Contribution ID: **59** Type: **not specified**

Optimization and Validation of Tiled Timing Counter for Muonium-Antimuonium Conversion Experiments

Modern particle detection systems increasingly rely on precise timing performance. This work presents the development of a scintillator Tiled Timing Counter (TTC) system optimized for the Muonium-to-Antimuonium Conversion Experiment (MACE). Our study introduces a simulation-guided optimization scheme and a prototype test with cosmic ray muons to validate the design concept. This study will pave the way for similar experiments of interests to measure the time of flight in a high resolution.

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