

DIS2023: XXX International Workshop on Deep-Inelastic Scattering and Related Subjects



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Probing the Partonic Structure of ^4He with Deep Exclusive Processes

Thursday, 30 March 2023 11:30 (20 minutes)

When beginning to describe the structure of ^4He , one often begins by invoking a description based on nucleon degrees of freedom – a bound system with two protons and two neutrons – leaving the partonic description at the level of each nucleon aside. However, the ultimate goal to understand ^4He within Quantum Chromodynamics (QCD) is to connect its intrinsic properties with the fundamental degrees of freedom of QCD, quarks and gluons. ^4He is a deeply bound spin-0 system and has only one chiral-even generalized parton distribution. Starting with a partonic description of the ^4He nucleus, we can use deeply virtual Compton scattering (DVCS) to probe the quark transverse spatial distribution and also leverage deeply virtual meson production as an effective probe of the transverse gluon spatial distribution. Using the CLAS12 spectrometer at Jefferson Lab's Hall-B and a low energy recoil tracker (ALERT) to detect the recoiling ^4He system, we will measure the coherent DVCS beam spin asymmetry and the coherent ϕ production cross section. We will discuss this opportunity for this experiment to study the quark and gluon structure of light nuclei and as a preview of physics anticipated at the Electron-Ion Collider.

Submitted on behalf of a Collaboration?

Yes

Participate in poster competition?

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