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Seminar über Quanten-, Atom- und Neutronenphysik (QUANTUM)

July 20, 2023 at 2 p.m.
IPH Lorentzraum 05-127

Asst. Prof. Dylan Yost
Colorado State University

Precision Hydrogen Spectroscopy at Colorado State University

Because of atomic hydrogen's simplicity, its energy levels can be precisely described by theory. This has made hydrogen an important atom in the development of quantum mechanics and quantum electrodynamics (QED). While one can use hydrogen spectroscopy to determine the Rydberg constant and the proton charge radius, a discrepancy of these constants determined through different transitions, or in different species, can indicate new physics. Such discrepancies currently persist between different measurements in hydrogen and muonic hydrogen.

With this motivation in mind, I will discuss several precision spectroscopy measurements of hydrogen as Colorado State University including a relatively recent measurement of the hydrogen 2S-8D two-photon transition, a measurement of the hydrogen 2S hyperfine splitting, and our future plans to measure several relatively narrow 2S-nS transitions in hydrogen. If these latter measurements are successful, they could provide some of the most precise measurements of the Rydberg constant along with insight into the experimental discrepancies.

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