

Measurement of ϕ meson directed flow in $\sqrt{s_{\text{NN}}} = 3 - 4.5$ GeV Au+Au collisions from STAR

Guangyu Zheng (for the STAR Collaboration)
University of Chinese Academy of Sciences

November 15, 2024

Abstract

The ϕ meson is an excellent probe of the partonic phase due to its small hadronic cross-section, making it less influenced by late-stage hadronic interactions compared to other hadrons. In the energy range of the STAR Beam Energy Scan II (BES II), the directed flow (v_1) of net-baryons has been suggested as a sensitive probe of the equation of state of hot and dense matter. The ϕ meson, with its mass close to that of the proton but with strange ($s\bar{s}$) quark content, provides a unique test for understanding the differences between net-baryon and meson directed flow.

In this poster, we will present the measurements of ϕ meson directed flow in $\sqrt{s_{\text{NN}}} = 3 - 4.5$ GeV Au+Au collisions from the RHIC-STAR experiment utilizing the fixed target datasets. The rapidity dependence of directed flow and its slope for the ϕ meson will be presented as a function of beam energy and compared with predictions from the AMPT-HC and JAM models.