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First simultaneous Monte Carlo analysis of PDFs and fragmentation functions

Tuesday, 24 March 2020 09:00 (30 minutes)

We report on the first simultaneous extraction of unpolarized parton distributions and fragmentation functions from a global QCD Monte Carlo analysis of inclusive and semi-inclusive deep-inelastic scattering, Drell-Yan lepton-pair production, and single-inclusive $e+e-$ annihilation data. We use data resampling techniques to thoroughly explore the Bayesian posterior distribution of the extracted functions, and use k-means clustering on the parameter samples to identify configurations that give the best description across all reactions. Our analysis reveals significant correlations between the strange quark density and the strange-to-kaon fragmentation function needed to simultaneously describe semi-inclusive K production data and inclusive K spectra in $e+e-$ annihilation, and suggests a suppression of the strange quark distribution at intermediate x values.
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