Nuclear modification factor of inclusive charged particles in Au+Au collisions at $\sqrt{s_{NN}} = 27$ GeV with the STAR experiment

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Abstract

The Beam Energy Scan (BES) program at RHIC aims to explore the QCD phase diagram, including the search for the evidence of QGP formation and the QCD critical point. One of the features observed in the study of the QGP is the effect of suppression of particle production with high transverse momentum p_T (> 2 GeV/c) at $\sqrt{s_{NN}} = 62.4$-200 GeV, as evident from the charged-particle nuclear modification factor (R_{CP}) measured using the STAR BES-I data. In 2018, STAR collected 500 million events from Au+Au collisions at $\sqrt{s_{NN}} = 27$ GeV, which is about a factor of 10 times of BES-I 27 GeV data size. In this talk, we present new measurements of charged particle production and the nuclear modification factor R_{CP}, from this new 27 GeV data and compare them with the BES-I results. The new measurements extend the previous BES-I results to higher transverse momentum range, which can better explore possible jet quenching effects, and may have implications on the formation and properties of QGP at lower energies.