

## T 103 Hauptvorträge III

Zeit: Montag 10:15–12:40

Raum: TU H105

**Hauptvortrag**

T 103.1 Mo 10:15 TU H105

**Der TeV Linear Collider: Faszination und Herausforderung** —  
•ROLF-DIETER HEUER — Universität Hamburg

Ein Elektron-Positron Linear Collider im Energiebereich von 90 GeV bis etwa 1 TeV ist das nächste große Beschleunigerprojekt der Teilchenphysik in idealer Ergänzung zum Hadroncollider LHC. Die im August 2004 getroffene Entscheidung, die supraleitende Technologie für die Beschleunigungsstrecken zu verwenden, wurde weltweit akzeptiert und bedeutet einen großen Schritt auf dem Weg zur Verwirklichung dieses Colliders als globales Projekt.

Der Vortrag wird zunächst die wichtigsten physikalischen Fragestellungen behandeln, die mit diesem Beschleuniger studiert werden können. Die neuesten Entwicklungen zum Design eines solchen Internationalen Linear Colliders (ILC) werden beschrieben, wobei insbesondere auf die Herausforderungen technologischer aber auch politischer Art eingegangen wird. Die am ILC möglichen Präzisionsmessungen stellen auch neue Anforderungen an die Detektoren, was am Beispiel der „Teilchenflußmessung“ erläutert wird.

**Hauptvortrag**

T 103.2 Mo 11:05 TU H105

**New results and concepts in perturbative QCD** — •ANDREAS  
VOGT — NIKHEF and University of Durham

For the next decade, the high-energy frontier of particle physics will be at colliders with proton beams, especially the LHC. At such machines, quantitative studies of the standard model and of (un-)expected new particles require reliable predictions of strong interaction corrections and backgrounds. The talk focuses on two recent developments. The first is the determination of the three-loop contributions to the splitting functions governing the evolution of the partonic luminosities. This computation opens the way for complete third-order calculations of important few-parton processes like Higgs production. The second is the development of a new formalism, based on Witten's observation of relation between gauge-theory amplitudes and a string theory in twistor space. This approach is especially promising for low-order calculations of multi-parton amplitudes where it has already lead to new results.

**Hauptvortrag**

T 103.3 Mo 11:55 TU H105

**Precision QCD Measurements at HERA and the Implications for LHC** — •TANCREDI CARLI — CERN

Strong interactions will be ubiquitous at the Large Hadron Collider (LHC) since the colliding beams consist of confined quarks and gluons. To maximise the precision and sensitivity of many physics analyses at LHC it is necessary to understand various perturbative, semi-perturbative and non-perturbative QCD effects. The electron proton collider HERA provides a clean QCD laboratory where the quantitative understanding of hadron production at high energies can be studied.

I will review the latest status of the measurement of the proton structure function and the extraction of the proton parton densities and their uncertainties after the HERA-I running period. I will discuss the implications for the quantitative prediction of cross-sections at LHC. This includes the possibility to validate our understanding of the evolution of parton densities and of the strong coupling to very high momentum transfers accessible at LHC using techniques developed at HERA. In addition, I will touch on other examples like effects of parton evolution at small momentum fractions, the understanding of events with many particles and many jets and their correlations and the production mechanism of heavy quarks.