Abstract:

In this talk, I plan to discuss the recent theoretical progress towards the exploration of the gluon saturation phenomenon in pA collisions and at the future EIC. As a next generation machine, the proposed cutting-edge EIC can lead us to answers to many fundamental questions about the physical role and 3D image of gluons in nucleons and nuclei with unprecedented precision, and also has the potential to discover a form of ultra-dense gluonic matter. Complementary measurements in pA collisions and at the EIC can help us measure small-x gluon distributions and study the onset of gluon saturation. In addition, DIS diffractive dijet and DVCS processes at small-x are sensitive to the dipole Wigner gluon distributions. Studies on these processes can provide us 3D tomographic images of low-x gluons inside high energy protons and nuclei.