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Collision energy dependence of the flow and spectra results in Au+Au collisions at $\sqrt{s_{NN}}$ = 7.7-200 GeV from PHENIX

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A central goal in experimental nuclear physics is to map out the QCD phase diagram, and to measure precisely the properties of the different phases. In order to achieve this goal, RHIC has embarked on an energy scan program involving gold nuclei at various energies. The data collected by the PHENIX experiment for this program consists of data sets obtained at $\sqrt{s_{NN}}$ = 200, 62, 39 and 7.7 GeV.

The analysis of these data, have yielded a wealth of new soft physics results which are used in concert to probe reaction dynamics and to constrain the transport coefficients of hot QCD matter. One particularly effective probe that is emphasized in this talk is the anisotropy of particle production, characterized by flow coefficients v_2 and v_4. For Au+Au collisions at $\sqrt{s_{NN}}$ = 200 GeV, measurements indicate a hydrodynamic flow of hot QCD matter at the partonic level with a small but finite value of the viscosity to entropy density ratio. However, at sufficiently low collision energy (thus lower energy density and temperature), we expect this picture to break down. Therefore measurement of the collision energy dependence of v_2 and v_4 could provide new insights to the current understanding of the nature of interactions in hot QCD matter.

We present new energy scan measurements of flow coefficients for both unidentified and identified particles, as well as several other soft physics observables such as identified hadron spectra and HBT correlations. The implications of these results will also be discussed.

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