

HK 85: Eingeladene Hauptvorträge

Zeit: Freitag 11:00–13:00

Raum: HSZ-02

Hauptvortrag HK 85.1 Fr 11:00 HSZ-02
Matrix Elements for Fundamental Symmetries — ●JAVIER MENENDEZ — Technische Universität Darmstadt — ExtreMe Matter Institute

Symmetries are crucial for our understanding of Nature and can be tested at low energies with massive detectors. These processes depend on matrix elements that involve both nuclear states, described with state-of-the-art nuclear structure calculations; and hadronic currents, obtained at nuclear energies within chiral effective field theory. Two processes will be reviewed: neutrinoless double-beta (0nbb) decay, and the scattering of weakly interacting massive particles (WIMPs) off nuclei. 0nbb decay violates lepton number conservation and its observation would establish the Majorana nature of neutrinos. WIMPs are predicted in supersymmetric extensions of the Standard Model and are among the most promising candidates for Dark Matter.

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Hauptvortrag HK 85.2 Fr 11:40 HSZ-02
Nuclear reactions for astrophysics studied at LUNA and in the Dresden Felsenkeller — ●DANIEL BEMMERER for the LUNA-Collaboration — Helmholtz-Zentrum Dresden-Rossendorf

Nuclear reactions power our Sun, and they create the chemical elements that are necessary for human life. In order to correctly understand what happens in stars, one needs astronomical observations, but also nuclear physics data. For a number of astrophysical scenarios such as the Big Bang and our Sun, precise astronomical data are now available. This calls for new nuclear reaction data of similar precision.

The nuclear reactions that are important for hydrogen burning in

the Sun and for Big Bang nucleosynthesis have to be studied by low-energy experiments with intensive beams of stable ions. Due to the low cross sections involved, the experiments are usually performed in a low-background environment, such as an underground laboratory. The results obtained in the last decade at the pioneering LUNA 0.4 MV accelerator deep underground in the Gran Sasso laboratory, Italy, will be summarized, as well as related studies at surface-based ion accelerators.

New, higher-energy underground accelerators are necessary to extend the energy range of the solar fusion data, and to address stellar helium and carbon burning. Relevant projects are underway both at LUNA and at the Dresden Felsenkeller.

Hauptvortrag HK 85.3 Fr 12:20 HSZ-02
Nukleare Astrophysik an FRANZ — ●KERSTIN SONNABEND — Goethe-Universität Frankfurt

An der Goethe-Universität Frankfurt entsteht zur Zeit die FRAnkfurter Neutronenquelle am Stern-Gerlach-Zentrum (FRANZ), deren hochintensiver Protonenstrahl und die damit produzierten Neutronen im keV-Energiebereich zukünftig für zahlreiche astrophysikalisch motivierte Experimente genutzt werden. Dabei werden neutronen- und protoneninduzierte Reaktionsraten, die für die Synthese der schweren Elemente im s- und p-Prozess verantwortlich sind, mit verschiedenen experimentellen Ansätzen untersucht. Aktuelle technische Entwicklungen und Highlights des geplanten experimentellen Programms werden vorgestellt.

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