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Cold QCD physics program with sPHENIX and potential forward upgrades

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The sPHENIX detector at BNL's Relativistic Heavy Ion Collider (RHIC) will enable a spectrum of new or improved cold QCD measurements. With its excellent tracking and full calorimetry (hadronic and electromagnetic) in the central pseudo-rapidity region, sPHENIX provides excellent opportunities for the studies of the partonic structure and dynamics in nucleons and nuclei. This includes the studies of the polarized structure of the proton utilizing RHIC's polarized proton collisions. Measurements will also take advantage of RHIC's unique capability to collide polarized protons on nuclei, which provides novel opportunities to study nuclear effects with spin observables. A potential upgrade to sPHENIX with forward instrumentation could significantly enhance these physics capabilities, expanding the probed kinematic range to lower and higher parton momentum fraction x . The cold QCD nuclear physics program for the proposed sPHENIX midrapidity detector as well as the enhanced program enabled with forward upgrades will be presented. The ongoing R&D work for the forward instrumentation will be discussed.

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