

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

Thursday 18 July 2024 11:15 (15 minutes)

The H1 Collaboration at HERA reports the first measurement of groomed event shapes in deep inelastic ep scattering (DIS) at $\sqrt{s} = 319$ GeV, using data recorded between 2003 and 2007 with an integrated luminosity of 351.1 ± 9.5 pb⁻¹. Event shapes in DIS collisions provide incisive probes of perturbative and non-perturbative QCD, and recently developed grooming techniques investigate similar physics in jet measurements of 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. Events are selected with squared momentum-transfer $Q^2 > 150$ GeV² and inelasticity $0.2 < y < 0.7$. Cross sections of groomed event 1-jettiness and groomed invariant jet mass are measured for several choices of grooming parameter. The measurements are compared to Monte Carlo models and to analytic calculations based on Soft Collinear Effective Theory (SCET).

Alternate track

I read the instructions above

Yes

Primary authors: BRITZGER, Daniel (Max-Planck-Institut für Physik München); COLLABORATION, H1 (DESY); ZLEBICKI, Radek (Deutsches Elektronen-Synchrotron (DE)); SCHMITT, Stefan (Deutsches Elektronen-Synchrotron (DE)); ZHANG, Zhiqing Philippe (IJCLab, Orsay (FR))

Presenter: ZLEBICKI, Radek (Deutsches Elektronen-Synchrotron (DE))

Session Classification: Strong interactions and Hadron Physics

Track Classification: 06. Strong Interactions and Hadron Physics