T 7: Eingeladene Vorträge 2

Zeit: Dienstag 13:45–16:15 Raum: HSZ-02

Eingeladener Vortrag T 7.1 Di 13:45 HSZ-02

Search for dark matter with the XENON100 experiment — •Teresa Marrodán Undagoitia — MPIK Heidelberg

The XENON100 experiment, located at the Italian Gran Sasso Laboratory, aims at the direct detection of weakly interacting dark matter particles via their elastic scattering off xenon nuclei. The detector is a liquid-gas time projection chamber built out of ultra radio-pure materials. In 2012, results from 225 live days data at 34kg fiducial mass were released, leading to the best sensitivity for WIMP masses above 8 GeV/c^2. After a brief review of the detector and its main components, the data analysis will be described and the latest results will be presented. The calibration procedures to determine the signal and background regions and the energy scales will be discussed, as well as laboratory activities to measure the electronic recoil scale in liquid xenon. Finally, the developments towards the construction of XENON1T will be presented.

Eingeladener Vortrag T 7.2 Di 14:15 HSZ-02

Discrete symmetries in supersymmetric models of flavor — •Christoph Luhn — University of Durham, Durham, England

Discrete symmetries play a crucial role in physics beyond the Standard Model. Focusing on supersymmetric models which aim at explaining the family structure of quarks and leptons, I first discuss how discrete Abelian symmetries such as e.g. R-parity can emerge from an underlying $U(1)$ family symmetry. The observation of large and very peculiar mixing angles in the neutrino sector motivates the idea non-Abelian discrete family symmetries. I review their implementation in supersymmetric model building, and briefly comment on the implications of the recent measurement of $\theta_{13} \approx 9^\circ$ by the Daya Bay and RENO collaborations.

Eingeladener Vortrag T 7.3 Di 14:45 HSZ-02

Messung von γ in Tree-Zerfällen bei LHCb — •Till Moritz Karbach — CERN, Genf

Der CKM-Winkel γ ist noch immer einer der am wenigsten genau bekannten Parameter der CKM Quark-Mischungsmatrix. Er lässt sich in Tree-Zerfällen der Art $B \to DK$ messen, wobei B und D generisch für geladene und neutrale Beauty- und Charm-Mesonen stehen. Die theoretische Unsicherheit dieser Methode ist extrem klein, $\Delta\gamma/\gamma = \mathcal{O}(10^{-6})$. Dadurch wird der Standardmodellpunkt definiert, mit dem sich Vorhersagen für γ aus globalen Fits des Unitaritätsdreiecks vergleichen lassen. Durch diesen Vergleich könnten erste Hinweise auf neue Phänomene identifiziert werden.

Eine neuartige, erstmals bei LHCb durchgeführte Messung, ist die Analyse von $B_s \to D_s K$ Zerfällen, deren Zeitabhängigkeit von der schwachen Phase $(\gamma - 2\beta_s)$ bestimmt wird. Dabei ist β_s die Mischungsphase des B_s-Systems. Die schwache Phase ist in diesen Zerfällen besonders gut messbar, da das Verhältnis der interferierenden Amplituden relativ groß ist.

Mit dem in 2011 aufgezeichneten Datensatz ($\sqrt{s} = 7\,\text{TeV}$) erreichen die kombinierten LHCb-Messungen eine Präzision auf γ von 16°. Diese ist vergleichbar mit derjenigen der finalen Messungen der B-Fabriken BaBar und Belle. Der Vortrag stellt die einzelnen Messungen vor, insbesondere diejenige von $B_s \to D_s K$, und diskutiert die Kombination dieser Messungen mit einer frequentistischen Methode.

Eingeladener Vortrag T 7.4 Di 15:15 HSZ-02

Automation of NLO calculations - Precise predictions for LHC processes — •Nicolas Greiner — Max-Planck-Institut fuer Physik, Foehringer Ring 6, 80805 Muenchen

The search for new physics is one of the main targets of the LHC. This requires an excellent understanding of the measurement and its uncertainties as well as precise predictions for signal and background on the theoretical side. Calculations at leading order in perturbation theory suffer from sizeable uncertainties leading to only imprecise predictions. Adding the next-to-leading order contributions improves the situation but the calculations become much more intricate. Therefore it is desirable to have such calculations done in an automated way in order to save time and avoid mistakes.

In this talk I will explain public tools that can be used for automated calcuations. Besides their description I will mainly focus on how they can be applied to relevant processes and present some results.

Eingeladener Vortrag T 7.5 Di 15:45 HSZ-02

Search for Higgs and other bosons in beyond standard model physics with CMS — •Adrian Perieanu — I. Physikalisches Institut B RWTH, Aachen, Deutschland

The data recorded with the CMS detector during the pp collisions at 7 TeV and 8 TeV centre of mass energy in 2011 and 2012,respectively, are analysed in the light of search for physics beyond the standard model. The di-muon and di-tau decay channels in various models are considered. The search for the di-muon rare decay of the Higgs boson in standard model and beyond is presented together with the search of di-tau pair decay of Z' boson and Higgs in W-boson associated production.