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Conceptual Design of the Muonium-to-Antimuonium Conversion Experiment (MACE)

The spontaneous conversion of muonium to antimuonium is one of the interesting charged lepton flavor violation phenomena offering a sensitive probe of potential new physics and serving as a tool to constrain the parameter space beyond the Standard Model. The Muonium-to-Antimuonium Conversion Experiment (MACE) is designed to utilize a high-intensity muon beam, a Michel electron magnetic spectrometer, a positron transport system, and a positron detection system, to either discover or constrain this rare process with a conversion probability of $\mathcal{O}(10^{-13})$. In this talk, we will present the experimental design and recent progress on prototyping and validation of MACE.

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