Contribution ID: **8** Type: **Talk**

The MUSE experiment

The MUon proton Scattering Experiment (MUSE) at the PiM1 beam line of the Paul Scherrer Institute was created a decade ago in response to the Proton Radius Puzzle, the difference observed between muonic hydrogen measurements of the proton charge radius and the existing electronic measurements. To date, MUSE has commissioned its experimental systems to the level needed for the measurements and performed a careful studies of the electron and muon beam properties in the PiM1 channel. MUSE already obtained scattering data sets at 3 different beam momenta: +/-115 MeV/c, +/-160 MeV/c and +/-210 MeV/c in 2021 and 2022. Now MUSE is simultaneously measuring the elastic scattering of electrons and muons from a liquid hydrogen target to increase the statistics of those data sets. Both beam polarities are being measured over the course of the experiment. By comparing the four scattering cross sections, the experiment will provide unique muon proton scattering data with a precision sufficient to address the proton radius puzzle and will directly measure two-photon exchange (TPE) effects for both muons and electrons.

The MUSE experiment is supported by the US Department of Energy, NSF, PSI, and the US-Israel Binational Science Foundation.

Primary author: Dr ROSTOMYAN, Tigran (Paul Scherrer Institut)

Presenter: Dr ROSTOMYAN, Tigran (Paul Scherrer Institut)