



Contribution ID: 183

Type: Oral

Pion and Kaon Structure using Distribution Function

We have investigated the pseudo-scalar meson structure in the form of transverse momentum-dependent parton distribution functions (TMDs) and generalized parton distribution (GPDs) in the light-front based quark model. Starting from leading order, we have calculated all the time-reversal even TMDs for pion and kaon up to twist-4. The parton distribution functions (PDFs) of pseudo-scalar mesons have been compared with the experimental result through NLO DGLAP evolution. The sum rules, TMD transverse dependence, inverse moments and Gaussian transverse dependence have also been studied. Further, the transverse quark densities have also been analyzed in the momentum space plane. The electro-magnetic form factors (FFs) have also been calculated for both the particles through unpolarized GPDs. The FFs of pion and Kaon found to be matches with experimental results. The nuclear medium modifications effect has also been studied in this work to study the PDFs and TMDs.

Reference Paper-

- (1) S. Puhan, et.al, JHEP 02 2024.
- (2) S. Puhan, et.al, PRD 110 2024.

Field of contribution

Phenomenology

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