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Physics Opportunities with Forward Detector Upgrades at STAR

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The STAR collaboration proposes to construct a Forward Calorimeter System and Forward Tracking System for future polarized p+p, polarized p+A, and A+A beam operations at RHIC. The main scientific goals are to study Quantum Chromo Dynamics (QCD) in the high and low Bjorken-x domain and to explore the properties of the strongly interacting Quark-Gluon Plasma (QGP). The proposed upgrades will allow measurements in polarized p+p collisions to improve our understanding of the spin and momentum-space parton distributions in the nucleon. Measurements in polarized p+A collisions will offer unique opportunities to study QCD dynamics in nuclei and to investigate the existence of non-linear evolution effects at high-gluon density. The proposed upgrade will also facilitate the determination of QGP properties in A+A collisions through improved measurements of the initial density fluctuations as well as the collective flow seeded by these fluctuations. In this talk, we will present the proposed forward detector upgrades and the exciting new physics opportunities that such upgrades will bring.

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