Old Dominion University
Department of Physics

Colloquium

Thursday, March 23, 2023

"Opportunities and Challenges for Nuclear Theory at Next-Generation Neutrino Experiments"

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Abstract: Nuclear physics is essential for several major experiments attempting to answer some of the most fundamental questions about nature and the Universe. In recent decades, there has been remarkable progress in understanding nuclear properties in terms of protons and neutrons interacting via potentials rooted in the Standard Model through the principles of effective field theory. We have expanded this approach to predict the responses of medium-mass nuclei to external probes such as photons, electrons and neutrinos up to the quasi-elastic kinematic regime, which is where the probe is energetic enough to knock out protons and neutrons. Our systematic framework allows us to quantify our theory uncertainties and improve the precision of future calculations. This will be essential for validating the neutrino-nucleus interaction models used in the upcoming accelerator-based neutrino oscillation experiments that aim to measure charge conjugation parity (CP) symmetry violation in neutrino-flavor mixing.

Presentation: OCNPS 200 @ 3:00 pm
Refreshments: OCNPS Atrium @ 2:30 pm

All interested persons are cordially invited to attend.