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The Proton Radius and its Relatives A.D. 2023

Monday, 31 July 2023 13:00 (35 minutes)

The size of the proton as measured with electromagnetic probes has been heavily debated in the last decade or so. Here I discuss the dispersion-theoretical framework which is based on elementary principles of quantum field theory like analyticity and unitarity.
It allows to analyse electron-proton scattering data for all values of the momentum transfer, including also the time-like region.
I discuss in particular the consequences for the proton charge radius and its relatives, the proton and neutron magnetic radii. The so extracted proton charge radius has shown an incredible consistency over many decades. I will also briefly discuss upcoming experiments and issues that need to be addressed to increase the precision of such determinations. Finally, I present a novel method to extract the proton charge radius from J/ψ decays.

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