Phenomenology 2025 Symposium



Contribution ID: 37

Type: not specified

Testing the lepton content of the proton at HERA and EIC

Although protons are baryons with an overall vanishing lepton number, they possess a non-trivial leptonic content arising from quantum fluctuations which can be described by lepton parton distribution functions (PDFs) of the proton. These PDFs have been recently computed and can be used to define lepton-induced processes at high-energy colliders. In this article, we propose a novel way to test the computation of lepton PDFs of the proton by analyzing both non-resonant di-lepton and resonant Z gauge boson production processes induced by leptons within the proton at proton-electron colliders like HERA and EIC. Despite the fact that lepton PDFs of the proton are known to be small, this work demonstrates that both processes imply a measurable yield of events at HERA and EIC, which could be used to test these PDFs.

Mini Symposia (Invited Talks Only)

Plenary (Invited talks only)

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