

The RHIC Beam Energy Scan

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For almost 30 years, hadron production in heavy ion collisions has been an important observable for probing the state of nuclear matter. Mapping out the phase diagram of strongly interacting matter is a challenging open task in quantum chromodynamics (QCD). The goal of the RHIC *Beam Energy Scan* program (BES) is to study the phase diagram of strongly interacting matter to search for the critical point (CP) and the onset of deconfinement. Currently the most promising predictions for identifying these phenomena are non-monotonic deviations in the energy dependence of elliptic flow, hadron yield production, and the critical point fluctuations of conserved quantum number like baryon number and strangeness. Furthermore a scan would provide more information about where the constituent quark scaling of elliptic flow will break and can be used as a signature for the onset of deconfinement. We will present recent results on particle yield and spectra, directed (v_1) and elliptic flow (v_2), and event-by-event fluctuations at $\sqrt{s_{NN}} = 7.7, 11.5$, and 39 GeV. The measurements will be compared to measurements at SPS, higher RHIC, and LHC energies, as well as string hadronic and hydrodynamic model calculations.

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