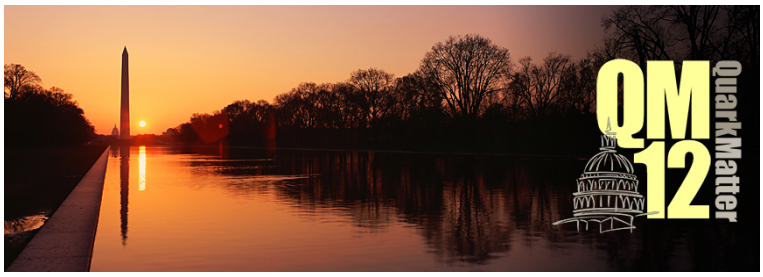

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Beam Energy Dependence of First and Higher-Order Flow Harmonics from the STAR Experiment at RHIC

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A primary goal of the RHIC Beam Energy Scan (BES) is to search for evidence of a transition between a hadron gas and a Quark Gluon Plasma. The dependence of v_1 and higher flow harmonics on system size and beam energy may be sensitive to the degrees of freedom in the system, as a consequence of early pressure gradients and a potential softening in the equation of state. In this talk, we present STAR measurements of v_1 for $\pi^{\pm}$, $K^{\pm}$, protons and antiprotons along with v_n for charged particles from 7.7 GeV to 200 GeV. A striking observation is that the v_1 slope $F = dv_1/dy$ for net protons, which is an estimate of the directed flow contribution from baryon number transported to the midrapidity region, changes sign twice within the BES energy range. In contrast, F for all other particle types is negative at all studied energies. For charged particles, we observe a local minimum in integrated ($0.2 < p_T < 2.0$ GeV/c and $|\eta| < 1.0$) directed flow between 11.5 and 27 GeV for central 0-20\% collisions. At a similar centrality, we observe a shallow minimum in the energy dependence of v_3 for charged hadrons. We also show the ratio of the two-particle cumulant $v_n\{2\}$ to participant eccentricity($\varepsilon_{n,\mathrm{part}}$) to quantify how well the system converts initial geometry fluctuations into momentum-space correlations for different collision energies, system sizes and harmonics.

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