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Pion and Kaon Properties from Dyson-Schwinger Equations

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We summarize results on the internal structure and properties of the pion and kaon as an illustration of how insights into hadron physics can be obtained from calculations based on the Dyson-Schwinger equations of QCD. The light pseudoscalar mesons are the best possible case for such considerations as the approach is very well-constrained by symmetries and there is direct connection to continuum QCD. Emphasis is upon the parton structure as a reflection of QCD-mechanisms such as dynamical chiral symmetry breaking and flavor symmetry breaking. The full dependence upon the momentum fraction variable x is available this way, and the results here complement and extend the results for low moments obtained from lattice-QCD. Specific topics include distribution amplitudes $\phi(x)$, parton distribution functions $q(x)$, and relationships to the ultraviolet behavior of exclusive elastic and transition form factors of pions and kaons. If time permits, we will discuss a simple model exploration of the spacelike correlator approach for obtaining quasi-pdfs $\tilde{q}(x, P_z)$ that should approach $q(x)$ as $P_z \to \infty$.

Summary

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