

DAMOP19-2019-020002

Abstract for an Invited Paper
for the DAMOP19 Meeting of
the American Physical Society

A high-precision measurement of the $n=2$ atomic hydrogen Lamb shift¹

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A precise microwave measurement of the $n=2$ Lamb shift of atomic hydrogen is presented. The measurement is performed using the new frequency-offset separated oscillatory field (FOSOF) technique. The rms proton charge radius can be determined by comparing the current measurement to existing precise QED theory. Since the measurement made in 2010 of the $n=2$ Lamb shift of muonic hydrogen, there has been a large unexplained discrepancy between the proton radius determinations using electrons and those determined using muons. This discrepancy has been referred to as the proton size puzzle, and the current measurement helps to resolve that puzzle.

¹This work was supported by NSERC, NIST, CFI and YRC.