

Towards π , K, p hadron production measurements in fixed target collisions with STAR

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Abstract

One of the main physics goals of the Beam Energy Scan (BES) at RHIC is to study the QCD phase diagram, especially around the phase transition between the quark-gluon plasma (QGP) and hadronic matter. BES Phase-I studied Au+Au collisions from center-of-mass energy ($\sqrt{s_{NN}}$) of 7.7 to 62.4 GeV. The BES Phase-II extended these measurements in several important ways, one of which was the addition of a fixed target program that pushed the energy reach down to a $\sqrt{s_{NN}}$ of 3.0 GeV (or baryon chemical potential, μ_B up to 720 MeV). Fixed target collisions at STAR allow for a more extensive scanning of the QCD phase diagram to an important region where the QCD critical point may lie, and to a region dominated by dense baryonic matter. The production of light-flavor hadrons are sensitive to the properties of the hot QCD medium formed, as well as its dynamic evolution. Therefore, the detailed measurements of their productions can provide strong constraints on the physics quantities in the theoretical models of QCD, and may eventually help to reveal the location of the QCD critical point. In this talk key detector validation checks towards such hadron production measurements are presented, including the comparisons of hadron yields across different particle identification systems in the same regions of phase space.