T 97: Eingeladene Vorträge 3

Zeit: Donnerstag 13:45–16:15 Raum: RW 1

Eingeladener Vortrag T 97.1 Do 13:45 RW 1

The XENON Project, Enlightening the Dark — •Ethan Brown — Institut für Kernphysik, Universität Münster

A large amount of evidence supports the theory that 25% of the universe is composed of cold dark matter. The XENON project has conducted several experiments using a liquid xenon target in a dual phase time projection chamber (TPC) in an attempt to detect dark matter in the form of Weakly Interacting Massive Particles (WIMPs). The XENON100 experiment has conducted a dark matter search based on 225 live days of data without evidence for a dark matter signal, placing an upper limit on the WIMP-nucleon cross section of $\sigma < 2.0 \times 10^{-45}$ cm^2.

The next phase of the XENON project aims to increase the sensitivity by two orders of magnitude by scaling up the existing 100 kg detector to the ton scale, now under construction. In order to achieve the sensitivity goal, detector performance must be similar to that of XENON100 while scaling up the detector size. Additionally, backgrounds must be substantially reduced by special material selection and purification techniques that are currently being developed.

Different aspects of this project are funded by BMBF and DFG.

Eingeladener Vortrag T 97.2 Do 14:15 RW 1

Forward particle production in pp and pPb collisions at the Terascale — •Dmytro Volyanskyy — Max-Planck-Institut für Kernphysik, PO Box 103980, 69029 Heidelberg, Germany

Due to its unique pseudorapidity coverage and the ability to perform measurements at low transverse momenta, the LHCb detector allows a unique insight into particle production in the forward region at unprecedented collision energies. Using large samples of proton-proton and proton-lead collision data accumulated in the years 2010-2013, the LHCb collaboration has performed a series of dedicated analyses providing important input to the knowledge of the parton density functions, underlying event activity, low Bjorken-x QCD dynamics and exclusive processes. Some of these will be presented here.

Eingeladener Vortrag T 97.3 Do 14:45 RW 1

Grand Unification and the hidden geometry of String Theory — •Thomas Grimm — Max Planck Institute for Physics, Munich, Germany

In this talk I present recent progress in realizing Grand Unified Theories in String Theory. I describe how the hidden dimensions of String Theory allow to geometrize many aspects of gauge theories and unify them with gravity. A special emphasis is given on the study of the effective actions that describe the dynamics of such String Theories at observably low energies.

Eingeladener Vortrag T 97.4 Do 15:15 RW 1

Exploring electroweak gauge boson self-couplings in vector boson fusion, scattering and multi-boson production — •Anja Vest — Technische Universität Dresden

Today's Standard Model of particle physics (SM) has been confirmed in numerous experiments over the past decades. The recent discovery of the Higgs boson at the Large Hadron Collider (LHC) could possibly complete our understanding of the SM of electroweak interactions. Since the scattering amplitude of longitudinally polarized W bosons is unitarized by the Higgs mechanism, measurements of vector boson scattering processes, in particular WW scattering, at highest energies are needed to gain confidence about the validity of the Higgs mechanism. These measurements also allow for a test for the presence of additional non-SM interactions, complementary to direct searches of new physics beyond the SM.

The recent run of the LHC provides sufficient data to study triple and quartic electroweak gauge boson self-couplings. In this presentation I will discuss the exploration of gauge boson self-couplings via precise measurements of vector boson fusion, scattering and multi-boson production processes at the LHC.

Eingeladener Vortrag T 97.5 Do 15:45 RW 1

Searches for high-mass resonances decaying to tau-lepton pairs with the ATLAS detector. — •William Davey — Universität Bonn, Bonn, Germany

Many extensions of the Standard Model predict additional heavy gauge bosons. While searches for such bosons decaying into electrons and muons at the LHC have already probed masses up to ∼3 TeV, lepton universality is not necessarily a requirement. In fact, a number of models, for instance those seeking to explain the large top-quark mass, predict enhanced couplings to third generation fermions. For such models, searches at the LHC in the di-tau decay channel can be more sensitive than for the lighter leptons, despite tau-leptons being more difficult to reconstruct in the hadronic environment. I present results of generic searches for high-mass resonances decaying into tau-lepton pairs using data collected by the ATLAS experiment in Run 1 of the LHC. I also present results from searches for neutral MSSM Higgs bosons decaying into tau-lepton pairs. These searches combined span a huge mass range from ∼100 GeV to ∼2 TeV.