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Measurement of groomed event shape observables in deep-inelastic electron-proton scattering at HERA

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The H1 Collaboration at HERA reports the first measurement of groomed event shape observables in deep inelastic electron-proton scattering (DIS) at $\sqrt{s} = 319$ GeV, using data recorded between the years 2003 and 2007 with an integrated luminosity of 351 pb^{-1} . Event shapes provide incisive probes of perturbative and non-perturbative QCD. Grooming techniques have been used for jet measurements in hadronic collisions; this paper presents the first application of grooming to DIS data. The analysis is carried out in the Breit frame, utilizing the novel Centauro jet clustering algorithm that is designed for DIS event topologies. Events are required to have squared momentum-transfer $Q^2 > 150 \text{ GeV}^2$ and inelasticity $0.2 < y < 0.7$. We report measurements of the production cross section of groomed event 1-jettiness and groomed invariant mass for several choices of grooming parameter. Monte Carlo model calculations and analytic calculations based on Soft Collinear Effective Theory are compared to the measurements

Secondary track

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