

LiLAND - Lithium Electron Antineutrino Source at KamLAND

Tuesday, 18 June 2024 17:30 (2 hours)

One of the longest-standing sterile neutrino anomalies is the Gallium anomaly in which transition from electron neutrino to sterile neutrino oscillation on the meter scale has been suggested as a solution to measured electron neutrino deficit originally observed in GALLEX and SAGE experiments, and more recently in the BEST experiment in which a 4 sigma significant deficit of electron neutrinos from the 51-Cr source was measured. Contrary to the reactor neutrino experiments where the expected flux is estimated from thousands of beta decay branches, neutrinos from a strong source feature well-understood spectrum due to a single radioactive process and flux extrapolated from the strength of the source. To search for meter-scale oscillations to sterile neutrinos with electron antineutrinos in KamLAND we propose LiLAND experiment that will utilize electron antineutrinos from the beta decay of 8-Li. 8-Li has a well-known spectrum with 13 MeV end-point, mostly above radiogenic backgrounds, making it a very attractive source of MeV antineutrinos. A similar idea has been previously proposed by IsoDAR experiment. Unique to LiLAND that we proposed, is the production mechanism of 8-Li. 8-Li will be produced in situ by irradiating 7-Li sleeve with neutrons produced by a high-power DT neutron generator at its core. This idea has been enabled by a recent development of very powerful DT generators with a yield of the order 10^{13} neutrons/s. We will present initial considerations, conceptual design, and expected rates. Of utmost importance is to place the source as close to KamLAND volume to increase sensitivity to to increase sensitivity to higher neutrino mass region favored by BEST result.

Poster prize

No

Given name

Tatjana

Surname

Miletic

First affiliation

Arcadia University

Second affiliation

Institutional email

miletict@arcadia.edu

Gender

Female

Collaboration (if any)

Primary authors: MARICIC, Jelena (University of Hawaii); MILETIC, Tatjana (University of Hawaii)

Presenter: MILETIC, Tatjana (University of Hawaii)

Session Classification: Poster session and reception 1

Track Classification: Sterile neutrinos