



## Poster session 1 - Monday 4 July

### P1.086 Performance study of the new light collection system for the ICARUS T600 detector

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*on behalf of ICARUS collaboration*

The ICARUS T600 detector is the largest liquid argon time projection chamber (LArTPC) to be built and operated. This detector was in operation in the INFN Gran Sasso underground laboratory until 2012, exposed to the CERN Neutrino to Gran Sasso (CNGS)  $\nu_\mu$  beam, performing neutrino oscillation studies.

The ICARUS T600 is presently under refurbishment in order to make it suitable for surface level operation as it will serve as the far detector for the Short-Baseline Neutrino (SBN) Program at Fermilab.

A major upgrade the ICARUS detector in order to allow it to cope with a high cosmic background is an upgrade of the light collection system. This upgrade will allow for the association of a charged track to its own light signal along the 20 meter beam direction for triggering as well as disentangling cosmogenic backgrounds from the neutrino signal.

Cosmic rays are expected to be the main trigger source in the T600 with only 1:4 triggers induced by beam neutrinos. The identification of events coming from neutrinos using the light collection system allows for a drastic reduction of the data rate.

The study presented here shows a simulation to optimize the PMT layout to allow for the localization and identification of interaction within the T600. An excellent performance can be obtained, with an error on the localization smaller than 20 cm and of the order of a few percent in the identification of cosmic rays.