

DNP17-2017-000107

Abstract for an Invited Paper
for the DNP17 Meeting of
the American Physical Society

Theoretical approaches to nucleon structure

CHRISTOPHER MONAHAN, Institute for Nuclear Theory

How do quarks and gluons, the basic degrees of freedom of the Standard Model of particle physics, interact to form protons and neutrons, the basic building blocks of most of the visible Universe? In spite of significant progress, the answer to this question is still unclear. Nucleons are strongly-coupled, highly nonlinear systems for which simple perturbative approaches fail and our understanding of their structure is far from complete. I will review recent theoretical approaches to nucleon structure, from both nonperturbative and perturbative quantum chromodynamics (QCD). In particular, I will highlight some recent advances in direct calculations from lattice QCD, in which QCD is formulated on a Euclidean hypercube, and discuss the complementarity and relative strengths of perturbative and lattice techniques. I will finish by providing an overview of various quantities for which lattice calculations and phenomenological results can (potentially) be compared.