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RF timing for MUSE and the Proton Radius Puzzle[1] RUJUTA MOKAL, Rutgers University, New Brunswick, MUON PROTON SCATTERING EXPERIMENT (MUSE) COLLABORATION — Knowledge about the proton and its radius are fundamental to research in nuclear, particle, and atomic physics. Recently, however, there is an approximately 4% discrepancy in the proton radius measured with muonic hydrogen spectroscopy compared to normal hydrogen spectroscopy or electron proton scattering. This discrepancy is known as the proton radius puzzle. For further investigation of the puzzle, a Muon-proton Scattering Experiment (MUSE) based at the Paul Scherrer Institute (PSI), Switzerland, is being performed. It uses a beam of particles including electrons, muons and pions. The interactions of these particles with the target proton is acquired through detectors and associated electronics. Analyzing the data will check whether the interactions of muons and electrons with protons are the same, will take us closer to an accurate value of the proton radius, and might possibly uncover new physics. I will be discussing recent analyses and observations of the RF time difference between electrons, muons and pions at different momenta and the comparison of these observations with our theoretical predictions.

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