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From MAMI to MESA: Precision Tools to Probe Fundamental Interactions and Search for New Physics

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The Mainz Energy-recovering Superconducting Accelerator (MESA) is a cutting-edge facility designed to push the frontiers of particle, hadron, and nuclear physics. It will enable high-precision measurements, including the weak mixing angle at low energies, and contribute to the search for physics beyond the Standard Model. MESA's two flagship experiments, P2 and MAGIX, will offer crucial insights into nucleon form factors, weak radii of nuclei, and dark matter.

Together with its predecessor MAMI, MESA offers a complementary approach to the high-energy frontier — enabling low-energy precision tests of the Standard Model and advancing our understanding of fundamental interactions. This talk will trace that journey: a chronicle of precision, perplexities, and uncertain tales.

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