

The 132nd HENPIC seminar by Dr. Zilong Chang 常子龙 (Brookhaven National Lab), Jan. 21, 2021, Thursday, 10:30 am (UTC+8)

Talk title: Spin Physics at the STAR experiment

Speaker: Dr. Zilong Chang, Brookhaven National Lab

Abstract:

The proton structure has been studied extensively over the past a few decades, especially from the polarized Deep Inelastic Scattering (DIS) Experiments. However due to its limit coverage in $-^2$ phase space and inability to directly access gluon inside the proton, at Relativistic Heavy Ion Collider (RHIC), the world-only polarized proton collider, it provides excellent opportunities to study the internal structure of proton. At both $\sqrt{s}=200$ and 510 GeV, the Solenoidal Tracker at RHIC (STAR) experiment has carried out a series of measurements from both longitudinally and transversely polarized pp collisions. The longitudinal double spin asymmetry, from inclusive jet and dijet production at $\sqrt{s}=200$ GeV provided the first evidence of the positive gluon polarization for $x > 0.05$. At $\sqrt{s}=510$ GeV, the same measurements have pushed the gluon polarization down to $x \sim 0.02$. The longitudinal single-spin asymmetry from \pm boson at $\sqrt{s}=510$ GeV shows that u -flavor sea quark polarization, $A_{1,LL}^{\pi^0}$, is larger than the d -flavor sea quark polarization, $A_{1,LL}^{\pi^+}$. The transverse single-spin dependence of the azimuthal asymmetry of charged pions in a jet indicated the first evidence of transversity in the pp collisions. The results enable to test the universality and factorization-breaking effects in pp collisions for Transverse-Momentum Dependent (TMD) distributions. In this talk, I will present the published and current measurements from STAR that explore both the helicity distribution functions and transverse structure of the proton.

Self-introduction:

Zilong Chang got his B.S. in Physics from University of Science and Technology of China in 2010, and his Ph.D in Physics from Texas A&M University in 2016. Since 2017, he has been working at Brookhaven National Laboratory as a post-doc researcher. His doctoral dissertation is on measurements of longitudinal double-spin asymmetry for inclusive jet production from $\sqrt{s} = 510$ GeV polarized pp collisions at STAR. Currently he is working with the same dataset to extract the inclusive jet cross-section to explore the gluon parton distribution function inside the proton.

Presenter: Dr CHANG, Zilong (Brookhaven National Laboratory)