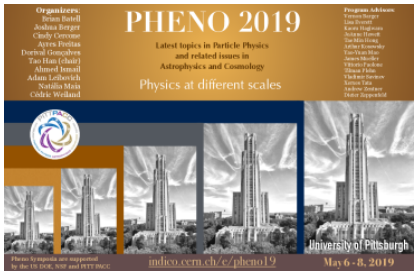

Contribution ID: **813** Type: **parallel talk**

Millicharged Particles in Liquid Argon Neutrino Experiments

Monday 6 May 2019 16:45 (15 minutes)

We investigate the potential of Liquid Argon (LAr) neutrino detectors to search for millicharged particles, a well-motivated extension of the standard model. Detectors located downstream of an intense proton beam that is striking a target may be exposed to a large flux of millicharged particles. Millicharged particles interact primarily through low momentum exchange producing electron recoil events near detector threshold. Recently, sub-MeV detection capabilities were demonstrated by the Fermilab ArgoNeuT detector, a small LAr detector which was exposed to the NuMI neutrino beam. Despite high background rates and its small size, we show that ArgoNeuT is capable of probing unexplored parameter space with its existing dataset. In particular, we show that the excellent spatial resolution in LAr detectors allows rejecting backgrounds by requiring two soft hits that are aligned with the upstream target. We further discuss the prospects of these types of searches in future larger LAr neutrino detectors such as the DUNE near detector.

Summary

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