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The commissioning of the ICARUS LAr detector on the short baseline (SBN) neutrino beam at FNAL

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The ICARUS T600 cryogenic detector is made of two identical modules for a total mass of ~ 760 tons of Liquid Argon, representing the biggest detector of this kind in operation. Each module is equipped with two readout chambers on the long sides, with planes of wires at 0° , $\pm 60^\circ$ for a total of 54000 readout wires. The LAr TPC's have been refurbished at CERN, in the framework of the WA104 project, and have been recently installed in the SBN Far Detector Building at FNAL. While during previous operations at LNGS, due to the deep rock overburden, a single prompt trigger has always ensured the unique timing connection of the main image of the event for the T600 detector, at FNAL, due to installation at shallow depth, several additional cosmic muons will be present in the 1 ms drift time, giving problems for track reconstruction. To handle this problem, in addition to a 4π cosmic ray tagger (CTS), a system based on 360 large area PMTs for the detection of the emitted scintillation light at ~ 128 nm has been implemented. This light readout system will allow both a precise event timing and localization and the exploitation of the SBN beam bunched structure (1.15 ns every 19 ns) to reject out-of-bunch cosmics. The timing measurements will rely on a fast laser based calibration system for time monitoring.

The refurbishment at CERN and installation and first commissioning at FNAL of the ICARUS detector will be reviewed, with emphasis on future perspectives.

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