# KMI Colloquium

## "Neutrino Physics with KamLAND and KamLAND-Zen"


## Hiroko Watanabe
## (RCNS, Tohoku Univ.)


## Sept. 26, 2012 (Wed) 17:00 -
## KMI Science Symposia (ES635)


Abstract:

KamLAND is marked by the ability to detect anti-neutrino signals at 1,000 ton of ultra-pure liquid scintillator. In 2009 the KamLAND collaboration started a campaign to purify the liquid scintillator and ultimately achieved a twentyfold reduction of 210Po, the dominant background in the prompt energy region below 3.0 MeV. This reduction give a better signal-to-background ratio for the geo-neutrino flux estimation and enhances sensitivity to reactor neutrino oscillation below 2.6 MeV. Last year, we presented new knowledges concerning anti-neutrino studies covering reactor anti-neutrinos, geo anti-neutrinos and extraterrestrial anti-neutrinos.

Observation of neutrinoless double-beta decay would definitively establish the Majorana nature of the neutrino, and provide information on the absolute neutrino mass scale. KamLAND-Zen double-beta decay experiment is a modification of the existing KamLAND detector carried out in the summer of 2011. The double-beta source/detector us 13 tons of Xe-loaded liquid scintillator contained in a 3.08-m-diameter spherical inner balloon. We measure two-neutrino double-beta decay half-life of 136Xe with high statistics, and a lower limit for the neutrinoless double-beta decay half-life is a factor 5 improvement over the previous limit.

In this talk, I will present overview of neutrino physics with KamLAND, and status and future prospects of KamLAND-Zen.