Joint DESY and University of Hamburg Accelerator Physics Seminar

Tuesday, December 14, 2004

(16:00 in Room 459/30b)

Twenty Five Years of the HERA Lepton–Proton Collider

F. Willeke

DESY

Abstract

Ever since early particle accelerators provided first evidence for an inner structure of the proton, scientists have been fascinated by this topic. Experiments between 1960 and 1980 led to a view of the proton which could only be confirmed with a collider for leptons and protons. This fascination motivated the construction of the HERA collider at Hamburg. HERA had a promising start: the very first data taken by the experiments H1 and ZEUS changed our picture of the proton. However, this was followed by several years of hard work learning how to produce high luminosity for collisions of electrons and protons, providing longitudinally polarized electrons for the HERMES experiment, battling the inefficiencies of a complex accelerator chain and, remedying the unexpected HERA dust problem. Eventually HERA could operate with high efficiency and exceeded the design luminosity. The HERA data provided input for a rich physics program. Encouraged by this success an ambitious upgrade was then performed which aims at five times the original HERA design luminosity. While high luminosity and longitudinally polarized leptons with colliding beams have been demonstrated, unexpected experimental background has required further improvements to detector protection systems and interaction region vacuum. Now, HERA is at the beginning of its 2nd phase with more exciting physics results expected in the near future.

D.P.Barber (MPY), J.Rossbach (Univ. HH) and M.Vogt (MPY).

Visit our web site at `http://www-mpy.desy.de/AccPhySemDESY/`