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

The  $\phi$  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  $\phi$  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  $\phi$  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  $\phi$  meson will be presented as a function of beam energy and compared with predictions from the AMPT-HC and JAM models.

### Category

Experiment

### Collaboration (if applicable)

STAR

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