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Properties of Transverse Energy Production in Deep-Inelastic Scattering

H1 Collaboration

Abstract

Transverse energy flow measurements for deep-inelastic scattering events produced in positron-proton collisions at HERA are presented. When compared with previous results, the statistical errors have decreased significantly and the kinematic range has been extended down to 4-momentum transfer squared Q^2 of 3 GeV^2 and to x_{Bj} as low as $8 \cdot 10^{-5}$. The average transverse energy in a central rapidity bin of $-0.5 < \eta < 0.5$ in the photon-proton center of mass system is found to rise, at fixed Q^2, with decreasing x_{Bj}. The corrected distribution of the transverse energy in the central rapidity bin has been determined for the first time. In a few percent of the events transverse energies above 10 GeV are observed. In addition, energy-energy correlations are presented in various kinematic bins covering a range of $3 < Q^2 < 34$ GeV^2 and $8 \cdot 10^{-5} < x_{\mathrm{Bj}} < 4 \cdot 10^{-3}$. The results are compared with Monte Carlo models incorporating gluon emission with and without ordering of the transverse momenta and, where available, with a QCD BFKL calculation.

Plenary Sessions:
2. Soft Interactions and Diffraction Phenomena - S. Levonian
4. QCD and Low x Physics - H. Abramowicz, R. Brock
Parallel Session: I Strong Interaction Physics
2. Soft Interactions
3. Structure Functions and Low x Physics
4. Hard Processes and Perturbative QCD