



The Total Photoproduction Cross Section σ_{TOT} Measurement

J. Chwastowski

The preliminary results on σ_{TOT} of the photon with proton interaction have been obtained. The results are compared with the theoretical predictions based on Regge model and with the H1 experiment results. The agreement is satisfactory. The first version of the paper is under work.

Vector Mesons Photoproduction at High Momentum Transfer $|t|$

K. Klimek

The photoproduction of vector mesons ρ^0 , ϕ and J/Ψ at high $|t|$ (where t is square of the four-momentum transfer to the final state vector meson) were studied in the $|t|$ range up to 12 GeV^2 . The special trigger configuration used in 96 and 97 ZEUS data, together with the information from 44m electron tagger, allowed the selection of events when proton dissociated into low-mass state and the average photon-proton CMS energy $W \simeq 100 \text{ GeV}$. The preliminary results of the differential cross sections $d\sigma/dt$ measurements for ρ^0 , ϕ and J/Ψ mesons have been compared with the theoretical models based on the soft or hard physics processes. For ρ^0 and J/Ψ mesons, the reasonable agreement with the perturbative QCD (pQCD) calculations is obtained. For ϕ , pQCD calculations failed to describe data and one may conclude that soft processes contribute here significantly to the production mechanism.

In parallel studies the ratios of ϕ/ρ^0 and $(J/\Psi)/\rho^0$ cross sections at different t have been measured. Such studies can verify the expectations in the flavour-independent production mechanism of the vector mesons. The first results obtained at high $|t| \geq 5 \text{ GeV}^2$ are consistent with such prediction.

Reference:

1. ZEUS Collaboration, "Study of the Diffractive Production of Vector Mesons at Large Q^2 or Large $|t|$ at HERA", Submitted to the International Europhysics Conference on High Energy Physics 99, Tampere, Finland, 15-21 July 1999.



The Studies of Charged Particles Correlations

L. Zawiejski

The data collected by the ZEUS experiment in 1995 were used for the studies of the short-range and long-range correlations in deep inelastic scattering at HERA. The two-particle short-range correlations are analysed in terms of angular separations in the current region of the Breit frame. The long-range correlations were measured between the current and the target regions. The results were compared with analytic QCD calculations and the Monte Carlo Models. They correctly describe the trends of the data at high Q^2 , but quantitative discrepancies are observed. The results on short-range correlations in e^+p show the differences with those measured in e^+e^- annihilation.

References:

1. L. Zawiejski, "Fragmentation in DIS", Nucl. Phys. **B** (Proc. Suppl.) 79 (1999) 456;
2. S.V. Chekanov, L. Zawiejski, "Short-Range and Long-Range Correlations in DIS at HERA", Presented at the XXIV International Symposium on Multiparticle Dynamics (ISMD99), 9 - 13 August, 1999, Brown University, Providence, USA, hep-ex/9909026 and bf ANL-HEP-CP-99-99;
3. ZEUS Collab., J. Breitweg, (L. Zawiejski) et al., "Angular and Current Target Correlations in Deep Inelastic Scattering at HERA", DESY 99-063 and The European Phys. J. **C12** (2000) 53.