

Design of the Massive SiPMs sensor Characterization System for the Deep Underground Neutrino Experiment

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The Deep Underground Neutrino Experiment (DUNE) will be an experiment in neutrino physics. DUNE will consist of two detector locations, one located at the Fermi National Accelerator Laboratory near neutrino production, and a Far Detector at the Sanford Underground Research Facility, South Dakota. The far detector consists of 4 liquid argon tanks of 10-kilotons fiducial mass each used to detect the charge and light produced in liquid argon by neutrino interactions. The photons generated will be detected by Silicon Photomultiplier Sensors (SiPMs). Since there is a great quantity of light sensors for the experiment, it is necessary to design a system for their massive characterization. For this reason we are designing MASSIBO (Massive SiPM Characterization Boards), an automatic system which consists of electronic boards for the amplification, multiplexing and digitization of the sensor signals. Currently, the DUNE laboratory at IFIC is working on the first prototype using the amplification and the multiplexing boards for the validation of the system. The first complete version or V1 of MASSIBO is expected to be available by August 2023, and it will be capable of obtaining all the necessary data from 180 sensors every 6 hours.

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