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Prototype Detector for the Deep Underground Neutrino Experiment: ProtoDUNE-SP

MICHAEL MOONEY, Colorado State University, DUNE COLLABORATION

The Deep Underground Neutrino Experiment (DUNE) is an international collaboration focused on studying neutrino oscillation over a long baseline (1300 km). DUNE will make use of a near detector and neutrino beam originating at Fermilab in Batavia, IL, and a far detector operating 1.5 km underground at the Sanford Underground Research Facility in Lead, South Dakota. The near and far detectors will use the LArTPC (Liquid Argon Time Projection Chamber) technology to image neutrino interactions. The single-phase far-detector prototype, ProtoDUNE-SP, which is located at CERN and contains 0.77 kilotonnes of LAr, is currently the largest single-phase LArTPC in operation (since September 2018). ProtoDUNE-SP acts as a test and validation of the design for the single-phase far detector, making use of one full-scale unit of the current far detector design. Data taken using a charged particle test beam and operation in a large cosmic flux enable the study of detector calibrations and optimization of event reconstruction algorithms. In this talk, I will give an overview of the construction, commissioning, and operation of ProtoDUNE-SP with an emphasis on first data analysis and critical detector calibrations.