HK 10: Hauptvorträge I

Zeit: Dienstag 8:30–10:30 Raum: F 1

Hauptvortrag HK 10.1 Di 8:30 F 1

Status of the FAIR Project — •Paolo Giubellino — FAIR & GSI, Darmstadt

The Facility for Antiproton and Ion Research FAIR is one of the European flagship facilities for basic science in the coming decades. The unique accelerator and experimental facilities will allow for a large variety of unprecedented fore-front research in physics and applied science. The science program of FAIR is structured in four research pillars: APPA, CBM, NUSTAR and PANDA. In the field of nuclear structure, nuclear astrophysics and nuclear reactions, the FAIR accelerator with the versatile NUSTAR instrumentation will give access to the yet unknown region of r-process path nuclei at and beyond N=126 and thereby provide stringent constraints for our understanding of the nucleosynthesis of the heaviest nuclei. In the field of nuclear and hadronic matter physics, CBM will offer unique conditions for a comprehensive study of QCD matter at the highest net-baryon densities achievable in the laboratory. In the field of hadron physics, PANDA opens up excellent research opportunities for high-precision systematic measurements in hadron spectroscopy and hadron structure. In addition FAIR will also allow for novel precision experiments in atomic physics as well as for tests of fundamental symmetries and interactions in nature. Last but not least, FAIR, with its large variety of ion beam species, energies and intensities will offer broad opportunities for a rich applied research program, APPA. The status of the FAIR realization and the plans for an intermediate research program at GSI will be presented.

Hauptvortrag HK 10.2 Di 9:10 F 1

Ab initio calculations of the neutron skin and the electric dipole response of nuclei — •Sonia Bacca — TRIUMF, Vancouver, Canada

The nuclear dipole response and its sum-rules are strongly correlated with the size of atomic nuclei. They also informs us about the neutron equation of state and thus link atomic nuclei to neutron stars [1]. Combining the Lorentz integral transform with the coupled-cluster method allowed us to perform ab initio computations of response functions for medium mass nuclei [2,3]. I will show recent highlights in conjunction with calculations of neutron skins and discuss them in light of recent and future experiments [1,4]. [1] G. Hagen et al., Nature Physics 12, 186-190 (2016). [2] S.Bacca et al., Phys. Rev. Lett. 111 122502 (2013). [3] M.Miorelli et al., Phys. Rev. C 94, 034317 (2016). [4] J. Birkhan et al., arXiv:1611.07072

Hauptvortrag HK 10.3 Di 9:50 F 1

QCD in external magnetic fields — •Gergely Endrődi — Goethe University Frankfurt

The physics of strongly interacting matter in background magnetic fields features rich phenomenology and has a wide range of applications, ranging from heavy-ion collisions through neutron star physics to the evolution of the early Universe. The most effective systematic approach to investigate this field is by means of numerical lattice simulations of the underlying theory, QCD. In this talk I give an overview of the recent developments in lattice QCD with background magnetic fields and discuss the relevance of the results for heavy-ion phenomenology.