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Partonic functions in Minkowsky space with tensor networks –a Schwinger model study

The rich internal structure of hadrons is encoded in partonic functions, such as parton distribution functions (PDFs) and light-cone distribution amplitudes (LCDAs), which are crucial in collider experiments and decay processes. Calculating them from first principles remains a major challenge: they require matrix elements with a Wilson line along a light-like direction, which is not directly accessible in the Euclidean lattice formulation underlying conventional Monte Carlo simulations. In contrast, the Hamiltonian formalism allows for a direct treatment of light-cone dynamics. We present a tensor-network framework that extracts light-cone matrix elements in Minkowski space through real-time evolution of states, and show the application in the Schwinger model. We obtain PDFs and LCDAs for different fermion masses with controlled uncertainties, demonstrating the feasibility of tensor networks for dynamical calculations in gauge theories.

Parallel Session (for talks only)

Structure of hadrons and nuclei

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