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Partonic Structure of the Pion and Kaon[1]

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The pion and kaon occupy a special place in Quantum Chromodynamics (QCD) – the strong interaction sector of the Standard Model of Particle Physics – as they are both a bound-state of a dressed-quark and a dressed-antiquark in quantum field theory and a Goldstone mode associated with dynamical chiral symmetry breaking (DCSB) in QCD. DSCB and color confinement are the two emergent phenomena that characterize QCD, which together give rise to almost all of the mass in the visible universe. As Goldstone modes, the pion, together with its heavier sibling the kaon, provide important opportunities to help understand these phenomena. This talk will present recent results on the partonic structure of the pion and kaon obtained using the Dyson-Schwinger equations. Particular focus will be given to the properties of the pion and kaon as expressed by aspects of their light-front wave functions, and the connection of these properties to DCSB, examples include, parton distribution amplitudes and functions, form factors, transverse momentum dependent and generalized parton distributions, together with possible insights into confinement from flavor breaking effects. Opportunities to measure aspects of this partonic structure at facilities such as Jefferson Lab and a future electron-ion collider will also be discussed.

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