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Spectroscopy of muonic atoms and the proton radius puzzle[1]

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We have measured several $2S - 2P$ transitions in muonic hydrogen (μp), muonic deuterium (μd) and muonic helium ions (μ^3He, μ^4He). From muonic hydrogen we extracted a proton charge radius 20 times more precise than obtained from electron-proton scattering and hydrogen high-precision laser spectroscopy but at a variance of 7σ from these values. This discrepancy is nowadays referred to as the proton radius puzzle. New insight has been recently provided by the first determination of the deuteron charge radius from laser spectroscopy of μd. The status of the proton charge radius puzzle including the new insights obtained by μd spectroscopy will be discussed.

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