

# The 21st International Workshop on Neutrinos from Accelerators (NUFACT2019)

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## Measuring the space charge effect in ProtoDUNE-SP

*Monday, August 26, 2019 7:00 PM (2 hours)*

The ProtoDUNE-SP detector is a 1/20 scale prototype, located at the CERN Neutrino Platform, of the planned first module of the DUNE far detector. Utilising single phase liquid argon TPC detection technology, ProtoDUNE-SP has successfully validated full scale prototype components and collected test beam and cosmic ray data to reduce systematic uncertainties in the future far detector. Space charge is the build-up of slow moving positive ions in a TPC. Due to the surface location of ProtoDUNE-SP, space charge has a large effect on the electric field and therefore on the position and number of ionisation electrons reaching the anode plane. As a result, measuring the magnitude of the space charge effect is required in order to allow accurate reconstruction of events. By selecting cosmic ray tracks with a known interaction time, a map of position distortions can be developed and the space charge effect in ProtoDUNE-SP determined. Using tracks passing through the anode plane greatly improves coverage in regions of the detector compared to cathode crossing tracks only, and a method of identifying anode piercing tracks is presented here.

### Working Group

WG1 : Neutrino Oscillation Physics

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