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The proton radius puzzle

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In 2010 the proton charge radius was extracted for the first time from muonic hydrogen, a bound state of a muon and a proton. The value obtained was five standard deviations away from the regular hydrogen extraction. Taken at face value, this might be an indication of a new force in nature coupling to muons, but not to electrons. It also forces us to reexamine our understanding of the structure of the proton. In this talk I will describe an ongoing theoretical research effort that seeks to address this "proton radius puzzle". In particular, I will present the development of new effective field theoretical tools that seek to directly connect muonic hydrogen and muon-proton scattering.

Author: PAZ, Gil (Wayne State University)

Presenter: PAZ, Gil (Wayne State University)

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