Charged Particle Distributions in Au+Au Collisions at $\sqrt{s_{NN}} = 3.0$ GeV at STAR

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Abstract

The RHIC Beam Energy Scan phase I (BES-I) program provided a detailed study of nuclear matter over a wide range of energies. Below $\sqrt{s_{NN}} < 19.6$ GeV, interesting results were shown in hadron azimuthal anisotropies, particle ratios, and net-proton higher moments which motivate the Beam Energy Scan phase II (BES-II). Compared to BES-I, BES-II has had improvements including increased statistics by a factor of 10 to 20 for each energy, improved acceptance from upgrades to the STAR experiment, and an extension of the energy reach from $\sqrt{s_{NN}} = 7.7$ GeV to $\sqrt{s_{NN}} = 3.0$ GeV with the STAR fixed-target program. This talk will present results from the lowest fixed target energy to be studied in BES-II including transverse mass spectra, rapidity density distributions, particle ratios, and centrality dependence for charged hadrons. These results are analyzed with a chemical equilibrium model to determine the chemical temperature and potential at freeze-out. At low energy, produced particles are sensitive to a Coulomb potential from a net positive source at low momentum which modifies the transverse mass spectra. The π^+/π^- ratio and extracted Coulomb potential will also be presented. These new data are compared to previously published results from experiments at the AGS.