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Scintillation balloon for neutrino-less double-beta decay search with a liquid scintillator detector

KamLAND-Zen experiment is a neutrino-less double-beta decay search experiment with ^{136}Xe and the low background liquid scintillator (LS) detector.

In order to suppress backgrounds proportional to volume, ^{136}Xe loaded LS is stored in an inner balloon (IB) made of nylon.

The IB was made as clean as possible. However, the contamination of ^{238}U still remains, and its daughter nuclei ^{214}Bi will be one of the largest backgrounds.

Although ^{214}Bi could be rejected by delayed coincidence tagging with α -ray from ^{214}Po , the tagging efficiency is not high enough due to the α -ray absorption in nylon IB.

To detect the α -ray and tag ^{214}Bi , we are planning to use a scintillation film for the IB in a future project, KamLAND2-Zen.

In this presentation, we describe the performance of scintillation IB and its potential for a pulse shape discrimination.

Mini-abstract

Scintillation balloon can reduce the backgrounds of KamLAND2-Zen.

Experiment/Collaboration

KamLAND-Zen

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