

DIS2011

Electroweak Physics and Beyond the Standard Model Parallel Session III, Tuesday 12th of April 2011, 14:15-16:00 (Joint with Structure Functions and Parton Densities)

Title: Measurement of High- Q^2 Neutral and Charged Current Deep Inelastic e^+p Scattering Cross Sections with a Longitudinally Polarised Electron Beam at ZEUS

Stewart Trevor

(combined talks of)

Measurements of the cross sections for charged current deep inelastic scattering in $e+p$ collisions with a longitudinally polarized positron beam are presented. The measurements are based on a data sample with an integrated luminosity of 132 /pb collected with the ZEUS detector at HERA in 2006 and 2007 at a centre-of-mass energy of 318 GeV. The total cross section is presented at positive and negative values of the longitudinal polarization of the positron beams. The single-differential cross sections $d\sigma/dQ^2$, $d\sigma/dx$ and $d\sigma/dy$ are presented for $Q^2 > 200$ GeV². The reduced double-differential cross section σ_r is presented in the kinematic range $280 < Q^2 < 30\,000$ GeV² and $0.0078 < x < 0.42$. The cross section measurements agree well with the predictions of the Standard Model. The results are used to determine a lower limit on the mass of a hypothetical right-handed W boson.

The cross sections for neutral current deep inelastic scattering in $e+p$ collisions with a longitudinally polarized positron beam have been measured using the ZEUS detector at HERA. The single-differential cross-sections $d\sigma/dQ^2$, $d\sigma/dx$ and $d\sigma/dy$ and the double-differential cross sections in Q^2 and x are measured in the kinematic region $Q^2 > 185$ GeV² for both positively and negatively polarized electron beams and for each polarization state separately. The measurements are based on an integrated luminosity of 136 /pb taken in 2006 and 2007 at a centre-of-mass energy of 318 GeV. The structure functions xF_3 and $xF_3^{\gamma Z}$ are determined by combining the $e+p$ results presented in this analysis with previously measured $e-p$ neutral current data. The measured cross sections are compared to the predictions.

Title: Measurement of positron-proton neutral current cross sections at high Bjorken- x with the ZEUS detector at HERA

Inderpal Singh

A new measurement of the differential cross section for neutral current deep inelastic $e+p$ collisions up to Bjorken- x values equal to one is presented. The measurement was performed using the data collected by the ZEUS detector at HERA with $\sqrt{s} = 318$ GeV and an integrated luminosity of 142 /pb. A new method is employed to reconstruct the kinematic variables and measure the cross sections for $Q^2 > 575$ GeV². The data are considerably more precise than previously published measurements in this kinematic region and provide interesting tests of parameterizations of the behavior of the cross section up to $x=1$.

Title: Measurement of the Drell-Yan differential cross section at 7 TeV

Norbert Neumeister (Purdue Univ.)

We present a measurement of the Drell-Yan differential cross section in pp collisions as a function of the dilepton invariant mass ($d\sigma/dm$). The data sample was collected by the CMS

detector at the LHC operating at a center-of-mass energy of 7 TeV, and corresponds to 36 /pb. The results are compared to predictions of the Standard Model.

Title: Direct photon measurements in ATLAS

Renat Ishmukhametov (Southern Methodist U)

A measurement of the cross section for the inclusive production of isolated prompt photons in pp collisions at a centre-of-mass energy $\sqrt{s} = 7$ TeV is presented, as well as a measurement of diphoton production. Photon candidates are identified by combining information from the calorimeters and from the inner tracker. Residual background in the selected sample is estimated from data based on the observed distribution of the transverse isolation energy in a narrow cone around the photon candidate. The results are compared to predictions from next-to-leading order perturbative QCD

Title: The EMC Effect and the NuTeV Anomaly

Ian C. Cloet (Univ. of Washington)

The NuTeV collaboration extracted a value for the weak mixing angle that has a 3-sigma discrepancy with the accepted Standard Model result. In the NuTeV analysis a non-trivial correction must be made for the small neutron excess in the steel target. We found that these additional neutrons have another, hitherto neglected effect, namely they generate an isovector-vector field which modifies the structure of all nucleons in the target. This represents a new correction for the NuTeV experiment and it explains a significant portion of the disagreement with the Standard Model. We will discuss the impact of this result on our understanding of the structure of bound nucleons and our understanding of the EMC effect. We will also highlight some of the interesting ramifications for parity violating deep inelastic scattering on nuclear targets.