

## Cold-QCD Physics of the STAR Forward Upgrade

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For almost twenty years, the STAR experiment at RHIC has played a leading role in expanding the frontier of nucleus-nucleus collisions and the interaction of spin-polarized beams of protons. In coming years, the STAR forward upgrade will enable new insight into cold nuclear matter, probing this physics at high and low regions of  $x$ . The proposed detector upgrades consist of electromagnetic and hadronic calorimetry as well as a charged-particle tracking system, each spanning the pseudorapidity range of  $2.5 < \eta < 4.5$ . Building upon existing STAR measurements, the upgrade will enable improved and precision measurements of probes such as neutral pions, direct photons, and Drell-Yan. Simultaneously, the upgrade will unlock a suite of new observables, such as charged-particle tagged jets at forward pseudorapidity. These measurements will provide new insights into the multidimensional imaging of quarks and gluons within the nucleon, nuclear parton distributions, and hadronization in a nuclear environment. As such, the STAR forward upgrade will provide information crucial to realizing the full potential of the approaching era of the electron-ion collider.

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