International Nuclear Physics Conference INPC2013: 2-7 June 2013, Firenze, Italy

Studies of the transverse structure of the nucleon at Jefferson Laboratory

Marco Mirazita

INFN, Laboratori Nazionali di Frascati, I-00044, Frascati, Italy

Contact email: *Marco.Mirazita@lnf.infn.it*

Since the earliest measurements in the '70, hadronic physics deals with a number of surprising phenomena that cannot be explained in the framework of perturbative QCD. Examples are the small fraction of the proton spin carried by the valence quark spins, the persistence at high energies of single spin asymmetries and azimuthal asymmetries in unpolarized processes. It is now believed that the answer to these questions may come from the transverse motion of partons inside the nucleon, which is encoded in the Transverse Momentum Dependent (TMD) Parton Distribution Functions. Among the large variety of processes that can be described in terms of TMDs, a major role is played by Semi-Inclusive Deep Inelastic Scattering (SIDIS) reactions, in which, together with the scattered electron, one or more hadrons are detected in the final state. Single and Double Spin Asymmetries are the experimental observables sensitive to TMDs. The identification of the final hadrons allows the tagging of the quark involved in the reaction at the parton level, and then the flavor separation of the relevant TMDs. SIDIS reactions are studied at Jefferson Laboratories since many years and are one of the main items in the physics program after the upgrade of the CEBAF accelerator. The large amount of new data that will be available in few years calls for the implementation of new tools, such as multidimensional analyses and refined techniques of TMDs extraction from the experimental asymmetries.
In this talk, the more recent results obtained at 6 GeV will be shown and the future measurements will be discussed.