

HK 28: Invited Talks

Time: Thursday 11:00–13:00

Location: MED 00.915

Invited Talk HK 28.1 Thu 11:00 MED 00.915
Toward the Island of Stability — ●KHUYAGBAATAR JADAMBAA — GSI Helmholtzzentrum für Schwerionenforschung GmbH, Darmstadt, Germany

Superheavy elements with extremely large atomic numbers remain one of the central and interdisciplinary research topics in modern science. In nuclear physics, one of the major goals is to explore the properties of superheavy nuclei (SHN) in the region of $Z = 114$ – 126 and $N=184$, where the next shell closures are predicted to occur. Superheavy nuclei in this region are expected to exhibit significantly longer spontaneous fission half-lives than their neighboring ones. Consequently, the fission landscape of SHN, in terms of half-life, has been envisioned as an Island of Stability surrounded by a sea of instability. Intensive research programs dedicated to probing the shell structure and fission stability of SHN are ongoing worldwide, including those conducted with the gas-filled recoil separator TASCA at GSI, Germany. I will present/discuss the current status of studies on the fission-landscape of SHN toward the Island of Stability.

Invited Talk HK 28.2 Thu 11:30 MED 00.915
From stars to underground labs: Nuclear astrophysics measurements at Felsenkeller — ●ELIANA MASHA — Helmholtz-Zentrum Dresden-Rossendorf (HZDR)

Nuclear reactions in stars take place at very low energies and are characterized by extremely small cross sections. To reproduce these conditions in the laboratory, high-intensity ion beams and low background environments are required. Underground accelerator laboratories provide such conditions by suppressing cosmic-ray induced background, enabling direct measurements at relevant astrophysical energies. This approach was pioneered by the LUNA experiment at Gran Sasso and has since been extended to other underground facilities worldwide. Among them, the Felsenkeller laboratory in Dresden offers new opportunities for precision nuclear cross-section measurements for different astrophysical scenarios. This talk will introduce the connection between nuclear processes in stars and underground laboratory experiments, and present selected science cases from the Felsenkeller laboratory.

Invited Talk HK 28.3 Thu 12:00 MED 00.915
Hunting exotic mesons in the light-quark sector at GlueX

— ●FARAH AFZAL for the GlueX-Collaboration — Ruhr University Bochum, Bochum, Germany

The detailed understanding of the hadron spectrum is currently one of the biggest open issues in the field of hadron physics. Most of the observed states are classified as quark-antiquark mesons or three-quark baryons. However, quantum chromodynamics (QCD) allows for a much richer spectrum with more complex, non-conventional configurations, such as multi-quark states, hybrid mesons and glueballs. Hybrid mesons, which manifest gluonic degrees of freedom, serve as an ideal testing ground for the non-perturbative regime of QCD and understanding the role of gluons in hadron formation.

The main goal of the GlueX experiment is to search for exotic hybrid mesons and to map out their spectrum in the light-quark sector. The experiment is located in Hall D at Jefferson Lab, USA, and uses a linearly polarized photon beam with energies of up to 12 GeV incident on a liquid hydrogen target and consists of a high-acceptance spectrometer with excellent charged as well as neutral particle detection capabilities. This allows us to study the production mechanisms and decays of a wide range of hadronic resonances.

This talk gives an overview of the ongoing search for exotic mesons in the light-quark sector at GlueX.

Invited Talk HK 28.4 Thu 12:30 MED 00.915
Dispersive analyses of Primakoff reactions with kaons — ●BASTIAN KUBIS — Helmholtz-Institut für Strahlen- und Kernphysik (Theorie), Universität Bonn, Nussallee 14-16, 53115 Bonn

The scattering of a charged-kaon beam off the Coulomb field of a heavy nucleus, as planned at the AMBER experiment at CERN, allows one to investigate photon-kaon reactions to various final states, so-called Primakoff processes. We investigate two important such reactions. First, we analyse $\gamma K \rightarrow K\pi$ and show how dispersion theory provides access to both the chiral anomaly and radiative resonance couplings in a unified manner. Second, from Compton scattering on the kaon, electric and magnetic polarisabilities can be extracted, which provide fundamental structure information about the lightest strange hadrons. We discuss similarities and differences to the analogous COMPASS analysis with charged pions, and show how the effects of the $K^*(892)$ resonance, seemingly impeding the polarisability determination, can be included model-independently.