HK 17: Hauptvorträge II

Zeit: Dienstag 11:00–12:45 Raum: Plenarsaal

Hauptvortrag HK 17.1 Di 11:00 Plenarsaal

Laboratories of the Strong Interaction: Exotic Hadrons — •Sebastian Neubert — Physikalisches Institut, Heidelberg, Germany

The formation of hadrons, which escape description through the quark model, is a most fascinating effect of the strong interaction. Such exotic hadrons can be studied with a variety of experimental techniques. The discovery of mesons composed of four quarks in decays involving charmonia at the B-factories has opened an experimental window that is especially well suited to the direct observation of effects beyond the quark model. With the discovery of Pentaquark candidates in their decay to J/ψ proton, LHCb has extended this window to the baryon sector. These phenomena are unique laboratories to study multiquark and multihadron effects in the spectrum of QCD, which may hold the key to some of the oldest questions in understanding the strong interaction.

Hauptvortrag HK 17.2 Di 11:35 Plenarsaal

Nuclear thermodynamics from chiral effective field theory — •Corbinian Wellenhofer — Institut für Kernphysik, Technische Universität Darmstadt — ExtreMe Matter Institute EMMI, GSI Helmholtzzentrum für Schwerionenforschung GmbH

The thermodynamics of dense nuclear matter is of fundamental importance for heavy-ion collisions and many astrophysical phenomena, in particular core-collapse supernovae and neutron star mergers. In recent years, considerable progress has been achieved in the description of low-energy nuclear interactions based on chiral effective field theory. This presentation focuses on recent advances in the application of chiral two- and three-nucleon interactions in nuclear matter calculations at zero and finite temperature. The discussed topics include the predictions for various nuclear bulk properties, the nuclear liquid-gas phase transition, and the fourth-order term in the Fermi-momentum expansion. The role of three-nucleon interactions and their impact on the theoretical uncertainties is examined, and we discuss current developments that are aimed at testing the many-body convergence and the construction of a chiral nuclear equation of state for astrophysical applications. Supported by the DFG - Projektnummer 279384907-SFB 1245.

Hauptvortrag HK 17.3 Di 12:10 Plenarsaal

Strange hadrons in cold and hot nuclear matter* — •Joana Wirth for the HADES-Collaboration — Physik Department, TUM, Garching, Germany — Excellence Cluster "Universe", Garching, Germany

The properties of hadrons immersed in a strongly interacting environment have been of great interest in recent decades. HADES explores the effects of nuclear matter in heavy ion collisions where baryon densities ρ_B exceed the normal nuclear density. However, modifications of hadron properties are already expected in cold nuclear matter (ρ_0), which is investigated in hadron-nucleus reactions with HADES where the dynamics are less complex and fundamental aspects can be addressed more directly. A nearly complete set of strange particles ($K^{\pm,0}$, Λ and ϕ) produced in the Au+Au collisions at 1.23A GeV as well as in $\pi^- + A$ ($A = C$, W) at $p_{\pi^-} = 1.7$ GeV/c has been measured.
We will present results on the (double-differential) yields and compare them with transport calculations. The KN potential is studied by means of the K^0_S and Λ kinematical distributions. Special attention will be on the investigation of the exclusive channel $\pi^- + p \rightarrow K^0 + \Lambda$ to shed light on the ΛN and $\Sigma^0 N$ potentials predicted by χ effective theory. In addition, the relative production yields of ϕ to K^- in all three collision systems will be discussed. Moreover, the K^- and ϕ absorption studied in πA collisions will be addressed in a model-independent way for the first time. ∗ supported by the DFG cluster of excellence "Origin and Structure of the Universe" and SFB 1258