Abstract Submitted
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Truncation Errors and Proton Radius Extractions from Form Factor Data[1] KATHERINE MESICK, Rutgers University, MUSE COLLABORATION — The MUon Scattering Experiment (MUSE) Collaboration plans to extract the proton charge radius from new $\mathcal{O}(1.\infty\%)$ measurements of the $\mu^{\pm}p$ and $e^{\pm}p$ electromagnetic form factors in the region of $Q^2 = 0.002 - 0.07$ GeV^2. The aim is to determine if there is a fundamental difference between e and μ, adding new insight into the proton radius puzzle – the $\sim 7\sigma$ discrepancy between the charge radius as determined from muonic hydrogen and that from atomic hydrogen spectroscopy and ep elastic scattering form factor data. One important consideration in extracting the radius from form factor data is errors in the fitting procedure, one of which is a so-called truncation offset, which results from the truncation of a series expansion to fit a finite range of Q^2 data. The truncation offset resulting from a Taylor series expansion and from an inverse polynomial series will be compared and discussed. An example of how the MUSE experiment plans to extract the proton radius and the anticipated significance will also be presented.

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