



Canadian Association
of Physicists

Association canadienne
des physiciens et physiciennes

Contribution ID: 3129

Type: **Invited Speaker** / **Conférencier(ère) invité(e)**

(I) Pion and Kaon Form Factor Measurements at the EIC

Tuesday 7 June 2022 15:45 (30 minutes)

One of the most puzzling aspects of the standard model is that the overwhelming majority of the mass of hadronic systems arises from massless and nearly massless objects. How this occurs is poorly understood, and remains a major open question of the standard model. Developing our understanding of hadronic mass generation mechanisms is one of the three key physics questions for the upcoming Electron-Ion Collider (EIC). From the little that we do understand, we know that mass generation is intricately connected to the internal structure of hadronic systems. Somewhat counter intuitively, it is some of the lightest hadronic objects, the charged pion and kaon, that may be able to fill in the missing piece of the puzzle. Advancing our understanding of the internal structure of these objects is crucial if we are to begin to untangle how this structure emerges from the dynamical nature of the interactions that govern it.

One potential window into the internal structure of the charged pion and kaon is their elastic electromagnetic form factors, $F_\pi(Q^2)$ and $F_K(Q^2)$. Electromagnetic form factors are fundamental quantities which describe the spatial distribution of partons within a hadron. Determining these form factors, as well as how they vary with Q^2 , is an important step on our road to understanding the internal structure of these objects. The EIC opens up the possibility of studying $F_\pi(Q^2)$ and $F_K(Q^2)$ to very high Q^2 . The Q^2 reach of these measurements is deep into unexplored territory, these cutting edge measurements could help disentangle the mass generation puzzle of QCD. In this talk, I will outline the opportunities and challenges of pion and kaon form factor measurements at the EIC. I will also present the latest projections for these measurements, which are based upon recent detector simulations.

Author: Dr KAY, Stephen (University of Regina)

Presenter: Dr KAY, Stephen (University of Regina)

Session Classification: T4-6 Physics at the EIC Symposium: Experimental Opportunities at the EIC (DNP) | Symposium sur la physique à l'EIC: opportunités expérimentales à l'EIC (DPN)

Track Classification: Symposia Day (Tues. June 7) / Journée de symposiums (mardi, le 7 juin): Symposia Day (DNP) - Physics at the Electron-Ion Collider (EIC)