Plenary Talk PV III Tue 9:45 Audimax

Precision physics with low energy electron scattering: The physics program at MESA — •Harald Merkel for the MAGIX-Collaboration — Johannes Gutenberg University, Mainz, Germany

An increasing number of experimental results with clear tension to the predictions of the Standard Model of particle physics suggests a path to access new physics. While the high energy frontier beyond the Higgs particle does not provide an obvious energy range to look for new phenomena, the precision frontier (also in high energy physics!) has promising candidate experiments for the search for new physics.

In Mainz, the electron accelerator MESA (Mainz Energy-recovering Superconducting Accelerator) is under construction. The key to precision physics at MESA is the operating principle of an energy-recovering linac (ERL). An ERL can provide very high luminosities with nearly massless targets, which increases the possible resolution of low energy electron scattering experiments by orders of magnitude.

In this talk, the physics program of MESA will be presented. Two major experimental setups will be installed: the P2 experiment will focus on the determination of the weak mixing angle as a key parameter of the Standard Model via parity violating electron scattering. The MAGIX setup, a multi-purpose experiment with high-resolution spectrometers, will be able to make a significant contribution, e.g. to astrophysical S-factor measurements of the Oxygen nucleo-synthesis, few body physics, proton radius measurements, or the search for messenger particles of the dark matter sector.