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Measurement of Leading Baryon Production at HERA and its Interpretation in terms of Colour Singlet Exchange

H1 Collaboration, DESY

Deep inelastic scattering events with an energetic leading baryon have been detected by the H1 experiment at HERA using a forward proton spectrometer and a forward neutron calorimeter. Semi–inclusive cross sections have been measured in the kinematic region $2 \leq Q^2 \leq 50$ GeV^2, $0.00006 \leq x \leq 0.0060$ and $p_T \leq 200$ MeV/c, for events with a final state proton with energy $740 \geq E' \geq 580$ GeV, or a neutron with energy $E' \geq 160$ GeV. The measurements are used to test production models and factorization hypotheses. A model of leading baryon production which consists of pion, reggeon and pomeron exchanges gives a good description of both semi-inclusive cross sections in the region $E'/E_p > 0.6$, where E_p is the proton beam energy. This model is used to constrain the pion structure function.