Contribution ID : **342** Type : **Plenary/section talk**

The Dark Matter search at KamLAND

Wednesday, 24 October 2018 09:00 (20)

Nature of the Dark Matter is one of the most fundamental physics problems. While practically all currently running Dark Matter experiments yield no positive result the DAMA/LIBRA collaboration continues to claim observation of the Dark Matter signal in the NaI(Tl) detector located deep underground. The new data released from the DAMA/LIBRA phase-2 experiment favors presence of a modulated signal from the Dark Matter with proper features at 11.9 sigma C.L. However, due to importance of the problem this observation requires verification by other groups of independent researchers.

This talk describes development of the ultra-low background NaI(Tl) detector modules by the KamLAND collaboration. It covers several subjects: the research infrastructure we built at the Kamioka mine (including supplementary neutron and radon detectors), a new laboratory for growth of ultra-low background crystals, selection of ultra-low background detector components, and experimental data taken with new NaI(Tl) ultra-low background test modules. Also it explains advantages of using a central ultra-low background region of the KamLAND liquid scintillator neutrino detector as a location for a large Dark Matter detector made of isolated NaI(Tl) modules.

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Session Classification : Facilities and Advanced Detector Technologies

Track Classification : Facilities and advanced detector technologies