

Spin and Forward Physics with the STAR detector: Measurements and Future Plans

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1 Abstract

The spin program at the STAR experiment at the Relativistic Heavy Ion Collider (RHIC) has explored many interesting topics and has helped our understanding of nuclear physics. In particular, non-vanishing transverse single-spin asymmetry measurements at RHIC and other experiments have shown that there is a rich substructure of the nucleon that needs further exploration in both theory and experiment. The STAR forward upgrade will utilize RHIC's unique capability of colliding polarized proton and heavy ion beams to make much more accurate measurements of Drell-Yan as well as jets, hadrons in jets, and dijets, among others. The new forward system will be in operation for the pp, pA and AA runs starting in Fall 2021 and utilize the latest developments in detector technologies so that they are ready for an electron ion collider (EIC). The forward upgrade will cover $2.5 < \eta < 4.0$, by installing two new forward tracking systems and a new calorimeter system. The tracking systems will consist of silicon disks and small thin gap chambers. The calorimeter system will consist of a preshower hodoscope, an electromagnetic calorimeter and a hadronic calorimeter. This talk will show some of the recent results from STAR's spin program as well as the design and capabilities of the forward upgrade and how it will complement measurements from a future EIC.