

# Tensor Networks in High Energy Physics: calculating Parton Distribution Functions

Manuel Schneider

National Yang Ming Chiao Tung University

Abstract:

While Monte Carlo methods in euclidean spacetime are tremendously successful in high energy physics, they are not well suited to address several problems in the field. Parton Distribution Functions (PDFs) describe universal properties of bound states and allow to calculate scattering amplitudes in processes with large momentum transfer. Calculating PDFs involves the evaluation of a Wilson line along the lightcone. In contrast to euclidean spacetime, this can be directly computed in the Hamiltonian formalism. The necessary spatial- and time-evolution can be efficiently applied using established tensor network methods. We study PDFs in the Schwinger model using matrix product states.