



“Geo-neutrino Observation: KamLAND and future plan”

by Taichi Sakai (Tohoku University)

Time and Date: 10:00-12:00, July 10th, 2024

Place: Room 743, Science Complex B H03 (hybrid)

Registration: "<https://us02web.zoom.us/meeting/register/tZYqd-uoqzstG9aelRpBCSvRspg0Gq8ikjJF>”

The decay of radiogenic isotopes such as uranium, thorium, and potassium within the Earth generates radiogenic heat, driving Earth's dynamics. These isotopes also produce geo-neutrinos (anti-electron neutrinos), which serve as the only direct means of observing Earth's internal heat content. Knowledge of the Earth's internal heat content through Geo-neutrino observations can provide significant clues to the structure of the Earth's interior. Further research could also be used to understand the evolution and composition of the Earth. KamLAND experiment is located 1000 m underground at the Kamioka mine in Gifu prefecture, Japan, and has been in operation since 2002. KamLAND experiment marked the world's first observation of geo-neutrinos in 2005. Since then, KamLAND has observed geo-neutrinos continuously with 1 kt liquid scintillator. Machine learning is currently being used and applied in a variety of fields. I am also applying machine learning to the KamLAND experiment to achieve a significant reduction in background and particle identification. This presentation will also present future plan. OBD(Ocean Bottom Detector) is a next-generation detector that is currently under development, and unlike conventional detectors, it makes observations at the bottom of the ocean. By making observations at the bottom of the ocean, Geo-neutrinos from the mantle can be observed directly without the influence of the continental crust..

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