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Neutrino Theory-Experiment Working Group at Fermilab

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A new Joint Group Between theorists and experimentalists at Fermilab

What we have

- Rich neutrino program at Fermilab
- Remaining questions of neutrino oscillation
- Neutrino phenomenology
- HEP theory
- Experimentalists
- Software expertise (collider, lattice, ν)

What we need

- Communication between theorists and experimentalists
- Accurate models
- New models to be developed and incorporated in the simulations
- Detailed understanding of each of the component of theory

Group Under the Neutrino Physics Center

- The group is part of the Neutrino Physics Center



Neutrino Physics Center
NPC News
NPC Scholar Program
Neutrino Seminar Series
Question of the Week
Neutrino Summer School
Neutrino University
Theory-Experiment Working Group
NPC Organization

Fermilab Links
Fermilab Neutrino Division
Colloquia on Neutrinos
Experimental-Theoretical Seminars
Neutrino Workshops
Fermilab News Articles on Neutrinos

Neutrino Joint Theory-Experiment Working Group

This joint group between theorists and experimentalists is intended to provide a forum for theorists and experimentalists to collaborate on topics of importance to Fermilab's neutrino program. Initial goals are:

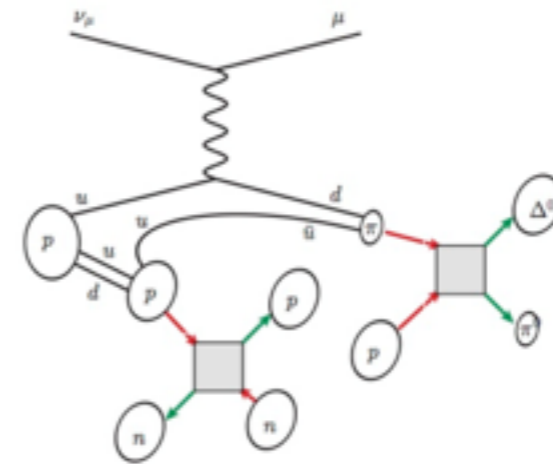
- create an interface between theory and generators
- work together toward improve the models
- incorporate new models in the simulations
- understand the interplay of neutrino interactions and phenomenology

Initial topics for the working groups:

- Interfacing theory and GENIE event generator
 - Specific tests cases: nuclear ab initio and deep inelastic scattering
- Lattice QCD
- Radiative corrections and ν_e/ν_μ cross section differences
- Phenomenology

We will have subgroups to work on each topics.

Meetings are once a month. Slides will be posted at <https://indico.fnal.gov/category/724/>



- Group of people representing theory, experiment and event generator: S. Brice, J. Campbell, M. Carena, P. Coloma, A. Furmanski, W. Giele, D. Harris, R. Hill, S. Mrenna, J. Morfin, M. Muether, J. Paley, S. Parke, G. Perdue, S. Prestel, A. Schukraft, R. Van De Water, D. Wackerroth, G. Zeller...

Team

- Fermilab staff, fellows, and distinguished scholars
- Different groups are part of the effort
 - Gil Paz from Wayne State University
 - Saori Pastore (Intensity Frontier Fellow) and Joe Carlson from Los Alamos
 - Huma Haider (Intensity Frontier Fellow) from Aligarh Muslim University
 - Steve Dytman (Intensity Frontier Fellow) from University of Pittsburgh
 - Kevin McFarland, University of Rochester
 - Post-docs and students



University at Buffalo
The State University of New York



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Overview

- We meet once a month to discuss progress and new ideas
- Topics so far:
 - Interfacing theory and generator
 - Radiative corrections and ν_{μ}/ν_e cross section differences
 - Modeling deep inelastic scattering
 - Interplay of phenomenology and neutrino interaction
- We have subgroups to work in each topic
 - Subgroups are formed by Professors, pos-docs and students
 - For example for the radiative corrections effort we have: Richard Hill, Doreen Wackeroth, Kevin McFarland, Adi Ashkenazi and students
- We communicate with a mailing list neutrino-theo-expe@fnal.gov

More details

- So far we had two meetings:
 - A meeting was dedicated to hear about theory-generator interface from collider physics by Stefan Prestel <https://indico.fnal.gov/event/15600/session/0/material/0/0.pdf>
 - Next meeting: Overview of GENIE
- We are starting to form the groups and make plans to start the work