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Two photon chirped laser cooling on 1S-2S transition of magnetically guided hydrogen SAMUEL COOPER, CORY RASOR, ZAKARY BURKLEY, ADAM BRANDT, DYLAN YOST, Colorado State University — There is currently a discrepancy in the RMS proton charge radius as determined from hydrogen spectroscopy, muonic hydrogen spectroscopy, and electron-proton scattering. This calls for new measurements in hydrogen with increased precision and reduced systematics. The ultimate limitations of previous precision hydrogen spectroscopy experiments have largely been the finite temperature of the atomic sample. In this talk, I will discuss progress towards a proposed two-photon laser cooling scheme on the 1S-2S transition using a continuous wave 243.15 *nm* radiation source and a cryogenic beam of atomic hydrogen transversely confined to a magnetic guide. Atoms prepared by this laser cooling scheme could have the longitudinal velocities reduced to $\sim 10 \text{ ms}^{-1}$ which would greatly reduce many of the current systematic uncertainties.

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