Abstract Submitted
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High-Accuracy Analysis of Compton Scattering in Chiral EFT: Proton and Neutron Polarisabilities[1] HARALD W. GRIESSHAMMER, George Washington University, DANIEL R. PHILLIPS, Ohio University, JUDITH A. MCGOVERN, University of Manchester — Compton scattering from protons and neutrons provides important insight into the structure of the nucleon. A new extraction of the static electric and magnetic dipole polarisabilities α_{E1} and β_{M1} of the proton and neutron from all published elastic data below 300 MeV in Chiral Effective Field Theory shows that within the statistics-dominated errors, the proton and neutron polarisabilities are identical, i.e. no iso-spin breaking effects of the pion cloud are seen. Particular attention is paid to the precision and accuracy of each data set, and to an estimate of residual theoretical uncertainties. ChiEFT is ideal for that purpose since it provides a model-independent estimate of higher-order corrections and encodes the correct low-energy dynamics of QCD, including, for few-nucleon systems used to extract neutron polarisabilities, consistent nuclear currents, rescattering effects and wave functions. It therefore automatically respects the low-energy theorems for photon-nucleus scattering. The $\Delta(1232)$ as active degree of freedom is essential to realise the full power of the world's Compton data.Its parameters are constrained in the resonance region. A brief outlook is provided on what kind of future experiments can improve the database.

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Harald W. Griesshammer
Institute for Nuclear Studies, Department of Physics,
George Washington University

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