Abstract #012345
Parallel sessions: 2,3
Plenary sessions: 1,2,3

Diffraction Dissociation in Photoproduction at HERA

H1 Collaboration

A study is presented of the process $\gamma p \rightarrow XY$, where there is a large rapidity gap between the systems X and Y. Measurements are made of the differential cross section as a function of the invariant mass M_X of the system produced at the photon vertex. Results are presented at centre of mass energies of $\langle W \rangle = 187$ GeV and $\langle W \rangle = 231$ GeV, both where the proton dominantly remains intact and, for the first time, where it dissociates. Both the centre of mass energy and the M_X^2 dependence of HERA data and those from a fixed target experiment may simultaneously be described in a triple-Regge model. The low mass photon dissociation process is found to be dominated by diffraction, though a sizable subleading contribution is present at larger masses. The pomeron intercept is extracted and found to be $\alpha_{I\!P}(0) = 1.068 \pm 0.016$ (stat.) ± 0.022 (syst.) ± 0.041 (model), in good agreement with values obtained from total and elastic hadronic and photoproduction cross sections. The diffractive contribution to the process $\gamma p \rightarrow Xp$ with $M_X^2/W^2 < 0.05$ is measured to be 22.2 ± 0.6 (stat.) ± 2.6 (syst.) ± 1.7 (model) % of the total γp cross section at $\langle W \rangle = 187$ GeV.