

Abstract Submitted
for the DAMOP13 Meeting of
The American Physical Society

Towards a measurement of the proton radius using the Lamb shift in hydrogen A.C. VUTHA, N. BEZGINOV, I. FERCHICHI, V. ISAAC, M.C. GEORGE, M. WEEL, C.H. STORRY, E.A. HESSELS, York University — The discrepancy between the charge radius of the proton, measured using muon-proton interactions versus electron-proton interactions, constitutes the *proton radius puzzle* [Pohl *et al.*, Nature 466:213 (2010), arXiv:1301.0905 (2013), Science 339:417 (2013)]. To aid in a resolution of the proton radius puzzle, we are developing an experiment with a fast metastable hydrogen beam, to measure the n=2 Lamb shift using the microwave separated oscillatory fields (SOF) technique. To avoid systematic effects from the frequency-dependent response of our microwave system, the measurement will use an SOF technique [Klein *et al.*, Phys. Rev. A 36, 3494 (1987)], in which the frequency is fixed and the relative phase is varied. We report on the current status of the experiment, including metastable hydrogen beam production by charge exchange of protons with a molecular hydrogen target, hyperfine-state preparation using microwaves, and Lyman-alpha photon detection using a large-solid-angle high-efficiency detector.

Amar Vutha
York University

Date submitted: 28 Jan 2013

Electronic form version 1.4