The electronic set-up for the scintillation light detection system of ICARUS-SBN at Fermilab

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The ICARUS-T600 Liquid Argon (LAr) Time Projection Chamber (TPC) is presently used as a far detector of the Short Baseline Neutrino (SBN) program at Fermilab (USA) to search for a possible LSND-like sterile neutrino signal with the Booster Neutrino Beam (BNB).

A light detection system, based on 360 Hamamatsu R5912-MOD Photo-Multiplier Tubes (PMTs), has been realized for ICARUS-T600 to detect VUV photons produced after the passage of ionizing particles in LAr. This system is fundamental for the TPC operation, providing an efficient trigger and contributing to the 3D reconstruction of events.

The system requires a high performance electronic set-up based on 24 fast sampling digitizers CAEN V1730 (500 MSa/s, 14-bit) allowing for the recording and the discrimination of the PMT signals and providing a fast identification of interactions and the exploitation of the scintillation light for trigger purposes.