T 88: Eingeladene Vorträge IV

Zeit: Donnerstag 13:45–16:15 Raum: VMP8 HS

Eingeladener Vortrag T 88.1 Do 13:45 VMP8 HS

Mass composition of ultra-high energy cosmic rays: new results from the Pierre Auger Observatory and their astrophysical implications — •Alexey Yushkov for the Pierre-Auger-Collaboration — University of Siegen, Siegen, Germany

The recent experimental data on the composition of cosmic rays from the 'knee' to the GZK cut-off region are reviewed. Special emphasis is given to the results of the Pierre Auger Observatory in the region around the 'ankle'. These results have important implications for the astrophysical scenarios concerning the transition between galactic and extragalactic cosmic rays. The perspectives of the experimental studies of the mass composition for GZK and super-GZK energies with the AugerPrime upgrade of the Pierre Auger Observatory are discussed.

Eingeladener Vortrag T 88.2 Do 14:15 VMP8 HS

Particle Flow Calorimetry — •Eva Sicking — CERN, Geneva, Switzerland — LAPP - Laboratoire d'Annecy-le-vieux de Physique des Particules, France

High energy e+e- colliders such as the Compact Linear Collider (CLIC) or the International Linear Collider (ILC) are very promising future projects for complementing and extending the LHC physics reach. At these colliders, many interesting physics processes will produce multi-jet final states which can be accompanied by charged leptons and missing momentum. High precision measurements at these colliders pose stringent requirements on the detector performance, in particular on the jet energy resolution (sigma(E)/E<3.5% for 100 GeV–1 TeV jets). The Particle Flow approach to calorimetry shows potential to meet the unprecedented demands on the jet energy resolution. It is based on highly granular calorimeters and particle flow analysis, i.e. resolving energy depositions of individual particles by sophisticated algorithms. Over the last decade, particle flow calorimetry was explored by the detector R&D collaborations of the future linear colliders, who built and tested large scale high-granularity calorimeter prototypes and studied the detector and software performance in full detector simulations. This talk describes the principles of particle flow analysis and discusses the advancements in particle flow calorimetry. Recent prototype developments of the CALICE (Calorimetry for Linear Collider Experiments) collaboration and results from beam tests and full physics simulations are presented with emphasis on the CLIC physics programme.

Eingeladener Vortrag T 88.3 Do 14:45 VMP8 HS

Flavour physics as a microscope for new phenomena — •Martin Jung — Excellence Cluster Universe, TU Munich

Flavour Physics is a central component in our search for new phenomena beyond the Standard Model. The continued absence of a direct, conclusive measurement pointing beyond the SM constitutes the central challenge for both theory and experiment at the moment. This talk discusses the resulting necessity for new and modified theoretical methods on the one hand, and for the combination of observables from different sectors of particle physics on the other. These general points are illustrated by examples, focussing on heavy-flavour physics.

Eingeladener Vortrag T 88.4 Do 15:15 VMP8 HS

Neue Ergebnisse der B-Fabriken und Ausblick auf Belle II — •Florian Bernlochner für die Belle II-Kollaboration — Physikalisches Institut der Rheinische Friedrich-Wilhelms-Universität Bonn, Bonn, Germany

Im letzten Jahrzehnt sind die beiden B-Fabriken BaBar und Belle der Frage nach dem Ursprung der Ladungs- und Paritätsverletzung im Universum nachgegangen. Die Idee, welche beide Experimente später bestätigten, geht auf Kobayashi und Maskawa zurück: beide brachten 1973 die Ladungs- und Paritätsverletzung und das Standardmodell in Einklang mittels einer irreduziblen komplexen Phase in der schwachen Wechselwirkung und der Voraussage, daß es sechs Arten von Quarks geben müsse. Kobayashi und Maskawa erhielten 2008 hierfür den Nobelpreis. Zurzeit wird in Tsukuba in Japan das Nachfolgeexperiment Belle-II aufgebaut. Deutschland ist mit starker Partizipation dabei und baut Teile des wichtigen Vertexdetektors mit. Läuft alles nach Plan, werden Ende 2018 große Mengen von B-Mesonen erzeugt um deren Zerfälle zu studieren. Präzisionsmessungen von semileptonischen Zerfälle spielen bei der Messung der komplexen KM Phase eine wichtige Rolle: sie erlauben es die absolute Grösse der CKM-Matrixelemente Vub und Vcb zu messen, welche die Grösse der komplexen Phase einschränkt. In diesem Vortrag gebe ich einen Überblick über neue Resultate von den bestehenden B-Fabriken mit dem Fokus auf semileptonische Zerfälle und gebe einen Ausblick über die Fragestellungen, welche wir mit dem Belle-II-Experiment erforschen wollen.

Eingeladener Vortrag T 88.5 Do 15:45 VMP8 HS

The DEAP-3600 Dark Matter Search Experiment - Updates and Commissioning Results — •Tina Pollmann — Laurentian University, Sudbury, Canada

The DEAP-3600 experiment uses a 3.6 tonne liquid argon target for a direct dark matter search with a projected sensitivity to the spin-independent WIMP-nucleon cross-section of 10^{-46} cm^2 at 100 GeV WIMP mass after a three-year background-free exposure.

DEAP is operated as a single-phase detector. The liquid argon volume is viewed by 255 high efficiency photo multiplier tubes, which record the scintillation light emitted when particles interact there. The resulting pulse shapes allow very efficient rejection of the overwhelming electromagnetic backgrounds from the dark matter signal region using pulse shape discrimination.

To meet the detector's extremely stringent background targets, remaining backgrounds are suppressed through several layers of active and passive shielding - including 6000 m.w.e of rock overburden, through material screening, through the use of clean construction techniques, through careful detector design, and in offline analysis through fiducialization.

The DEAP detector was built between the years of 2011 and 2016 at the SNOLAB facility, 2 km underground, and is currently taking commissioning data. We will present the status of the experiment and results from analysis of the first commissioning data on behalf of the DEAP-3600 collaboration.