

The ePIC detector and the physics program of the future Electron-Ion Collider

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The future Electron-Ion Collider (EIC) will open a new precision frontier for QCD studies in collisions of polarized electrons with polarized protons and with a broad variety of nuclei. Its scientific program addresses key questions about the spin, flavor, and charge spatial structures in the nucleon, about the origin of nucleon mass, and on the role of gluons in nucleons and nuclei.

The ePIC detector is being developed for the main general-purpose experiment at the EIC. It is designed to provide a near-hermetic coverage equipped with high-resolution tracking and calorimetry, comprehensive particle identification, and dedicated far-forward and far-backward instrumentation. These capabilities are essential to meet the broad and demanding requirements of the EIC physics program.

This talk will present an overview of the ePIC detector concept and of its physics opportunities, with particular emphasis on measurements of relevance to the meson community. Key topics include exclusive and diffractive meson production as probes of gluon imaging and saturation, as well as semi-inclusive measurements of identified pions and kaons for studies of flavor and spin structure and of hadronization dynamics. The role of tagged measurements with light nuclei in accessing neutron structure will also be discussed. Finally, the status of the project and recent progress in physics-readiness efforts will be summarized.

Collaboration

ePIC

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