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Collins-Soper kernel comprehensive extraction from e+e− data of energy-energy correlator

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Abstract

We study the extraction of the Collins–Soper kernel and the strong coupling constant using data from energy-energy correlation in e+e− in the back-to-back limit (i.e. at small transverse momenta). By isolating nonperturbative effects and using next-to-next-to-next-to (N3LO)perturbative results we perform a comprehensive global fit to all available data (to the best of our knowledge). We find that the current precision of the data provides a precise fit of the Collins-Soper kernel, but still a poor description of the strong coupling. We provide predictions for Belle and FCC-ee, based on the present theoretical and experimental understanding.

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