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Towards a Pixel-Based Imaging of Quantum-Correlation Functions

Understanding hadron structure requires the extraction of Quantum Correlation Functions (QCFs), such as parton distribution functions and fragmentation functions, from experimental data. The extraction of QCFs involves solving an inversion problem, which is ill-posed due to errors and limitations in the experimental data.

To address this challenge, we propose a novel method for extracting QCFs by conceptualizing them as images or multidimensional tensors. This approach allows us to leverage image processing techniques, including Generative Adversarial Networks (GANs), to not only extract the QCFs but also quantify the associated uncertainties.

We will present results showcasing the application of this novel framework to the extraction of Generalized Parton Distribution Functions (GPDs) and Transverse Momentum Dependent Distribution Functions (TMDs).

AI keywords

Generative Adversarial Networks : Inversion Problem : Image Processing : Image Processing

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