Abstract Submitted
for the DNP20 Meeting of
The American Physical Society

Nucleon and Resonance Structure: Windows onto Emergent Hadronic Mass CRAIG ROBERTS, Nanjing University — Atomic nuclei are the core of everything we can see. At the first level of approximation, their atomic weights are simply the sum of the masses of all the nucleons they contain. Each nucleon has a mass mN ≈1GeV, i.e. approximately 2000-times the electron mass. The Higgs boson produces the latter, but what produces the nucleon mass? This is the crux: the vast bulk of the mass of a nucleon is lodged with the energy needed to hold quarks together inside it; and that is supposed to be explained by quantum chromodynamics (QCD), the strong-interaction piece within the Standard Model. Critically, one can argue that revealing the origin of mass will also explain the nature of confinement; and the problem of confinement is the focus of a "Millennium Problem" posed by the Clay Mathematics Institute. This contribution canvasses the potential for a coherent effort in QCD phenomenology and theory, coupled with experiments at existing and planned facilities, to reveal the origin and distribution of mass by focusing on the properties of the nucleon and its excitations, particularly as they are revealed in the baryon spectrum and through nucleon-resonance electroproduction.

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Date submitted: 18 Jun 2020 Electronic form version 1.4