Contribution ID: **72** Type: **Oral presentation**

Parton Energy Loss and Modified Beam Quark Distribution Functions in Drell-Yan Process in p+A Collisions

Thursday, 31 May 2012 14:40 (20 minutes)

Within the framework of generalized collinear factorization in perturbative QCD (pQCD), we study the effect of initial multiple parton scattering and induced parton energy loss in Drell-Yan (DY) process in proton-nucleus collisions. We express the contribution from multiple parton scattering and induced gluon radiation to the DY dilepton spectra in terms of nuclear modified effective beam quark distribution functions. The modification depends on the quark transport parameter in nuclear medium. This is similar to the final-state multiple parton scattering in deeply inelastic scattering (DIS) off large nuclei and leads to the suppression of the Drell-Yan cross section in $p + A$ relative to $p + p$ collisions. With the value of quark transport parameter determined from the nuclear modification of single-inclusive DIS hadron spectra as measured by the HERMES experiment, we calculate DY spectra in $p + A$ collisions and find the nuclear suppression due to beam parton energy loss negligible at the Fermilab energy $E_{\rm lab}$=800 GeV in the kinematic region as covered by the E866 experiment. Most of the observed nuclear suppression of DY spectra in E866 experiment can be described well by parton shadowing in target nuclei as given by the EPS08 parameterization. The effect of beam parton energy loss, however, becomes significant for DY lepton pairs with large beam parton momentum fraction x' or small target parton momentum fraction x. We also predict the DY cross section in $p + A$ collisions at lower beam proton energy $E_{\rm lab}$=120 GeV and show significant suppression due to initial state parton energy loss at moderately large x' where the effect of parton shadowing is very small.

Primary author: XING, Hongxi (Institute of Particle Physics, Central China Normal University)

Co-authors: Prof. WANG, Enke (IOPP); Prof. WANG, Xin-Nian (IOPP/LBNL); Dr GUO, Yun (Guangxi Normal University)

Presenter: WANG, Xin-Nian (Central China Normal University and Lawrence Berkeley National Laboratory)

Session Classification: Parallel IVC: Initial state and pA