HK 15: Hauptvorträge I

Zeit: Dienstag 11:00–12:30 Raum: Audimax

Hauptvortrag HK 15.1 Di 11:00 Audimax

Lattice QCD calculations and the muon anomalous magnetic moment — •Antoine Gerardin — Institute for Nuclear Physics, Mainz

The anomalous magnetic moment of the muon is one of the most promising observables to identify hints for physics beyond the Standard Model of particle physics. This quantity exhibits a persistent discrepancy of 3.5 standard deviations between the direct measurement by the Brookhaven E821 Collaboration and its theoretical prediction based on the Standard Model. Two new experiments (E989 at Fermilab and E34 at J-PARC) should reduce the experimental error by a factor four in the next few years. A similar reduction of the theory error is therefore highly desirable. The later is now dominated by effects of the strong interaction between quarks and gluons (QCD): the contribution from the hadronic vacuum polarization (HVP) and from hadronic light-by-light scattering (HLbL). I will discuss recent progress on determination of hadronic contributions from lattice QCD calculations.

Hauptvortrag HK 15.2 Di 11:30 Audimax

Wie identifiziert man QCD-Exoten? — •Malte Albrecht — Ruhr-Universität Bochum, Germany

Das Spektrum der bekannten QCD-Zustände ist ausgesprochen umfangreich. Neben den im Quarkmodell etablierten Zuständen (Mesonen, Baryonen) sollte es nicht nur weitere Multiquarkzustände, sondern auch Gluebälle und Hybride geben. Trotz zahlreicher Kandidaten war eine eindeutige Identifikation und Klassifikation solcher Zustände bisher jedoch nicht zweifelsfrei möglich. In diesem Vortrag wird aufgezeigt, wie durch gezielte Untersuchungen der Produktions- und Zerfallseigenschaften in verschiedenen physikalischen Prozessen und Energiebereichen ein konsistentes Bild entstehen kann.

Hauptvortrag HK 15.3 Di 12:00 Audimax

Beta and double-beta decays within an effective theory — •Eduardo Coello Pérez — Institut für Kernphysik, Technische Universität Darmstadt, 64289 Darmstadt, Germany — ExtreMe Matter Institute EMMI, Helmholtzzentrum für Schwerionenforschung GmbH, 64291 Darmstadt, Germany

We have developed an effective theory in terms of collective degrees of freedom to calculate the matrix elements for beta decays from odd-mass nuclei to excited states in spherical even-even nuclei. For the systems in which the effective theory consistently describes the data, we then also calculated the matrix element for the two-neutrino double-beta decay between the corresponding even-even nuclei. The systematic construction of the effective operators within the effective theory allows one to estimate theoretical uncertainties. The calculated two-neutrino double-beta decay matrix elements with associated theoretical uncertainties consistently describe experimental data where available, without the need for additional adjustments.