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Decoding the Nucleon; Experimental Approaches to Its Internal Structure

Tuesday 19 August 2025 09:00 (25 minutes)

Understanding the internal structure of the nucleon is a crucial step toward unraveling the mysteries of visible matter, which constitutes just ˜ 5% of our universe. Despite significant progress in understanding atomic and subatomic particles, key properties of the nucleon, such as the origin of its mass, the "proton spin crisis," and the proton radius puzzle, remain unsolved. This talk will provide an overview of experimental approaches to probing nucleon structure, from the foundational scattering experiments to modern techniques exploring generalized parton distributions (GPDs) and transverse momentum distributions (TMDs). Key experiments at facilities like Jefferson Lab, Fermilab, and future explorations at the Electron-Ion Collider (EIC) will be discussed. By analyzing deep inelastic scattering, measuring spin asymmetries, and studying sea quark contributions, we aim to build a more unified and comprehensive picture of the nucleon. The insights gained from these approaches not only deepen our understanding of nucleon structure but also offer pathways to addressing broader questions about the fundamental composition of our universe.

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Session Classification: Researcher session