

Precision measurement of neutrino oscillation at Hyper-Kamiokande



Akira Konaka
(TRIUMF)

March 20th (Wed.), 2019

17:00 - 18:00

@ KMI Science Symposia
(ES635)

Abstract:

Hyper-Kamiokande is a next generation large scale neutrino detector in Japan with a fiducial volume of 187 kton. Neutrinos from J-PARC accelerator provides high statistics measurement of 3% accuracy in both neutrinos and anti-neutrinos beams tuned at the first oscillation maximum. Atmospheric neutrinos provide high statistics neutrino oscillation studies up to several oscillation maxima, which is called oscillogram. Careful control of systematic uncertainties is essential to match the high statistical precision. Taking the ratios between near and far detectors in the accelerator neutrinos would cancel the systematic uncertainties in principle, but there remains challenging difference in the energy and neutrino flavour (electron vs. muon neutrinos) dependence of cross sections and the difference in detection efficiencies between near and far detectors. In this talk, I will describe the approach taken by Hyper-Kamiokande to carefully cancel and control the systematic uncertainties. The high precision expands HyperK's sensitivity to neutrino astrophysics, such as the supernova neutrinos and higher energy astronomical neutrinos, as well as the searches for dark matters and nucleon decays.