Karlsruher Institut für Technologie

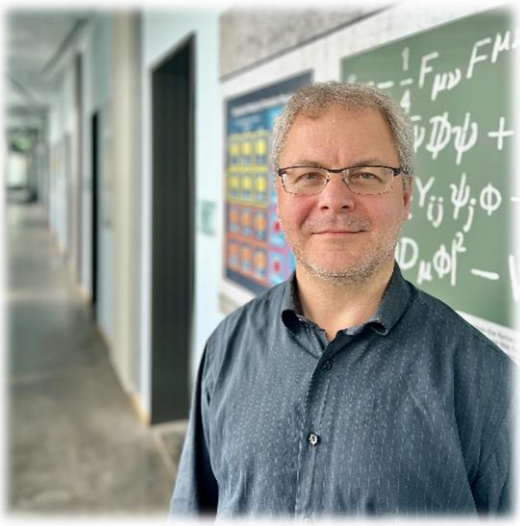
KIT-Fakultät für Physik

Einladung zum Physikalischen Kolloquium

21.06.2024 **Heiko Lacker, Humboldt-Universität zu Berlin**

»Searching for low-mass, feebly interacting particles with the SHiP experiment«

Einführung: T. Ferber



In March 2024, CERN decided – as part of its physics diversity strategy - to build the Search for Hidden Particles (SHiP) experiment at a dedicated beam-dump facility (BDF). The SHiP is optimized to search for low-mass, so-called feebly interacting particles (FIPs) such as right-handed Majorana neutrinos, dark photons, dark scalars, and axion-like particles, which have very long lifetimes. FIPs are predicted in extensions of the Standard Model of Particle Physics and might provide solutions to several unanswered questions such as: Why are the masses of the known neutrinos so small? How can one explain the observed matter-antimatter asymmetry in our universe? If dark matter is made from elementary particles, what is the nature of these particles?

With SHiP, one will be able to search for these particles by dumping 400 GeV protons from the CERN SPS accelerator on the massive beam-dump target. Thanks to the huge proton intensity, one will be sensitive to very small production cross sections of FIPs, which are searched for in the SHiP detector by reconstructing their decays into known particles. The search sensitivity of SHiP will extend the existing limits on the FIPs interaction probabilities with normal matter by several orders of magnitude. The setup is complemented by the so-called Scattering-and-Neutrino (SND) detector, the technology of which is already in use in SND @LHC, a detector that has measured in 2022 for the first time neutrinos that are produced by a collider. SND @SHiP will allow to search for light dark matter particles produced in the beam dump and scattering in the SND @SHiP detector. The detector will offer also a broad neutrino programme, in particular with the first high-statistics tau- and anti-tau neutrino sample.

The colloquium will present the physics case, the experimental methods and detectors as well as the status of the SHiP project.

Der Vortrag findet **am Freitag, den 21. Juni 2024 um 15:45 Uhr im Otto-Lehmann-Hörsaal**, Physik-Flachbau (Geb. 30.22), KIT-Campus Süd statt.

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