to Au nucleus, uranium is a heavier and naturally deformed. The planned U + U collisions at RHIC (2012) could provide higher densities than that achieved in Au + Au collisions. In this talk, we present the results of a test on ideal hydrodynamical limit. The v_2 data from Au + Au collisions at $\sqrt{s_{NN}} = 200$ GeV are used. It has been found that even at most central Au + Au collisions the ideal hydrodynamical limit has not been reached. In addition, we present the prediction of v_2 in U + U collisions at $\sqrt{s_{NN}} = 200$ GeV by extrapolating the measured v_2 in Au + Au collisions at RHIC.