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Precision temperature gradient system for ProtoDune YUJING SUN, Univ of Hawaii — DUNE is a world-leading long-baseline neutrino oscillation experiment which will measure fundamental physical parameters to unprecedented sensitivity and precision for addressing the neutrino mass hierarchy, CP violation in neutrino mixing, and resolving the octant of mixing angle 23. In addition to precisely testing the 3-flavor neutrino model, DUNE will also provide the opportunity to search for nucleon decay, neutrinos emitted by supernovae in our galaxy and beyond. In order to test and validate the technologies and design that will be applied to the construction of the DUNE Far Detector, DUNE prototype detectors of the order of 1 kton LAr, are under construction at CERN. A precision temperature gradient measurement system designed by Univ. of Hawaii group will measure the LAr temperature gradient in protoDUNE over 7.5 m height with 5 mK precision. The temperature gradient in LArTPC is an excellent measure of the LAr purity and recirculation effectiveness which is a great challenge in kton scale LAr detectors. A temperature sensor array will be deployed and can be moved vertically by a linear actuator to achieve measurement precision, while increasing sampling capability, limiting the number of cables and feedthroughs and cross calibrating sensors.

Yujing Sun
Univ of Hawaii

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