

An extraction of the Sivers, and the Boer-Mulders functions in $SU(3)_{flavor}$ with DNNs.

I. P. Fernando, D. Keller
for the UVA Spin Physics Group

Abstract :

Transverse Momentum Dependent Parton Distribution Functions (TMDPDFs) can be extracted from the processes that are corresponding to multiple kinematic scales such as Drell-Yan (DY), Semi Inclusive Deep Inelastic Scattering (SIDIS), and $e^+ e^-$ annihilation. Among the eight leading-twist TMDPDFs, there are two time-reversal odd TMDs, namely the Sivers function and the Boer-Mulders function, which represent the correlation between the spin of the quark and the spin of the hadron. These T-odd TMD PDFs have connections to the partons' orbital angular momenta contributing to the overall angular momentum of the hadron. Deep Neural Networks (DNNs) are quickly becoming an invaluable tool for information extraction and modeling. DNN models can be built and trained to make predictions of the Transverse Momentum-dependent Distributions (TMDs) based on fits to Semi Inclusive Deep Inelastic Scattering (SIDIS) and Drell-Yan (DY) data. An analysis of the Sivers, and the Boer-Mulders functions in $SU(3)_{flavor}$ using DNNs with available experimental data as well as utilizing the transverse momentum of di-muons (q_T) dependence of the measured DY asymmetries from DNN-based reconstruction techniques will be presented in this talk.