

## Spin Physics with sPHENIX detector

*Wednesday, 12 September 2018 18:00 (20 minutes)*

sPHENIX is a major upgrade of the PHENIX experiment at Brookhaven National Laboratory's Relativistic Heavy Ion Collider (RHIC), designed for detailed studies of the Quark Gluon Plasma created in heavy ion collisions, with focus on jet, photon and heavy flavor measurement capabilities. With its excellent tracking and full calorimetry (hadronic and electromagnetic) in the central pseudo-rapidity region of  $|\eta| < 1.1$ , sPHENIX provides excellent opportunities for the studies of the polarized structure of the proton utilizing RHIC's polarized proton collisions. With enhanced RHIC luminosity anticipated in 2020+, and sPHENIX high rate capabilities, the expected precision will far exceed that achieved at RHIC by now, particularly for the measurements of gluon spin contribution to the spin of the proton, and quark transversity, related to the nucleon tensor charge, an important quantity to describe the nucleon spin structure. The proposed modest forward detector upgrade will open door to new exciting measurements in a new kinematic regime. Transverse Momentum Dependent (TMD) parton distributions measured in forward kinematics expand the parton imaging from one dimensional (longitudinal) to three dimensional momentum space, and along with the related Twist-3 parton correlation functions serve to study parton dynamics within the nucleon.

In this talk we will discuss these and other exciting opportunities for the measurements in polarized proton-proton and polarized proton-nucleus collisions with sPHENIX detector at RHIC. These high precision data along with future data from the anticipated Electron-Ion Collider will be vital to establish universality of parton distributions and their modification in nuclear environment.

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