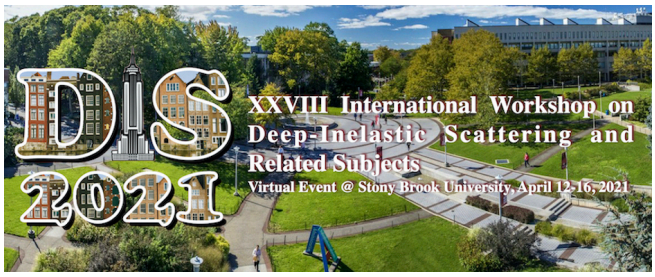

Contribution ID: **373** Type: **Contributed Talk**

Probing quantum entanglement and collectivity effects in e+p collisions at HERA

Thursday, 15 April 2021 13:08 (18 minutes)

Charged particle multiplicity spectra and hadron entropies are measured using the H1 detector at HERA, where positrons of energy 27.6 GeV collided with protons of energy 920 GeV. For the analysis, data on deep-inelastic scattering in the momentum transfer range 5<□2<100 GeV2 and inelasticity range 0.0375<□<0.6 are used. The observed multiplicity spectra of charged hadrons are compared to Monte Carlo models based on leading-order matrix element, parton showers and string fragmentation. The hadron entropy determined from the multiplicity spectra is compared to the gluon entropy predicted from a quantum-entanglement model.

Observations of two- and multi-particle correlations in high multiplicity p-A, p-p and ultra-peripheral Pb+Pb collisions at RHIC and LHC reveal the collective nature of particle production in small collision systems. These results motivate a study in even smaller systems such as e+p collisions in order to understand the origin of the observed collectivity. Here, multi-particle correlations are studied in ep collisions using the DIS data described above, as well as, for the first time, photoproduction events. The photoproduction sample corresponds to collisions of quasi-real photons with protons at a center-of-mass energy of about 270 GeV. Collectivity effects are studied as a function of track multiplicity. The data are compared to predictions from Monte Carlo generators.

Primary authors: SCHMITT, Stefan (DESY); H1, Collaboration (DESY); SUN, Chuan

Presenter: SUN, Chuan

Session Classification: QCD with Heavy Flavors and Hadronic Final States

Track Classification: QCD with Heavy Flavors and Hadronic Final States