

NuSTEC Cross Experiment Working Group Update



Dan, Vishvas, and Afro

CEWG Organization

Leadership:

- Conveners: Dan, Afro, Vishvas
- Member representatives from major experiments: (T2K, NOvA, MINERvA, MicroBooNE, SBND, ICARUS, DUNE, and Electron Scattering)

Communication:

- Slack channel on the NuSTEC workspace (for conveners and representatives)
- Email list (open to all)
- Indico folder (meeting pages)
- Page on NuSTEC website

Monthly meetings:

- Rotate through experiments
- Identify topics of interest to cross section experts
- “Deep dive” presentations followed by discussion
- First “working” Thursday of each month at 10:00 CT for roughly 90 minutes

The goal of the NuSTEC CEWG is to provide a service to the neutrino-nucleus interaction community by aiding communication between experiments, and building consensus on how to best perform and report cross section measurements.

2024



- June 13, 2024: “Measurement of double-differential cross sections for mesonless charged-current muon neutrino interactions on argon with final-state protons using the MicroBooNE detector”, Steven Gardiner (Fermilab)
- March 7, 2024: “Measurement of Transverse/Generalized Kinematic Imbalance Variables in MicroBooNE”, Andrew Furmanski (University of Minnesota), Afroditi Papadopoulou (Argonne National Laboratory)
- January 18, 2024: “NuHepMC: A Standardized Event Record Format for Neutrino Event Generators”, Steven Gardiner (Fermilab), Joshua Isaacson (Fermilab), Luke Pickering (STFC, Rutherford Appleton Laboratory)

Topics Already Covered for 2024


- Jan 18 2024: NuHepMC: A Standardized Event Record Format for Neutrino Event Generators
- March 7 2024: Measurement of transverse/generalized kinematic imbalance variables in MicroBooNE
- June 13 2024: Measurement of double-differential cross sections for mesonless charged-current muon neutrino interactions on argon with final-state protons using the MicroBooNE detector

10:00 AM → 10:45 AM **NuHepMC: A Standardized Event Record Format for Neutrino Event Generators** ⌚ 45m


Speakers: Joshua Isaacson (FNAL), Luke Pickering (Royal Holloway, University of London), Steven Gardiner (Fermilab)

 Meeting_Recording_...  NuSTEC NuHepMC_...

10:45 AM → 11:30 AM **Discussion** ⌚ 45m

10:00 AM → 10:45 AM **Measurement of transverse/generalized kinematic imbalance variables in MicroBooNE** ⌚ 45m 

Speakers: Afroditi Papadopoulou, Andrew Furmanski

 NuSTEC_Seminar_...

10:45 AM → 11:30 AM **Discussion** ⌚ 45m

10:00 AM → 10:45 AM **Measurement of double-differential cross sections for mesonless charged-current muon neutrino interactions on argon with final-state protons using the MicroBooNE detector** ⌚ 45m

Speaker: Steven Gardiner (Fermilab)

 CEWG CCNp talk.pdf  Meeting Recording  Paper on arXiv  Related methods pa...

Planned Topics for Rest of 2024

Fully booked until the end of the year!

- Aug 15 2024: Neutrino-nucleus interaction systematic uncertainties and baseline model for DUNE analyses by Laura Munteanu
- Sept 12 2024: $e4\nu$ proton transparency study by Steven Dytman
- Oct 3 2024: ACHILLES overview by Josh Isaacson
- Nov 7 2024: MicroBooNE data driven constraint by Nitish Nayak
- Dec 5 2024: Omnifold for cross section unfolding by Andrew Cudd
- **Joint seminars with CTGWG starting this fall, already in communication with CTGWG conveners**
e.g. Potential Speaker: Mino Kabirnezhad, working on global fit of single pion cross section and its implementation in GENIE

2025 Outlook

Already very good candidates for 2025!

- MicroBooNE new inclusive charged current $0pNp$ cross section measurements
arXiv:2402.19216 (accepted to PRD), arXiv:2402.19281 (accepted to PRL)
- New SIREN event generator (arXiv:2406.01745)

Thank you!