

APR13-2013-020109

Abstract for an Invited Paper
for the APR13 Meeting of
the American Physical Society

Proton Radius, Darwin-Foldy Term and Radiative Corrections

ULRICH JENTSCHURA, Missouri University of Science and Technology; Heidelberg University

It is not an easy task to define the proton charge radius. Namely, by definition, the proton radius is the slope of the G_E Sachs form factor of the proton at zero momentum transfer, provided one has subtracted from the scattering cross sections, all effects due to QED. That means that radiative corrections must be subtracted; these otherwise “mask” the proton structure from the surroundings. On the other hand, the self-energy of the proton (not of the electron or of the muon) also influence the spectrum of atomic hydrogen, or muonic hydrogen, respectively. In the talk, we shall review the difficulties faced by a consistent definition, offer a way to resolve them, and review the current status of Lamb shift predictions in muonic hydrogen, with a special reference to the current experimental-theoretical discrepancy, as reported by the CREMA collaboration.