TRANSVERSE MOMENTUM DEPENDENT QUARK DISTRIBUTIONS IN THE NAMBU JONA LASINIO MODEL

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Transverse momentum dependent quark distributions (TMDs), which appear in the cross sections of semi-inclusive deep inelastic scattering and Drell-Yan processes, are very important quantities in hadron physics. Because TMDs cannot be treated perturbatively, effective quark models are very useful theoretical tools for evaluating TMDs. One successful candidate is the Nambu-Jona-Lasinio (NJL) model. It successfully describes chiral symmetry and its dynamical breaking, but it generally fails to account for quark confinement.

In order to simulate effect of quark confinement, the proper time regularized NJL model with an infrared cut-off is often used. This approach gives very good descriptions of hadrons, for example, hadron form factors and PDFs are in excellent agreement with experiments.

In this talk, we discuss the TMDs in pseudoscalar and vector mesons as well as the nucleon in the NJL model using the proper time regularization scheme. Mesons are described as quark-antiquark bound states in the Bethe-Salpeter approach, while the nucleon is described as a solution of the Faddeev equation where the scalar and axial vector diquark channels are taken into account. The quark number and momentum sum rules are exactly satisfied in this method. We show our model results of 3-dimensional quark momentum distributions, and compare with empirical parameterizations.