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Type: **Talk**

Performance of the ICARUS Trigger System at the Booster and NuMI Neutrino Beams

Tuesday 3 September 2024 12:00 (20 minutes)

The ICARUS-T600 liquid argon time projection chamber (LArTPC) detector is taking data at shallow depth as the far detector of the Short Baseline Neutrino program at Fermilab, to search for a possible sterile neutrino signal at $\Delta m^2 \approx 1 \text{ eV}^2$ with the Booster (BNB) and Main Injector (NuMI) neutrino beams at $\sim 0.8 \text{ GeV}$ and $\sim 2 \text{ GeV}$ average energies respectively.

The ICARUS trigger system exploits the coincidence of the BNB and NuMI beams with scintillation light signals detected by 360 8" photo-multiplier tubes, and is based on a PMT-multiplicity within 6-m TPC regions along the beam direction, where typical neutrino interactions are expected to be contained.

The trigger efficiency measurement leverages cosmic ray minimum-bias data, collected without imposing any scintillation light requirement, and the timing from an external cosmic ray tagger system.

The efficiency measured with stopping muons saturates at $E_\mu \approx 300 \text{ MeV}$, covering most of the BNB and NuMI charged-current neutrino interactions.

For the latest ICARUS run, special *adder* boards, performing the analog sum of light signals, were introduced as a complementary trigger to possibly recover low-energy neutrino interactions.

Finally, the ns-scale timing resolution on the interaction times allows to reconstruct the bunched structures of the BNB and NuMI beams, with the aim of introducing an off-line time-based trigger to cut cosmogenic background in-between beam bunches.

Internet talk

No

Is this an abstract from experimental collaboration?

Yes

Name of experiment and experimental site

ICARUS

Is the speaker for that presentation defined?

Yes

Details

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