

STAR Forward Upgrade: Design, Measurements, and Future Plans

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May 21, 2025

1 Abstract

The STAR experiment at the Relativistic Heavy Ion Collider (RHIC) has upgraded its capabilities in the pseudorapidity region of $2.5 < \eta < 4.0$ to help explore cold QCD physics in the very high and low regions of Bjorken-x, and the longitudinal structure of the initial state in relativistic heavy ion collisions. This is possible by utilizing the unique ability of RHIC to collide polarized protons, as well as heavy ions. The upgrade has been successfully installed in 2022 for the RHIC Run 22 and has had a successful data taking in the years since. These data will allow STAR to make precise measurements of transverse single spin asymmetries of Drell-Yan, jets, hadrons in jets, dijets and many other measurements. The forward upgrade includes two separate tracking systems: a silicon tracker, and a small-strip thin gap chamber. Downstream from the trackers is a Pb scintillator sampling electromagnetic calorimeter and further down from that is a steel scintillator sampling hadronic calorimeter. The calorimeters will utilize an existing STAR detector, the event plane detector, as a preshower. This talk will describe the design of the STAR forward upgrade as well as the physics goals and some of the first measurements from RHIC run 22.