

JLab Experiments E12-09-011

Studies of the L/T Separated Kaon Electroproduction Cross Sections from 5-11 GeV

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The simplest strongly bound quark-gluon systems in nature are the two lightest quark-antiquark pairs, pions and kaons, and the two lightest three-quark systems, protons and neutrons - these also provide the building blocks for the atomic nuclei at the core of the atom. Gaining a quantitative description of the nature of these systems, including a revealing of their inner structure and an understanding of the dynamics that bind them, is thus of great importance for our understanding of the fundamental structure of matter. This experiment is aimed to confirm the potential of kaon measurements both for studies of the kaon structure itself and of the 3D structure of the proton, in terms of spatial imaging (tomography). In particular, **E12-09-011** will probe if the measurements to map the spatial extension of the charged pion can be extended to those of the charged kaon, and if kaons can be utilized to enable 3D spatial tomography of strange quarks.

The **E12-09-011** experiment is an exclusive measurement of the L/T separated kaon electroproduction cross section important for understanding the role of strangeness in GPD studies and the kaon form factor. It will for the first time make precision measurements of the L/T separated kaon electroproduction cross sections as a function of Q^2 above the resonance region. These data will provide information about the onset of the Q^2 evolution in kaon production. A direct comparison of the scaling properties of the π^+ and K^+ separated cross sections would provide an important tool for the study of the onset of factorization in the transition from the hadronic to the partonic regime, and provide a possibility to study effects related to SU(3). The L/T separated cross sections at low $-t$ can further provide constraints of the largely unknown kaon form factor.