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Measurement of azimuthal anisotropy of hadrons in Au+Au collisions from the beam energy scan program by the PHENIX experiment at RHIC

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Large azimuthal anisotropy of particle emission in non-central heavy ion collisions has been clearly observed in heavy ion collision at RHIC since 2001. The elliptic flow as given by the second term of the Fourier series for the azimuthal distribution of particles with respect to the event plane is believed to carry information on the initial geometrical anisotropy. One of the early observations was that in Au+Au collisions at 200 GeV, the elliptic flow of hadrons scales with number of constituent quarks, which may be an indication for flow of constituent quarks in a QGP phase. An event plane detector, RxP, was installed in the PHENIX experiment for 2007 data taking period, in order to improve the resolution of the event plane determination. The RxP detector also has allowed PHENIX make accurate measurements of elliptic flow at lower collision energies, where the transition of a QGP might be detected. The primary goal of beam energy scan program at RHIC energy is to search for the boundary between two phases of QCD matter: a gas of hadrons, and the Quark Gluon plasma. The latest elliptic flow measurement for identified hadrons in Au+Au collisions from the beam energy scan program at PHENIX will be presented and discussed.

Summary

Elliptic flow v_2 of π^+ , π^- , K^+ , K^- , p , \bar{p} , d were measured at Au+Au $\sqrt{s_{NN}}=200, 62$ and 39 GeV at PHENIX. Proton v_2 and anti-proton v_2 are deviated. The difference increases to low energy collision and is flat to momentum. It leaving from number of constituent quarks scaling at low energy collision. π^- v_2 has slightly larger than π^+ . K^- v_2 has no difference for \pm charge.

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