

# Neutrino Cross Sections Topical Group (NF06)

CPM Preparation Meeting 2020-09-16

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# NF06 Overview

Primary Input to Snowmass Report answers two questions:

- What are the neutrino cross sections needed to meet the needs of the neutrino experimental and theoretical community in the next decade?
- What are the facilities, neutrino sources, detector technologies, computational tools, theoretical input, and event generators required to make those measurements?

# Summary of Letters of Interest

Total of 79 Letters directly relevant to NF06

Subset of 22 Letters where NF06 is primary

Preliminary Groupings and Themes:

- Low Energy Neutrino Nuclear Cross Sections
- Near Detector, service experiments
- Electron Scattering
- Event generators
- Lattice QCD Applications?

# LOIs NF06 Primary (Part 1)

## Near Detector

NF053	DUNE Near Detector	Ryan Patterson, Elizabeth Worcester
NF166	Precision Neutrino-Nucleus Interaction Physics and BSM Searches at the Short-Baseline Near Detector (SBND) at Fermilab	David Schmitz
NF122	Precision Measurements with (Anti)Neutrinos at LBNF	Roberto Petti
NF094	Neutrino-induced Shallow- and Deep-Inelastic Scattering	Teppei Katori
NF139	Physics Opportunities in ANNIE	Mayly Sanchez
NF165	Neutrino Scattering Measurements on Hydrogen and Deuterium	Richard Hill
NF068	The NOvA Near Detector Physics Program	Jonathan Paley

# LOIs NF06 Primary (Part 2)

## Low Energy Neutrino Scattering

NF001	COherent Neutrino-Nucleus Interaction Experiment (CONNIE): Status and Plans	CONNIE
NF095	Future COHERENT physics program at the SNS	Rex Tayloe
NF170	Electroweak precision measurements in low energy neutrino experiments	Andre de Gouvea
NF194	Low-energy Inelastic Neutrino Cross Sections	Steven Gardiner
NF139	Inelastic Neutrino-Nucleus Interaction Measurements with COHERENT	Kate Scholberg
NF161	Neutrino Opportunities at the ORNL Second Target Station	Kate Scholberg

# LOIs NF06 Primary (Part 3)

## Event Generators

CompF132	The GENIE neutrino event generator	C. Andreopoulos
CompF131	Neutrino Event Generators	S. Gardiner
NF144	Event Generators for Accelerator-Based Neutrino Experiments	William I. Jay

## Electron Scattering

NF147	Electron scattering and neutrino programs	Kendall Mahn
NF102	Using Electron Scattering to Constrain Neutrinos	Adi Ashkenazi
NF0911	Electron-Nucleon Scattering at LDMX for DUNE	Andrew Furmanski

## Lattice QCD Applications

NF177	Connecting QCD to neutrino-nucleus scattering	Michael Wagman
NF111	Nucleon Form Factors for Neutrino Physics	Aaron S. Meyer
NF167	Theoretical predictions of Neutrino-nucleus Interactions	Rajan Gupta

# Workshops

**Goal: To hold a series of short (2-3 hour over 2 day) workshops to address topics relevant to the X-sec community**

- **Data Usage and Archival**

- Held Sept 3 & 4th: <https://indico.fnal.gov/event/45059/>

- **“Gaps” workshop**

- What are the physics measurements of the future? What service measurements need to be made (within the experiments or outside?) (Next workshop on our list...date TBD)

- **“Name the pain” workshop:**

- Discuss the challenges facing the neutrino cross-section community (theory hires, generators, role of measurements) and specific solutions which could get traction

- **Role and importance of electron scattering experiments**

- Discuss the importance and role other scattering experiments play

- **Low energy cross sections**

- Closely coordinating with M7s community on CEvNS and non-CEvNS topics

- **Relevant workshops coming from the needs generated by the LOI’s**

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NF122	Precision Measurements with (Anti)Neutrinos at LBNF	Roberto Petti
NF102	Using Electron Scattering to Constrain Neutrinos	Adi Ashkenazi
NF091	Electron-Nucleon Scattering at LDMX for DUNE	Andrew Furmanski
NF177	Connecting QCD to neutrino-nucleus scattering	Michael Wagman



# LOIs NF06 Primary - Part 2

NF094	Neutrino-induced Shallow- and Deep-Inelastic Scattering	Teppei Katori
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