Contribution ID: **52** Type: **Parallel**

Inclusive charged hadron elliptic flow v_2 in Au+Au collisions at $\sqrt{s_{NN}}$ = 14.5 GeV

Wednesday, 17 February 2016 15:20 (20 minutes)

Quark Gluon Plasma (QGP) is a phase of nuclear matter at high temperature and high energy density formed in relativistic nucleus-nucleus collisions. Azimuthal anisotropy is an important tool for understanding the basic properties of QGP and to characterize the collision dynamics in high energy heavy-ion collisions [1]. These anisotropies are expected to arise due to initial pressure gradients and subsequent interactions of the constituents [2]. The second order azimuthal anisotropy namely elliptic flow is defined as the 2^{nd} harmonic coefficients of the Fourier decomposition of the azimuthal distribution of produced particles with respect to the reaction plane angle (ψ_n), and the azimuthal anisotropy can be expressed as $v_2 = \langle cos(2(\phi - \psi_n))\rangle$, where ϕ is the azimuthal angle of produced particles. Recently, a Beam Energy Scan (BES) program at RHIC has been completed. Its aim is to study the QCD phase diagram [3] by extending the range of chemical potential. The BES program extends the range of baryonic chemical potential (μ_B) from 20 to about 400 MeV at RHIC [4]. The baryon chemical potential increases with the decrease in the beam energy while the chemical freeze-out temperature increases with increase in beam energy [4]. This allows one to study azimuthal anisotropy at midrapidity with varying net-baryon densities. Here we will present a systematic study of the inclusive charged hadron elliptic flow (v_2) as function of transverse momentum (p_T) at midrapidity ($\eta \leq 1.0$) in Au+Au collisions at s N N = 14.5 GeV. The v_2 results will be compared to similar measurements at $\sqrt{(}s_{NN}$ = 7.7, 11.5, 19.6, 27, 39 and 62.4 GeV. We will discuss inclusive charged hadron v_2 from different methods, including η-sub event plane method with a η-gap of 0.15 and 2(4)-particle cumulants method to reduce non-flow correlations. We will also discuss the centrality dependence of v_2, and comparison to calculations from a transport model (AMPT) [5].

References

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Primary authors: BAIRATHI, Vipul (National Institute of Science Education and Research); FOR THE STAR COLLABORATION

Presenter: BAIRATHI, Vipul (National Institute of Science Education and Research)

Session Classification: Session 8