

# Studying Gluon GPDs at the Electron Ion Collider via Deeply Virtual Meson Production

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The Electron Ion Collider (EIC) is a next-generation hadron physics facility, planned to be built in the coming decade at Brookhaven National Laboratory (BNL), with the intention of further exploring the quark and gluon substructure of hadrons and nuclei. The EIC will address fundamental questions in QCD, probing the interplay of quarks and gluons to learn how they contribute to overall nucleon properties, and how they are affected by the nuclear environment. With heavy ion beams to enable in-depth studies of nuclear matter, alongside the precision of the electromagnetic interaction and the determinative properties of polarised nucleon beams, the EIC is expected to provide scientific opportunities for decades to come.

Hard exclusive meson electroproduction processes, also known as deeply virtual meson production (DVMP), are complementary to the deeply virtual compton scattering (DVCS) reaction. In DVMP, the scattering reaction produces a meson instead of a photon, and through the study of heavy vector meson reactions, such as  $J/\psi$ , it is possible to probe gluon GPDs and ultimately provide information about saturation when studying the evolution of gluon spatial distribution.

The work presented will focus on studies of  $J/\psi \rightarrow e^+e^-$  events from ep collisions, and the evaluation of projected detector performance for DVMP measurements in an EIC detector concept. Prospects for extending these studies to other vector meson channels, from  $\phi$  to  $\Upsilon$ , will also be discussed.

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