Study on liquid scintillator purification

2019 fall GP-PU Progress Status Presentation

B9SD2011 KAMEI Yuto

KamLAND-Zen 800 experiment

- Neutrinoless double beta decay (0νββ) search
- Decay target : Xe136 (740 kg)
- KamLAND is a large, ultrapure liquid scintillator (LS) detector.

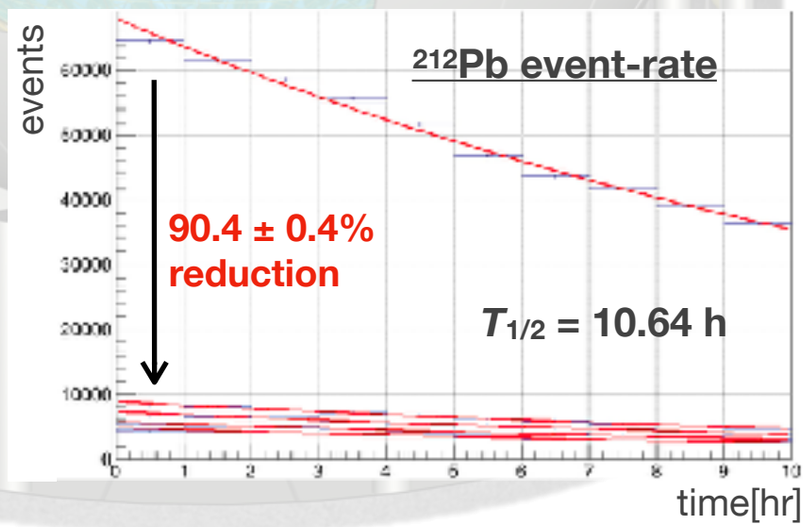
The key of 0νββ search is high energy resolution
and ultrapure environment.

KamLAND2-Zen experiment

- Updating plan of KamLAND-Zen
- New LS, High efficiency PMT w/ Collecting Mirror, Xe ~1000 kg

New purification methods for new LS is improving.

- Metal scavenger is useful.
- Purification system with Actual column was and efficiency of purification was tested.



Schedule

Metal scavenger work

- will finish in this financial year
- go ahead with preparation of paper
  - consider details…

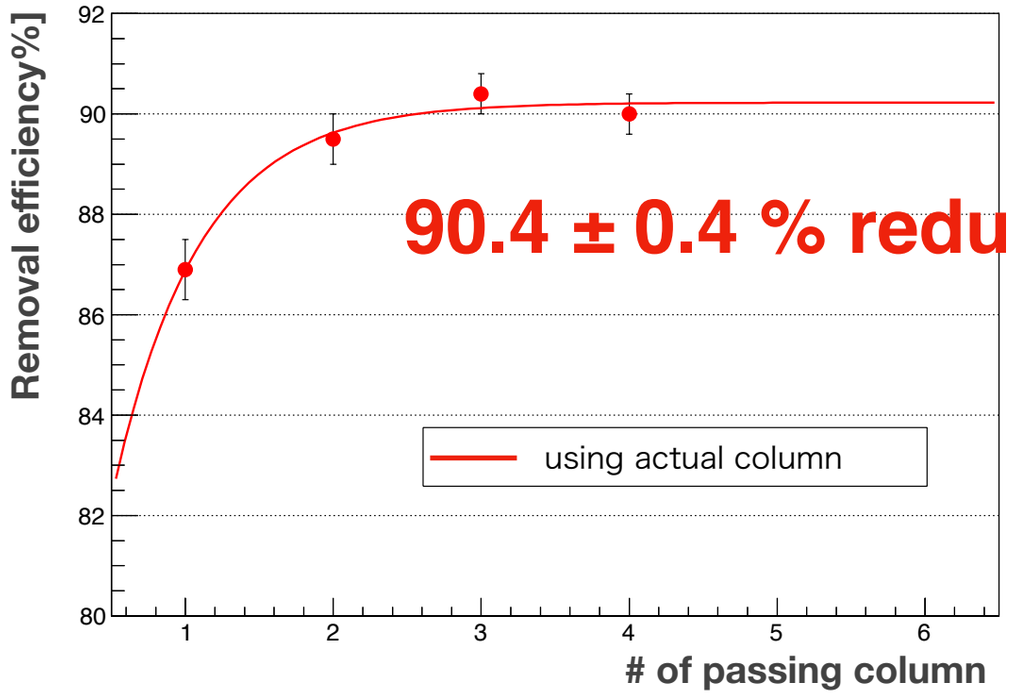
KamLAND-Zen 800 work

- Now observing for 0νββ
- Analysis for first result now on going
  - Continuing analysis
    - Data updating
    - Background estimation (e.g. spallation product events reduction)
    - Energy estimator will be development. (talked by Miyake-kun)
      - Data-set will change.
      - Analysis for this new data-set
  - etc…

Current Status

Metal scavenger work

- confirmed high purification efficiency by using metal scavengers
- LS quality (light yield, light transparency, amount of radioactive impurities and component of LS) was stable after purification.
- Writing the paper



KamLAND-Zen 800 work

- Analysis on going
  - my part : hit timing correction, estimation of background

Plan of study abroad

I have gone ahead with the preparation.

I will go to the Nikhef, University of Amsterdam
and join the XENON experiment.

Period : May 2020 - Oct. 2020 (not decided)

XENON experiment is the Dark matter search with liquid Xe TPC detector.