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

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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.

[1] H1 Collaboration, C.Adloff et al.,
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