



# 1) “Research for improving sensitivity of pre supernova neutrino alarm system”

by Keita Saito (Tohoku University)

Time and Date: 10:00-12:00, Nov 25, 2024

Place: Room 721, Science Complex B (H-03) (hybrid)

Registration: "<https://us02web.zoom.us/meeting/register/tZUtdO2uqj4oGt1bDMeH-LBCVXYmDX3iozcP>”

Pre-supernova neutrinos are released by massive stars at the end of stellar evolution. The detection of these neutrinos provides early warning of supernovae to astronomical detectors, including gravitational wave detectors and neutrino detectors. KamLAND is a 1-kiloton liquid scintillator neutrino detector located in Japan. KamLAND detects anti-electron neutrinos with inverse beta decay. Use of the inverse beta decay reaction enables us to perform delayed coincidence selections for low background measurements. It introduces the capability to detect pre-supernova neutrinos from nearby stars. We have started an early warning system using pre-supernova neutrinos since 2015. This system is based on the significance of the statistical excess from background rate. we present new possibilities to use time evolution of expected pre-supernova neutrino flux. The SK-Gd experiment, in which Gd is added to Super Kamiokande, is also sensitive to pre-supernova neutrinos. Additionally, we present the combined alarm system with the SK-Gd experiment.

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