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Progress of Muonium-to-Antimuonium Conversion Experiment (MACE)

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Muonium-to-Antimuonium Conversion Experiment (MACE) aims to probe the spontaneous conversion from muonium to antimuonium. With a high-intensity muon beam, a high-resolution Michel electron spectrometer, a precise positron transport solenoid, and a near- 4π coverage positron spectrometer, MACE is expected to enhance the sensitivity to the rare process by more than two orders of magnitude, from the current stringent constraint obtained by the PSI experiment two decades ago. This talk will introduce the current status of MACE, including its considerations on physical goals, detection system designs, and simulation results. Recent efforts on detector R&D, muonium in-vacuum production scheme updates, positron solenoid design, and progress on sensitivity and background study will be presented.

Authors: ZHAO, Shihan (Sun Yat-sen University); MACE WORKING GROUP

Presenter: ZHAO, Shihan (Sun Yat-sen University)

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