

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

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KamLAND-Zen experiment is a low background liquid scintillator (LS) detector and searches for neutrino-less double-beta decay ($0\nu\beta\beta$) of ^{136}Xe . In order to suppress backgrounds proportional to volume (cosmo-genic muon spallation products, solar ^8B ν , etc.), ^{136}Xe loaded LS is stored in the 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 for $0\nu\beta\beta$ search. Although ^{214}Bi could be rejected by tagging with ^{214}Po , the α from ^{214}Po is absorbed in the nylon IB. If the IB is made of a scintillation film, it enables us to detect the α and tag ^{214}Bi . Therefore, we are planning to use a scintillation film for an IB in a future project, KamLAND2-Zen. In this presentation, we describe a performance of the scintillation IB and its potential for pulse shape discrimination.

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