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## The RHIC Beam Energy Scan Program: Results from the PHENIX Experiment

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Many recent lattice QCD calculations predict that there may be a first order phase transition from hadronic matter to a Quark-Gluon Plasma that ends in a critical point, with a continuous phase transition on the other side of the critical point. The Relativistic Heavy Ion Collider (RHIC) has conducted a program to probe different regions of the QCD phase diagram in the vicinity of the possible critical point with a beam energy scan. During 2010 and 2011, RHIC provided Au+Au collisions to PHENIX at  $\sqrt{(s_{NN})} = 200$  GeV, 62.4 GeV, 39 GeV, 27 GeV, 19.6 GeV, and 7.7 GeV. Analysis of the data concentrates on two strategies: looking for signs of the onset of deconfinement by comparing to results at the top RHIC energy, and searching for direct signatures of a critical point.

Results presented will include the following: charged particle multiplicity at mid-rapidity, transverse energy production at mid-rapidity, energy loss via the  $R_{AA}$  and  $R_{CP}$  observables from a variety of identified particles including neutral pions and the  $J/\psi$ , collective flow measurements ( $v_2, v_3, v_4$ ) from various particles including neutral pions, charged hadrons, and identified particles in order to examine the validity of the number of constituent quark scaling at lower energies, higher moments of the net charge distribution, and fluctuations of the charged particle multiplicity.

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