

## **First measurement of transverse single spin asymmetry for very forward $\pi^0$ production in polarized p+p collisions at $\sqrt{s} = 510$ GeV**

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Non-zero transverse single spin asymmetry, AN, of forward  $\pi^0$  production in the pseudo rapidity range of  $3 < \eta < 4$  has been measured by various experiments so far and usually interpreted by hard process mechanism between polarized and unpolarized proton collisions. However, no clue can be found yet if there is a potential contribution from the soft process and recently larger AN was also observed when the  $\pi^0$  was detected by more diffractive-like event at STAR experiment. The measurement of AN for very forward  $\pi^0$  production in the range of  $6 < \eta$  by RHICf experiment will provide a new insight on the origin of the non-zero AN, particularly from the view points of diffractive and non-diffractive interactions. To measure the very forward  $\pi^0$  precisely, an electro-magnetic calorimeter was newly installed at STAR and data was taken in June, 2017. High position and energy resolution of the detector make the detailed AN study with wide kinematic range possible. In this presentation, we'll report our measurement of the very forward  $\pi^0$  and its current analysis status on the AN depending on transverse momentum in different longitudinal momentum fraction ranges.

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