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Demonstration of Tl-208 background reduction using topological information of Cherenkov light and observation of Zr-96 two neutrino double beta decay

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ZICOS is a future experiment for neutrinoless double beta decay using ^{96}Zr nuclei. In order to achieve sensitivity over 10^{27} years, ZICOS will use tons of ^{96}Zr, and need to remove ^{208}Tl backgrounds as observed by KamLAND-Zen one order of magnitude. For this purpose, we have developed new technique to distinguish the signal and background using topology of Cherenkov light. We have already measured this topology using HUNI-ZICOS detector, and the results clearly indicated the topology as effective even 1MeV electron. We have also developed the pulse shape discrimination for the extraction of PMT which receives Cherenkov lights in the liquid scintillator. In order to confirm above technique, we demonstrated beta-gamma events such as ^{208}Tl beta decay scheme using ^{60}Co source with UNI-ZICOS detector.

Here we will report some results obtained by recent measurement using UNI-ZICOS, and will also explain a plan to observe the two neutrino double beta decay for ^{96}Zr nuclei using new detector 2nu-ZICOS.

Submitted on behalf of a Collaboration?

Yes

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