

Abstract Submitted
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Measurement of the MUSE Scattered-Particle-Scintillators Time Resolution¹ LIN LI, University of South Carolina, MUSE COLLABORATION — The proton-radius puzzle, which arises from the discrepancy between measurements of the proton charge radius using muonic and electronic probes, has led to theoretical and experimental investigations. The MUon Scattering Experiment (MUSE) at the Paul Scherrer Institute (PSI) will address the puzzle by determining the proton charge radius with electron- and muon-scattering measurements off the proton with high precision. The MUSE scattered-particle scintillators, built at University of South Carolina, are part of the readout trigger and serve as time-of-flight detectors for particle identification. The system is comprised of 18 120-cm long detectors in a front wall and 28 220-cm long detectors in a rear wall. In this talk I will discuss a testing procedure for the TOF system using cosmic rays and six detector elements to determine their time resolutions. With this procedure, an average time resolution of better than 60 ps over the full length of a long detector bar (6 cm × 6 cm × 220 cm) and better than 50 ps for a short bar (6 cm × 3 cm × 120 cm) was demonstrated. The time resolutions are well within the requirements of the experiment.

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