

Abstract Submitted
for the APR18 Meeting of
The American Physical Society

Repurposing MINOS Scintillator Modules for the Short Baseline Neutrino Program Far Detector (ICARUS) Cosmic Ray Tagger¹
CHRISTOPHER HILGENBERG, ROBERT WILSON, Colorado State University,
ANNE SCHUKRAFT, SIMONE MARCOCCI, FNAL — The ICARUS T600 liquid argon time-projection chamber will be the far detector for the short baseline neutrino program. The detector will operate at shallow depth and therefore be exposed to the full surface flux of cosmic rays, which poses a problematic background to the electron neutrino appearance analysis. A direct way to remove this background is to utilize a detector external to the liquid argon active volume capable of tagging thoroughgoing cosmic muons with high efficiency. Ideally, this cosmic ray tagger (CRT) would provide full geometric coverage of the T600 amounting to about 900m². This is achieved through adopting a system based on extruded organic scintillator, wavelength-shifting fibers, and silicon photomultipliers. Due to the large area, the CRT is broken into 3 subsystems: the top portion will be new construction, the side coverage will be provided by salvaged MINOS scintillator modules, and the bottom will be covered by Double Chooz veto modules. To cope with high rates of cosmic muons, the MINOS system requires a new optical readout and front-end electronics. Here, I present results from the research and development of this new readout scheme and testing of the salvaged modules.

¹Universities Research Association, Department of Energy - Office of Science

Christopher Hilgenberg
Colorado State University

Date submitted: 12 Jan 2018

Electronic form version 1.4