

## The proton size puzzle: latest news

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Current status of the proton size puzzle from experimental and theoretical points of view is briefly discussed. The interest to these studies is primarily related to experiments conducted by the CREMA collaboration (Charge Radius Experiments with Muonic Atoms) with muonic hydrogen and deuterium by methods of laser spectroscopy. As a result a more accurate value of the proton charge radius was found to be  $r_p = 0.84184(67)$  fm, which is different from the value recommended by CODATA for  $7\sigma$ .

Then, we discuss recent calculations of the contribution of light pseudoscalar (PS) and axial-vector (AV) mesons to the interaction operator of a muon and a proton in muonic hydrogen atom, with the coupling of mesons to the muon being via two-photon intermediate state. Numerical estimates of the contributions to the hyperfine structure of the spectrum of the S and P levels are presented. It is shown that such contribution to the hyperfine splitting in muonic hydrogen is rather important for a comparison with precise experimental data.

**Primary author:** Prof. DOROKHOV, Alexander (JINR)

**Co-authors:** Prof. MARTYNENKO, Alexei (Samara University); Dr RADZHABOV, Andrey (Irkutsk University); Mr MARTYNENKO, Fedor (Samara University)

**Presenter:** Prof. DOROKHOV, Alexander (JINR)

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