PHYSICS SEMINAR

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"Study of the nucleon structure with Super BigBite Spectrometer"

Abstract

Super Bigbite Spectrometer (SBS) is a new nuclear physics apparatus dedicated to the study of the nucleon structure, which is currently being installed in Hall A. It is composed of a large acceptance dipole magnet with a configurable detector package. It can also be combined with a variety of other instruments and apparatuses, such as the BigBite spectrometer. The large acceptance combined with the high luminosity of Hall A makes SBS a suitable instrument to measure processes with very small cross-sections. All these features make SBS a very versatile tool to study the nucleon structure.
The core of the SBS physics program is the measurement of the nucleon form factors at $Q^2 \geq 10$ GeV^2. The SBS physics program also includes other physics topics such as transverse momentum distributions with SIDIS (semi-inclusive deep inelastic scattering) on ^{3}He, and the hadron structure functions with TDIS (tagged deep inelastic scattering). Most importantly, the versatility of the SBS apparatus means that it is possible to extend the physics program to the measurement of Generalized Parton Distributions (GPD), including on the neutron.

In this presentation I will give a review of the SBS physics program, with an emphasis on both the form factors and the GPDs. I will present some key features of the experiments I have proposed to the Jefferson Lab program advisory committee to extend the SBS program: the neutron-Two Photon Exchange (nTPE) experiment; and the possible measurement of Deeply Virtual Compton Scattering off the neutron (nDVCS) with spectator proton tagging. I will also highlight my contributions to the SBS software and to the preparation of the BigBite spectrometer for the upcoming GMn experiment.

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