

## T 47: Eingeladene Vorträge 1

Zeit: Dienstag 14:00–16:15

Raum: H 1

**Eingeladener Vortrag** T 47.1 Di 14:00 H 1  
**ATLAS Search for Scalar Leptoquarks at  $\sqrt{s} = 13$  TeV** —  
 •RUTH PÖTTGEN — Universität Stockholm

In the Standard Model, there are many striking similarities between the quark and the lepton sector, like the number of families and the mass hierarchy between them. Leptoquarks are hypothetical particles that occur in various models for physics beyond the Standard Model and provide a connection between the two sectors. They are commonly assumed to couple to quarks and leptons of the same fermion generation but this need not be the case. This contribution gives an overview of the motivation for and presents important aspects of the search for scalar leptoquarks performed by the ATLAS collaboration using proton-proton collision data collected at a centre-of-mass energy of  $\sqrt{s} = 13$  TeV.

**Eingeladener Vortrag** T 47.2 Di 14:27 H 1  
**Search for new physics with leptons in the final state** —  
 •SWAGATA MUKHERJEE — RWTH Aachen, 3A

Numerous new physics models predict the existence of heavy particles decaying to leptonic final states. Experimental signatures involving leptons are one of the cleanest probes of new physics at the LHC. This talk presents searches for physics beyond the standard model in final states with leptons (including hadronically decaying tau leptons) with the CMS detector, focusing on the recent results obtained using the data collected during the 2016 proton-proton run of the LHC at the centre of mass energy of 13 TeV.

**Eingeladener Vortrag** T 47.3 Di 14:54 H 1  
**Suche nach vektorartigen Quarks mit Zerfällen in geboosten Endzuständen mit dem ATLAS-Experiment** — •JANET DIETRICH — Humboldt-Universität zu Berlin

Die im Jahre 2015/2016 mit dem ATLAS-Detektor am LHC genommenen Daten bei einer Proton-Proton-Schwerpunktsenergie von 13 TeV ermöglichen die Suche nach neuer Physik auf der TeV-Skala und erlauben erstmals einen Blick auf vorher nicht zugängliche Phasenraumbereiche. Vektorartige Quarks, die überwiegend an die dritte Quarkgeneration koppeln, sind die einfachste Ergänzung von farbgeladenen Fermionen zum Standardmodell. Sie sind experimentell noch nicht ausgeschlossen und werden von einer Vielzahl von möglichen Standardmodellerweiterungen wie zum Beispiel Composite-Higgs-Modellen vorhergesagt. Der Fokus dieses Vortrages liegt auf der Suche nach schweren vektorartigen Quarks, die in Top- oder Bottomquarks und W-, Z- oder Higgs-Bosonen mit großen Impulsen zerfallen. Es werden exemplarisch einige Analysen, sowie deren experimentelle Herausforderungen in der Rekonstruktion dieser Zerfallsprodukte diskutiert. Kurz vor dem LHC-Neustart nach der Winterpause 2016/2017 werden außerdem

die aktuellen Massen- und Kopplungsausschlussgrenzen vorgestellt und erörtert.

**Eingeladener Vortrag** T 47.4 Di 15:21 H 1  
**Falsifying High-Scale Baryogenesis** — •JULIA HARZ — Sorbonne Universités, Institut Lagrange de Paris (ILP), 98bis Boulevard Arago, F-75014 Paris, France — Sorbonne Universités, UPMC Univ Paris 06, UMR 7589, LP THE, F-75005 Paris, France — CNRS, UMR 7589, LP THE, F-75005 Paris, France

One of the open fundamental questions which points towards physics beyond the standard model is the baryon asymmetry of our Universe, which can be experimentally quantified by the baryon-to-photon ratio. Given the multiplicity of models, a way to push our field further is to think about strategies how to test or at least to falsify certain ideas or theories. I will give a brief overview of different ways to directly test certain models of leptogenesis. Mainly, I will focus on model independent approaches combining LHC physics, neutrinoless double beta decay, and searches for lepton flavour violation in order to falsify high-scale models of baryogenesis. I will conclude by commenting on their limitations.

**Eingeladener Vortrag** T 47.5 Di 15:48 H 1  
**The COSINUS project - development of new NaI-based detectors for direct dark matter search** — •KAROLINE SCHÄFFNER — Gran Sasso Science Institute, L'Aquila, Italy

Dark matter makes up more than a quarter of the matter-energy composition of the Universe and until today its presence is discerned by gravitational interactions only. Remarkably though, several direct dark matter searches, in particular the DAMA/LIBRA experiment, observe an annual modulation signal which matches the expected signal from particle dark matter, but is inconsistent with null-results of most other direct dark matter searches. Since different experiments use diverse target materials, a direct comparison of their results is only possible if taking into account certain assumptions. So, the only way of providing a model independent cross-check of the DAMA/LIBRA dark matter claim is the use of the same target material, but in a different experiment. Within the COSINUS project we aim to develop a cryogenic scintillating calorimeter operated at around ten milli-Kelvin using undoped sodium iodide (NaI) scintillating crystals as target for direct dark matter search which allows for a direct comparison to DAMA/LIBRA, and the additional and unique feature of providing a lower nuclear recoil threshold combined with particle discrimination. In this talk I will give an introduction to low temperature detectors and their potential in the field of rare event searches. Furthermore, I will discuss in detail the COSINUS detector concept and the differences to already existing NaI-based detectors. I will conclude with achieved results within the first year of the project and its future perspectives.