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Measurement of Leading Proton and Neutron Production in Deep Inelastic Scattering at HERA

H1 Collaboration,
DESY, Notkestr.85, D-22607 Hamburg, Germany

Deep–inelastic scattering events with a 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, $6 \cdot 10^{-5} \leq x \leq 6 \cdot 10^{-3}$ and baryon $p_T \leq 200$ MeV, for events with a final state proton with energy $580 \leq E' \leq 740$ GeV, or a neutron with energy $E' \geq 160$ GeV. The measurements are used to test production models and factorization hypotheses. A Regge model of leading baryon production which consists of pion, pomeron and secondary reggeon exchanges gives an acceptable description of both semi–inclusive cross sections in the region $0.7 \leq E'/E_p \leq 0.9$, where E_p is the proton beam energy. The leading neutron data are used to estimate for the first time the structure function of the pion at small Bjorken–x.

Reference

1. H1 Collaboration, C. Adloff *et al*, DESY-98-169 / submitted to Eur. Phys. J. C