FIAS Seminar

Thursday, November 13, 2008, 14:30
FIAS, Ruth-Moufang-Str. 1, 60438 Frankfurt am Main
Lecture Hall 0.100

Speaker: Prof. Dr. Josef Pochodzalla, Physics Dept., Johannes Gutenberg University, Mainz

Title: Beyond the conventional nuclear chart: hyperons and antihyperons in nuclear systems

Abstract: Quantum Chromo Dynamics (QCD) is the theory of the force responsible for the binding of nucleons and nuclei and thus of a significant fraction of the ordinary matter in our universe. While the internal structure of hadrons and the spectra of their excited states are important aspects of QCD, it is at least equally important to understand how nuclear physics emerges in a more rigorous way out of QCD and how nuclear structures - nuclei on the small scale and dense stellar objects like neutron stars on the large scale - are formed.

A hyperon bound in a nucleus offers a selective probe of the hadronic many-body problem as it is not restricted by the Pauli principle in populating all possible nuclear states, in contrast to neutrons and protons. On one hand a strange baryon embedded in a nuclear system may serve as a sensitive tracer for the nuclear structure and its possible modification due to the presence of the hyperon. On the other hand properties of hyperons may change dramatically if implanted inside a nucleus. Therefore a nucleus may serve as a laboratory offering a unique possibility to study basic properties of hyperons and strange exotic objects. Thus hypernuclear physics represents an interdisciplinary science linking many fields of particle, nuclear and many-body physics.

The talk will give an overview of future experiments on hypernuclei. Finally, a possible experiment to study the properties of antihyperons in nuclei will be presented.