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Compton amplitude and the nucleon structure functions on the lattice via the Feynman-Hellmann theorem

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The structure of hadrons relevant for deep-inelastic scattering are completely characterised by the Compton amplitude. As a physical amplitude, the Compton tensor is parameterised by structure functions and it naturally includes all target mass corrections and higher twist effects at a fixed virtuality, Q^2 .

In this talk, I will be highlighting QCDSF/UKQCD Collaboration's recent developments on computing the Compton amplitude in a lattice approach. I briefly discuss how to access the Compton amplitude directly via the second-order Feynman-Hellmann theorem and as an application, present a calculation of the nucleon Compton tensor across a range of photon momenta. This enables us to study the Q^2 dependence of the low moments of the nucleon structure functions in a lattice calculation for the first time. I will also discuss possible further applications of this approach and present some preliminary results.

Preferred track

Hadron Structure

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