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Lund and Cambridge multiplicity for precision physics

Friday, 8 July 2022 14:45 (15 minutes)

Multiplicity is one of the simplest experimental observables in collider events, whose importance stretches from calibration to advanced tagging techniques. We introduce a new (sub)jet multiplicity, the Lund multiplicity, for lepton and hadron collisions. It probes the full multiple branching structure of QCD and is calculable in perturbation theory. We introduce a formalism allowing us to calculate the average Lund and Cambridge multiplicities to all orders, reaching next-to-next-to double logarithmic (NNDL) accuracy in e^+e^- collisions, an order higher than the existing state-of-the-art, and next-to-double logarithmic accuracy (NDL) in hadronic collisions. Matching our resummed calculation to the NLO result, we find a reduction of theoretical uncertainties by up to 50% compared to the previous state-of-the-art. Adding hadronisation corrections obtained through Monte Carlo simulations, we also show a good agreement with existing Cambridge multiplicity data.

In-person participation

Yes

Primary authors: SOTO ONTOSO, Alba; MEDVES, Rok (University of Oxford); SOYEZ, Gregory

Presenter: MEDVES, Rok (University of Oxford)

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