Old Dominion University
Department of Physics

Colloquium

Thursday, April 6, 2023

"Theory and Experiment for Precision Neutrino Physics"

Dr. Oleksandr Tomalak

Los Alamos National Laboratory

Abstract: Forthcoming neutrino oscillation experiments LBNF/DUNE (USA) and Hyper-Kamiokande (Japan) will discover or rule out charge-parity violation in the lepton sector and determine the ordering of neutrino masses. To achieve these goals, precise electron-neutrino appearance and muon-neutrino disappearance rates are compared to corresponding rates with antineutrinos. Extracting the oscillation parameters from these data requires accurate knowledge of scattering cross sections and incoming (anti)neutrino fluxes. In this colloquium, I will discuss how modern and future experimental activities at JLab and improved theoretical description pave the way to discoveries and precision in oscillation experiments with accelerator neutrinos. In particular, vector-current contributions at the nucleon level are described by nucleon electromagnetic form factors and meson production amplitudes are constrained by the electron-nucleus scattering experiments. While measurements of nuclear spectral functions in electron scattering can be applied to describe neutrino scattering at the nuclear scale.

Presentation: OCNPS 142 @ 3:00 pm
Refreshments: OCNPS Atrium @ 2:30 pm

All interested persons are cordially invited to attend.