

PHAS Colloquium:

Laser spectroscopy of hydrogen and muonic atoms and the proton radius puzzle



ABSTRACT

Laser spectroscopy of muonic hydrogen yielded a proton rms charge radius which is 4% (or ~ 6 sigmas) smaller than the CODATA value. This discrepancy is now called the "proton radius puzzle". Also the deuteron charge radius from muonic deuterium is 6 sigmas smaller than the CODATA value, but consistent with the smaller proton inside the deuteron. These smaller charge radii, when combined with precision measurements of the 1S-2S transitions in regular (electronic) hydrogen and deuterium, yield a 6 sigmas smaller value of the Rydberg constant, compared to the CODATA value. In this talk I will report about a new measurement of the Rydberg constant from the 2S-4P transition in regular hydrogen performed in Garching, which supports the smaller, "muonic" value. More recently, however, a new measurement of the 1S-3S transition in Paris confirmed the larger proton radius. Several new measurements, such as hydrogen from York U, elastic electron scattering at lower Q^2 , and new results from electronic and muonic helium will help understand the proton radius puzzle.

Image Credit: Nature, July 8th 2010 Cover
Poster Designed By: Neil McCall (neilmcl@my.yorku.ca)

DATE: November 22nd, 2018

TIME: 12:00 PM

LOCATION: PSE 317

SPEAKER

Randolf Pohl

Johannes Gutenberg-Universität Mainz.

**THERE WILL
BE SNACKS**

ALL ARE WELCOME