



PHYSICS AND ASTRONOMY SEMINAR

Dr. Mark Hartz

TRIUMF

“Probing Neutrino Masses and Mixing with Precision Measurements of Neutrino Oscillations”

Abstract

Precision measurement of neutrino oscillation parameters may constrain beyond the standard model theories that describe the origin of flavor. The current generation of neutrino oscillation experiments have established mixing with at least three mixing angles and a phase governing CP violation in neutrino oscillations. The next generation of neutrino oscillation experiments will measure the hierarchy of neutrino masses and make precision measurements of neutrino oscillation parameters, including the CP phase. I will review the T2K experiment, which established the muon neutrino to electron neutrino oscillation channel which will be used for mass hierarchy determination and searches for CP violation in the future. I will describe the work by T2K to characterize and constrain dominant systematic uncertainties on neutrino oscillation measurements that arise due to modeling of neutrino-nucleus scattering. I will describe the next-generation Hyper-K experiment, which will have increased sensitivity relative to T2K with an 8 times larger detector mass and 3 times more intense neutrino beam. I will describe the proposed J-PARC E61 experiment, which uses the NuPRISM method to measure the energy dependence of neutrino-nucleus scattering properties to control systematic uncertainties for Hyper-K. I will also describe the proposal for measurements at the second neutrino oscillation maximum to minimize the impact of systematic uncertainties on the measurement of the CP violating phase.

Friday, September 21, 2018

2:30 p.m.

Clearihue Building – Room C109