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Spin Polarisabilities and Compton Scattering from χEFT: Bridging QCD and Data[1] HARALD W. GRIESSHAMMER, George Washington Univ, JUDITH A. MCGOVERN, University of Manchester, DANIEL R. PHILLIPS, Ohio University — Compton scattering from protons and neutrons probes their two-photon response in electric and magnetic fields of real photons, exploring the symmetries and interaction strengths of the internal degrees of freedom. With the scalar polarisabilities α_{E1} and β_{M1} now reasonably understood, the focus turns to the so-far poorly explored spin-polarisabilities. They parametrise the stiffness of the nucleon spin in external electro-magnetic fields, analogous to rotations of the polarisation of light by optically active media (bi-refringence/Faraday effect) and are particularly sensitive to the directional dependence of the $\pi N\gamma$ interactions dictated by chiral symmetry and its breaking. This contribution addresses the potential of Chiral Effective Field Theory to relate between lattice QCD and ongoing or approved efforts at MAX-lab, HIγS and MAMI. We discuss high-intensity experiments with polarised targets and polarised beams which will allow the extraction of the spin-polarisabilities; χEFT predictions which indicate which observables for polarised protons, deuterons and 3He are particularly sensitive; convergence, residual theoretical uncertainties and possibilities for improvement; and chiral extrapolations in m_π for lattice computations.

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Harald W. Griesshammer
George Washington Univ

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