Contribution ID: **56** Type: **not specified**

Precision Physics at MAMI and MESA

Friday, 19 August 2022 22:20 (25 minutes)

The Mainz Microtron MAMI provides an intense electron beam with energies up to 1.6 GeV. Precision measurements of the electromagnetic form factors and the polarizability of the nucleon are performed. The high degree of polarization of the beam also allows for precision measurements of parity violating asymmetries in elastic electron-proton scattering with longitudinally polarized electrons and determinations of the the two-photon exchange amplitude in the elastic scattering of electrons off nuclei with transversersely polarized electrons.

Currently, the new accelerator facility MESA is under construction. It will provide an even more intense electron beam that opens the window for high precision experiments. The MAGIX collaboration will use the very intense beam at the energy recovering mode with an internal gas target for very precise cross section measurements. The P2 collaboration plans experiments with parity violating electron scattering for a determination of the weak mixing angle which is sensitive to physics beyond the Standard Model in an energy range of up to 49 TeV. Futhermore, the DarkMESA experiment will perform a search for light dark matter at the MESA beam dump.

Category

talk

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Session Classification: Session 4