CSU PHYSICS COLLOQUIUM

"Chasing Long Standing Neutrino Anomalies with MicroBooNE "

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120 Engineering (Hammond Auditorium)

Abstract

Neutrinos are the most elusive fundamental constituents of matter. And yet these particles may hold the key to exotic new phenomena, which transcend our Standard Model of particle physics. In the last several decades neutrino oscillation experiments have given us a consistent picture of neutrino mass and mixing among three neutrino flavors. However, fundamental questions about the nature of the neutrino and matter itself remain unanswered. In addition, a series of anomalies, including an unexplained excess of electron-like events seen by the MiniBooNE experiment, hint at the existence of additional "sterile" neutrino flavors and complicate this simple picture. In order to improve on the previous generation of neutrino oscillation experiments and address these anomalies, new detector technologies are required. Liquid Argon time projection chambers (LArTPCs) promise to have the sensitivity and scale needed to chart this new territory. In this talk, I will present results from the MicroBooNE's first series of analyses investigating the anomalous excess of electron-like events seen by MiniBooNE.

Biography

Before joining Yale University, Dr. Jay Hyun Jo received his B.S. in Physics from Seoul National University in 2009 and his Ph.D. in Physics from Stony Brook University in 2015. His doctoral thesis was on the measurement of electron neutrino interaction rate on water using the Pi0 detector in the T2K long baseline neutrino experiment.

He is currently working with Prof. Bonnie Fleming on the MicroBooNE experiment at Fermi National Accelerator Laboratory, a liquid argon time projection chamber (LArTPC) neutrino experiment that investigates the low energy excess events observed by the MiniBooNE experiment, which could be an indicator of the existence of a new type of "sterile" neutrino. He is collaborating with a team at Brookhaven National Laboratory to develop a novel track reconstruction algorithm, known as Wire-Cell tomographic imaging. They have recently published their first result on the low energy excess search, which is a significant milestone for the particle physics community.

In his earlier career at Yale, Dr. Jay Hyun Jo worked with Prof. Reina Maruyama on dark matter search, using NaI detectors to test DAMA's assertion that the observed annual modulation is due to dark matter. He played a vital role in every facet of the detector commissioning, data production, and physics analyses. He also led the modulation analysis working group to produce COSINE-100's primary physics result, a measurement of the dark matter signal induced by annual modulation.