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Detectors for MUSE[1] JACK HIRSCHMAN, George Washington University, MUON SCATTERING EXPERIMENT (MUSE) COLLABORATION — Until recently, it was thought that the proton radius was known with an uncertainty of 1%. However, experiments carried-out at the Paul Scherrer Institute (PSI) involving muonic hydrogen yielded a radius 4% smaller with an uncertainty of .1%, a 7.9σ inconsistency. This problem of properly measuring the radius now requires new and different measurements. The Muon Scattering Experiment (MUSE) will thus be the first to utilize elastic muon scattering with sufficient precision to address the proton radius measurement. MUSE will run in PSI's PiM1 beamline, using a stack of GEM chambers and thin scintillation detectors to identify and track the beam particle species in this mixed e, pi, mu beam. Scattered particles will be measured in two arms with ten layers of Straw Tube Tracking (STT) detectors and a double plastic scintillator wall for timing of and triggering on scattered particles. The STT chambers will employ the anti-Proton Annihilations at Darmstadt (PANDA) design. Each straw consists of a thin wire with high voltage surrounded by an aluminized Mylar tube inflated with a mix of Argon and Carbon Dioxide, the ratio of which is important for optimal operation. The Argon gas, ionized by incoming charged particles, releases electrons which attract to the central wire. The CO2 acts as a quencher, taking-up electrons to prevent an unstable avalanche effect. This project will investigate the effects of altering the gas mixture in the STTs on signal size and timing.

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