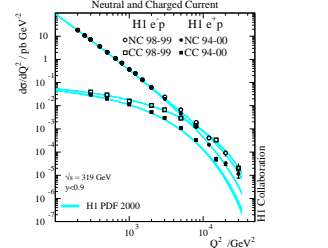
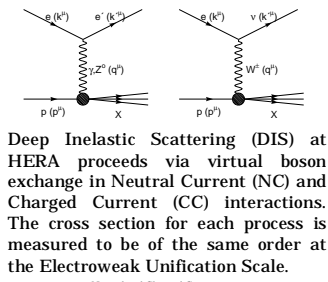
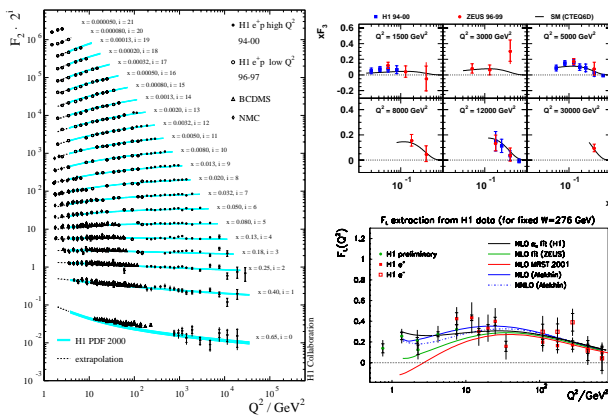


Physics Results from the Experiment at HERA



Electroweak Unification

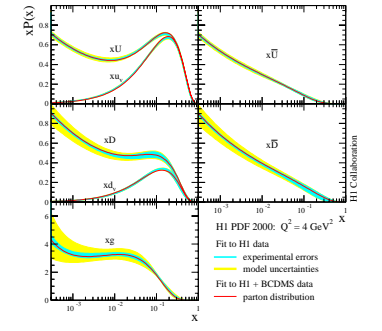
Inclusive Measurements



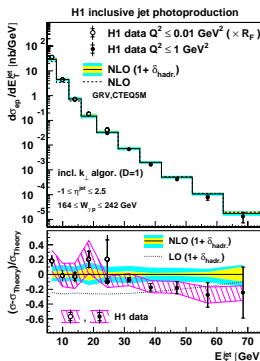
The NC inclusive cross section measurement is performed in the range of four momentum transfer squared Q^2 up to 30000 GeV^2 and Bjorken x between 0.00005 and 0.65. The above distributions display the extracted parton structure functions F_2 (left), xF_3 (upper right) and F_L (lower right).

Parton Distribution Functions

The NC and CC cross section data in e^+p and e^-p scattering measured by the H1 experiment are used to perform new NLO QCD analyses in the framework of the Standard Model to extract flavour separated parton distributions of the proton. Five components of the proton structure are extracted, as shown below.

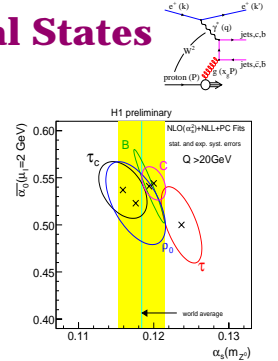


Hadronic Final States



Jets and Event Shapes

The measured inclusive jet photoproduction cross section is remarkably well described by NLO QCD across more than 6 orders of magnitude (left). The measurement of event shape variables yields a consistent picture, constraining the values of α_s and the power correction parameter α_0 (right).



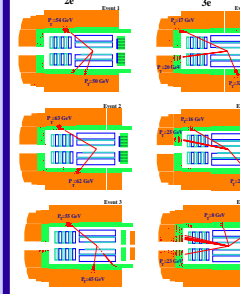
Rare and Exotic Processes

Isolated Leptons

P_T^{miss} (GeV)	Data	SM Expectation
< 12	5	6.40 ± 0.79
12 - 25	3	3.08 ± 0.43
25 - 40	4	1.83 ± 0.27
> 40	6	1.08 ± 0.22
Total	18	12.40 ± 1.49

Events containing isolated leptons in coincidence with large missing transverse momentum are observed at H1. An excess of approximately 3σ above the Standard Model prediction (dominated by W production) is observed at large values of hadronic transverse momentum, as detailed in the above table.

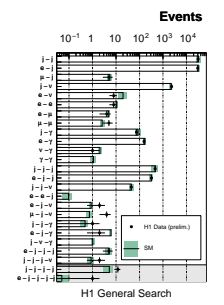
Multi Electron Production



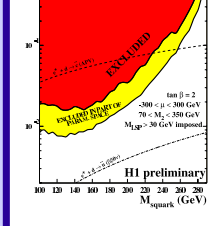
Multi electron production is studied at high electron transverse momentum. In events with electron pair invariant masses greater than 100 GeV, 3 di-electron events and 3 tri-electron events are observed compared with an expectation of 0.30 ± 0.04 and 0.23 ± 0.04 respectively. These events are displayed on the left.

General Search Analysis

A model independent search for deviations from the Standard Model examines over 20 different high transverse momentum final states. The search confirms the observed excesses in the above analyses and exhibits good agreement with the Standard Model prediction in the remaining event classes.

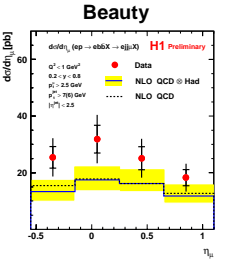
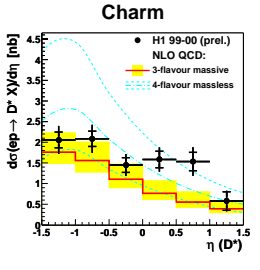


Searches for squarks in R_p viol. SUSY



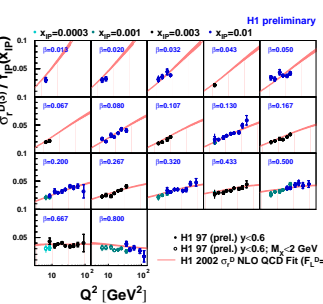
R_p Violating SUSY

Competitive limits are set by many H1. Beyond the Standard Model analyses. A search for squark production in R -parity violating supersymmetry yields no significant deviation from the Standard Model. Squark masses below 275 GeV are excluded for a Yukawa coupling of electromagnetic strength.



Heavy Quark Production

New cross section measurements of D^* meson (far left) and beauty photoproduction with semi-muonic decay (left) are performed by H1. The D^* data are described by NLO QCD calculations. The measured dijet-muon cross section is found to be 1.5σ above the theoretical prediction.



Diffractive

Approximately 10% of low x DIS events involve a diffractive exchange resulting in a large rapidity gap. Using the virtual photon to probe the structure of the exchange, H1 measures the diffractive cross section up to a Q^2 of 1600 GeV^2 . The measured cross section at medium Q^2 is displayed on the left. NLO QCD fits are performed to extract diffractive parton densities, shown below left. The extracted PDFs are dominated by the gluon component and form the basis of the successful predictions for diffractive dijet and D^* cross sections shown below.

Diffractive Final States

