

SMEFT probes in future precision DIS experiments

We analyze the potential of future high-energy deep-inelastic scattering (DIS) experiments to probe new physics within the framework of the Standard Model Effective Field Theory (SMEFT). We perform a detailed study of SMEFT probes at a future Large Hadron-electron Collider (LHeC) and a Future Circular lepton-hadron Collider (FCC-eh) machine, and extend previous simulations of the potential of a Electron-Ion Collider (EIC) to include Z-boson vertex corrections. Precision Z-pole constraints on vertex corrections suffer from numerous degeneracies in the Wilson-coefficient parameter space. We find that both the LHeC and the FCC-eh can help remove these degeneracies present in the existing global fits of precision Z-pole observables and LHC data. The FCC-eh and LHeC will in many cases improve upon the existing precision electroweak bounds on the SMEFT parameter space. This highlights the important role of precision DIS measurements for new physics studies.

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