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Deep Learning applications for electron neutrino reconstruction in the ICARUS experiment.

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The ICARUS T600 detector is a liquid argon time projection chamber (LArTPC) installed at Fermilab, aimed towards a sensitive search for possible electron neutrino excess in the 200-600 MeV region. To investigate electron neutrino appearance signals in ICARUS, a fast and accurate algorithm for selecting electron neutrino events from a background of cosmic interactions is required. We present an application of the general-purpose deep learning based reconstruction algorithm developed at SLAC to the task of electron neutrino reconstruction in the ICARUS detector. We demonstrate its effectiveness using the ICARUS detector simulation dataset containing electron neutrino events and out-of-time cosmic interactions generated using the CORSIKA software. In addition, we compare the selection efficiency/purity and reconstructed energy resolution across different initial neutrino energy ranges, and discuss current efforts to improve reconstruction of low energy neutrino events.

Poster prize

Yes

Given name

Dae Heun

Surname

Koh

First affiliation

Stanford University

Second affiliation

SLAC National Accelerator Laboratory

Institutional email

koh0207@stanford.edu

Gender

Male

Collaboration (if any)

ICARUS

Primary authors: Dr DRIELSMA, Francois (SLAC National Accelerator Laboratory); KOH, Dae Heun (SLAC); Dr

JWA, Yeonjae (SLAC National Accelerator Laboratory); Dr TERAO, Kazuhiro (SLAC National Accelerator Laboratory)

Presenter: KOH, Dae Heun (SLAC)

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