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Pion and rho structure functions from $N_f = 2 + 1$ lattice QCD

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The rho meson is the lightest strongly decaying particle and also the simplest spin-1 meson, which allows for the study of polarisation dependent structure functions that are not present in the spin-1/2 case. Its unstable nature complicates the analysis of its structure, both on the lattice and in experiment. However, it allows us to study the interplay between hadron polarization and parton densities, and provides us a comparative value for other spin-1 systems. The prominent example here is the b_1 structure function of the deuteron measured by HERMES.

So far, only very few lattice studies of the rho meson structure functions exist. Moreover, disconnected contributions were neglected, which we find to be non-negligible. We will present first results for flavor singlet and non-singlet matrix elements of the rho and the pion. Using a large subset of Coordinated Lattice Simulations (CLS) gauge ensembles enables us to perform a controlled quark mass- and continuum extrapolation to the physical limit.

Primary authors: Prof. SCHÄFER, Andreas (Regensburg University); Dr WEIN, Philipp (Regensburg University); LÖFFLER, Marius (Regensburg University)

Presenter: LÖFFLER, Marius (Regensburg University)

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