

Physics Division Seminar

Haiyan Gao

Duke University

The Proton Remains Puzzling

Host: Whitney Armstrong

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Nucleons (protons and neutrons) are the building blocks of atomic nuclei, and are responsible for more than 99% of the visible matter in the universe. Despite decades of efforts in studying its internal structure, there are still a number of puzzles surrounding the proton such as its spin, mass, and charge radius. While major progress has been made in the last three decades in understanding the proton spin "crisis", which originated in the late 1980s by the European Muon Collaboration experiment, the nature of the proton spin remains puzzling. Another puzzle developed about ten years ago concerns the proton charge radius, which refers to a 5-7 sigma discrepancy between the ultrahigh precise value of the proton charge radius determined from muonic hydrogen Lamb shift measurements and the values determined from electron-proton scattering experiments and the CODATA value of the electronic hydrogen spectroscopy measurements. In this talk I will introduce these puzzles first, and then focus on the latest developments concerning the proton spin and charge radius.