

HK 57: Hauptvorträge

Zeit: Freitag 11:00–12:30

Raum: A

Hauptvortrag

HK 57.1 Fr 11:00 A

The PANDA Experiment at FAIR — •BERNHARD KETZER for the PANDA-Collaboration — Technische Universität München, Physik Department, 85748 Garching, Germany

PANDA is a new detector at the antiproton storage ring HESR of FAIR to study fundamental questions of hadron physics at large distances using an intensive, cooled antiproton beam. Precision spectroscopy of hadrons containing strange and charm quarks in the mass range between 2 and 5 GeV/ c^2 is the key towards a complete understanding of the charmonium spectrum, especially above the $D\bar{D}$ threshold, and a firm establishment of gluonic excitations, like hybrids or glueballs, or multi-quark states. Modifications of spectral properties of charmed mesons in nuclear matter are expected to give insight into the mechanism of hadron mass generation by chiral symmetry breaking. Other topics to be studied at PANDA include measurements of J/ψ dissociation in nuclei, hypernuclei, time-like electromagnetic form factors, and open charm physics.

The efficient detection and identification of charmed hadrons requires a state-of-the-art spectrometer with high resolution and maximum solid angle coverage both for charged and neutral particles, and a flexible yet selective triggering and data acquisition system.

After a brief overview of the FAIR accelerator complex, I will discuss the physics questions to be addressed at PANDA, the requirements to the beam and detector resulting therefrom, and the present layout of the detector, including a more detailed description of a few of its key components.

Hauptvortrag

HK 57.2 Fr 11:30 A

Experiments with real photons for nuclear astrophysics^D — •ANDREAS WAGNER¹, NADIA BENOURET^{1,2}, ROLAND BEYER¹, FRIEDRICH DÖNAU¹, MARTIN ERHARD¹, ECKART GROSSE^{1,3}, ARND JUNGHANS¹, KRASIMIR KOSEV¹, CHITHRA NAIR¹, GENCHO RUSEV¹, KLAUS-DIETER SCHILLING¹, and RONALD SCHWENGNER¹ — ¹Institut für Strahlenphysik, Forschungszentrum Dresden-Rossendorf, 01314 Dresden — ²Univ. d' Alger, 16111 Alger, Algerie — ³Institut für Kern- und Teilchenphysik, Tech. Univ. Dresden, 01062 Dresden

Explosive stages in the evolution of massive stars lead to temperatures which cause photon-induced disintegration of nuclei producing e.g. the so-called p-process nuclei and possibly modifying the r-process path. In order to obtain a detailed understanding of those processes an experimental program using intense bremsstrahlung has been initiated at the new superconducting electron accelerator ELBE at the Forschungszentrum Dresden-Rossendorf. For the first time the smooth transition from photon scattering to photo-disintegration has been investigated in detail experimentally for the chain of all stable even-even molybdenum isotopes, the N=50 closed shell nuclei ⁸⁸Sr, ⁸⁹Y, ⁹⁰Zr, and the p-process nucleus ¹⁴⁴Sm. The influence of the tail of the giant dipole resonance at energies well below 10 MeV and (γ, p) - and (γ, α) -reactions are discussed leading to important consequences on cosmic element production in sufficiently hot environments.

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Hauptvortrag

HK 57.3 Fr 12:00 A

Search for kaonic clusters in nuclear collisions at SIS18 — •LAURA FABIETTI for the FOPI-Collaboration — Technische Universität München

Recently a new method to study in-medium hadron-mass spectroscopy has been carried out, that involves the production of deeply bound states of a hadron-nucleus system. The formation of such objects has been investigated theoretically and the predicted bound states of kaon and nucleons are expected to have narrow decay widths, large binding energies and also a high density. Experimentally, direct reactions using kaon beams have been studied at KEK and at Frascati, ppnK-, pnnK-, ppK- states have been observed. The available data are far from being conclusive and more experiments are needed. In particular, we plan within the next two years a serie of exclusive measurements to study the production of such states in proton induced and heavy ion reactions. The theoretical predictions, the so far available results and the future experiments planned at SIS18 at GSI will be discussed. This program is supported as Young Investigator Group by the HGF.