

APR11-2010-000061

Abstract for an Invited Paper
for the APR11 Meeting of
the American Physical Society

Theory of the Lamb shift in muonic hydrogen

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Recently a successful measurement of the Lamb shift in muonic hydrogen was performed at PSI. According to the claimed accuracy, the most accurate value of the proton charge radius came from comparison of the PSI experiment and related theory. Unfortunately, the result disagrees with those from the hydrogen spectroscopy and electron-proton scattering experiments. To resolve discrepancy one has to revisit theory and measurements in each of three mentioned areas, namely, in spectroscopy of ordinary and muonic hydrogen and in the scattering. The present talk is on the state of the art of theory of the Lamb shift in muonic hydrogen.