

Abstract Submitted  
for the SES16 Meeting of  
The American Physical Society

**A Proton Radius Puzzle?**<sup>1</sup> BLAINE NORUM, Univ of Virginia — The proton charge radius ( $r_p$ ) as measured using both the muonic atom Lamb shift [0.84087(39) fm] and the atomic hydrogen Lamb shift [new preliminary result 0.83(1) fm] differ significantly from a recent analysis of elastic electron scattering measurements [0.879(8) fm]. This discrepancy has generated a great deal of interest. To examine possible origins of this discrepancy we reanalyzed the published electron scattering data from Saskatchewan (1974), Mainz (1980), and Mainz (2014) using standard statistical methods. We found that these data are actually in very good statistical agreement with the Lamb shift results, thus indicating that no discrepancy exists. In addition, while strictly speaking not germane to the extraction of the charge radius, we found that a simple dipole function with its single parameter fixed to the muonic atom value of the proton radius reproduces  $GE_p$  within  $\approx 1\%$  up to momentum transfers of  $q^2 = 30 \text{ fm}^{-2}$ . This is far better agreement than is obtained using the “standard” dipole function which corresponds to  $r_p = 0.81 \text{ fm}$ .

<sup>1</sup>work supported by the U.S. Department of Energy, Office of Science, Office of Nuclear Physics under Contracts No. DE-AC05-06OR23177 and No. DE-SC0014325.

Blaine Norum  
Univ of Virginia, Charlottesville, VA 22904

Date submitted: 07 Oct 2016

Electronic form version 1.4