

A photograph of the University of Rochester campus. In the foreground, a green ornate lamp post stands on the left, with a large tree and a pink flower basket. In the background, the iconic University of Rochester building with its large dome is visible, surrounded by green lawns and trees. The sky is clear and blue.

University of Rochester and ICARUS

Kevin McFarland
ICARUS meeting
14 May 2018

Rochester Neutrino Group



UNIVERSITY of
ROCHESTER

- PIs: Arie Bodek, Kevin McFarland, Steve Manly
- Relevant current & past activities
 - MINERvA: wrote original letter of intent in 2002, McFarland served as founding co-spokesperson through 2017, ~1/3 of construction (by \$) through Rochester, operations & run coordination, recent physics includes ν_e and ν_μ CC 0π , 2p2h tune
 - T2K: joined in 2001, design and construction of near detector, lead neutrino interaction model, added ν_e CC $1\pi^+$ to osc. analysis in 2016
 - DUNE: near detector design leadership, development of systematic uncertainty framework “T2KReWeight”
- Group: Senior scientist Howard Budd, Postdocs Ruterbories and Wret, nine Ph.D. students currently in group. Primarily DOE support, with 2 students supported by NSF fellowships and 3 by DoEd fellowships



Interest in ICARUS

- Our primary science interest is measurement of electron neutrino interactions from the NuMI beam.
 - This is one area where neither modeling nor data has yet yielded satisfactory information for impact on DUNE precision measurements.
 - Nuclear effects, radiative corrections, and form factor (m_ρ) differences between muon and electron neutrinos are all poorly constrained.
- We have substantial experience and interest in commissioning and experimental operations which may be useful to ICARUS.



Rochester group on ICARUS

- We have not yet discussed an involvement with DOE.
 - This is a delicate time for us because we have to submit our three-year renewal proposal this September.
 - We are concerned about how to write a compelling proposal, and how to sell the reviewing community on the impact of US university collaborators.
- This will only be one of our efforts.
 - Most Ph.D. students will write MINERvA theses. Continuing T2K interest is serious, and we intended to continue that work at DUNE.
- Senior scientist Budd would have significant time to work on operations and trigger after MINERvA ends its run in 2019.
- Postdocs and most students live at FNAL and could contribute to operations, trigger development, and physics analysis.



Possible work on ICARUS

- We would be comfortable taking on a major role in operations with senior scientist Budd leading a group of part-time contributors.
- Trigger for NuMI beam would be a sensible direction for focus, and we have the impression that effort would be welcome here.
- Simulations and physics analysis for electron neutrino interactions from NuMI beam.