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Model independent analysis of proton structure for hydrogenic bound states GIL PAZ, Wayne State University — The charge radius of the proton is a basic non-perturbative parameter. Recently, it was extracted for the first time from the Lamb shift in muonic hydrogen. For a long time it was anticipated that such a measurement would reduce the error by an order of magnitude compared to measurements from electron- proton scattering and regular hydrogen spectroscopy. While this goal was achieved, the value of the proton's charge radius that was obtained was, very surprisingly, five standard deviations away from the world average. The extraction of the charge radius from the Lamb shift in muonic hydrogen depends on a theoretical input. Together with Richard J. Hill, we are studying the hadronic uncertainty in the theoretical prediction using the tool of an effective field theory, namely NRQED. In the talk I will describe the results of this study.

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