



# Impacts of Energy Resolution on SBN Oscillation Measurements

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SIST/GEM: 5 Slides / 5 Minutes

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# Short Baseline Neutrino Program and Detector

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- **Neutrino Oscillation**
  - Neutrinos come in 3 Flavors: Muon, Electron, Tau
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  - MicroBooNE
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ICARUS T600 @ CERN



SBND @ Fermilab

## Motivation + Goal: Improving Searches (Part 1)

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### Purpose:

- Other experiments have seen oscillations beyond expected
  - Meaning, could some oscillations be anomalies or be something concrete?
  - Studying oscillations can help us determine if **sterile neutrinos**, the potential fourth neutrino, are present

## Motivation + Goals: Improving Searches (Part 2)

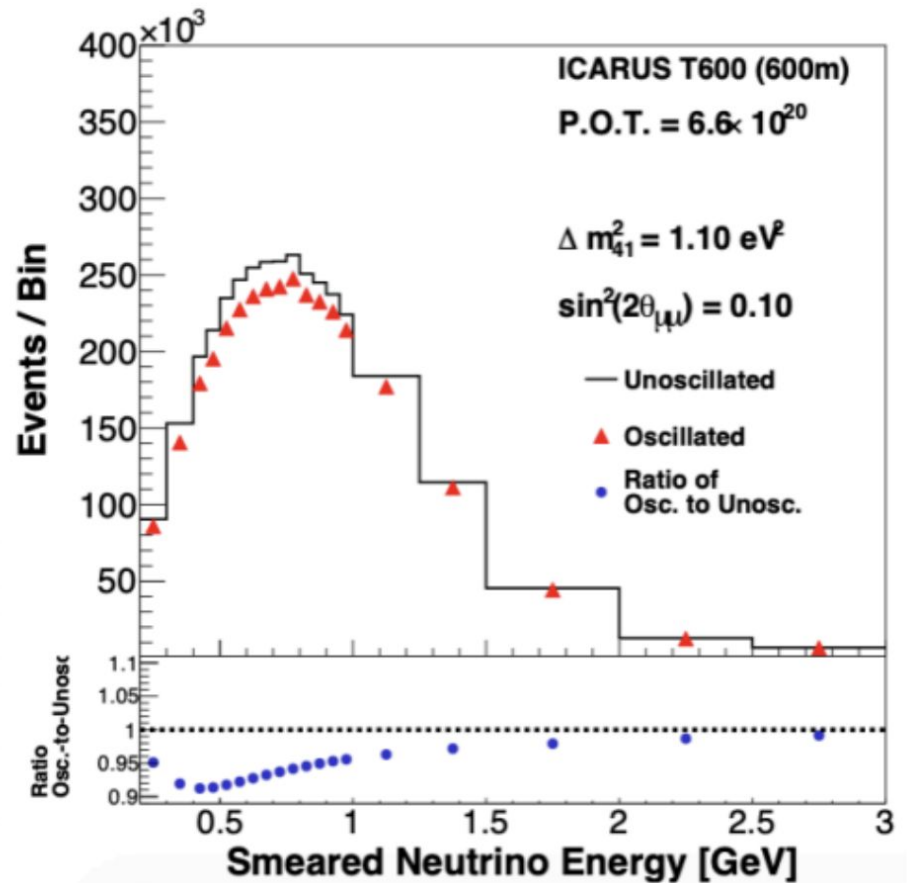
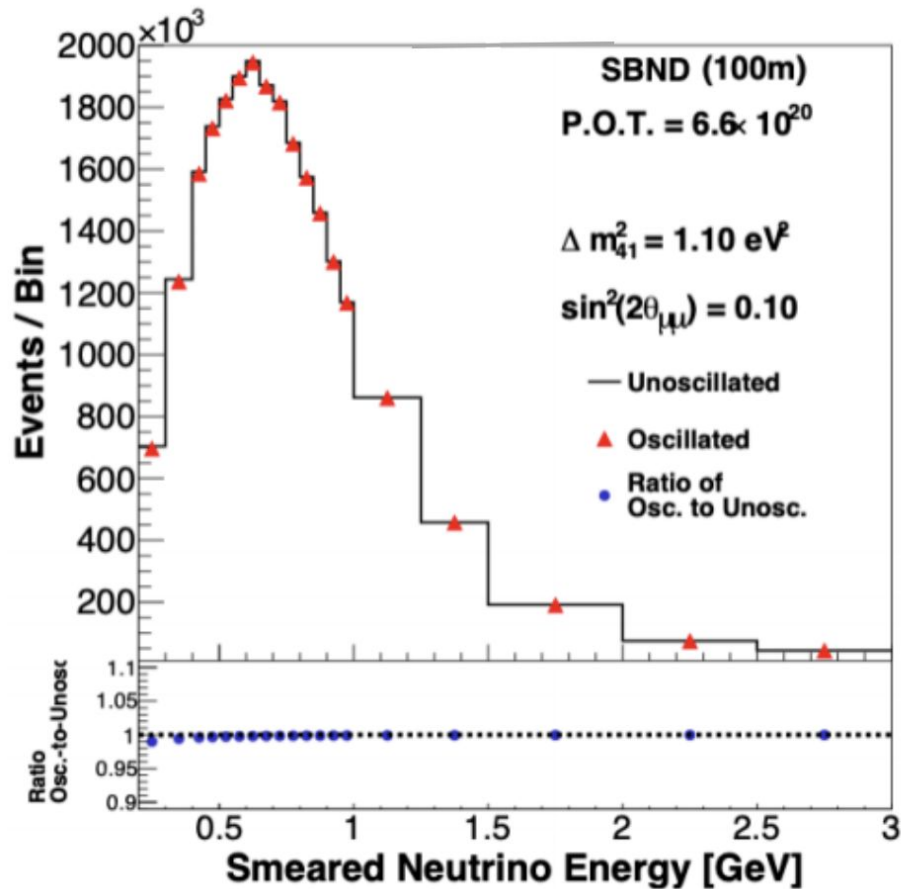
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### Tasks This Summer:

- Analyze how **energy reconstruction** within **SBND** & **ICARUS T600** can allow us to have **improved searches** for understanding how neutrinos oscillate and change from one flavor to another
  - **Look for tiny wiggles in neutrino energy distributions**



## Motivation + Goals: Improving Searches (Part 2)



Credit: Joseph Zennaro

These plots show when there is a tiny wiggle occurs with the neutrinos as they pass through ICARUS (first plot) then go through MicroBooNE (second plot).

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  - **Look for tiny wiggles in neutrino energy distributions**
- Use simulations from detector to make fit plots/graphs to analyze how varying precise neutrino energy reconstruction impacts or improves the understanding of neutrino oscillations



## First Steps to Improving Searches

- First steps are working with Common Analysis Framework (CAF) to:
  - Understand how to make, edit, and use CAFs
  - This will help prepare me to work with actual SBND and ICARUS T600 data in the near future
- Next Steps are using simulations from CAFs to:
  - Make fit plots
  - Construct plot of **energy distribution** of neutrinos from SBND and ICARUS T600