

# Muon-induced spallation backgrounds for MeV astrophysical neutrino signals in Super-Kamiokande

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High energy cosmic ray muons not only are backgrounds for high energy astrophysical neutrinos, they also produce serious background for low energy neutrino searches. When muons interact in detectors, their energy losses lead to nuclear breakup (“spallation”) processes. The subsequent beta decays of unstable daughter nuclei mimic MeV neutrino signals. This background has been understudied in water detectors. We show how muons produce these spallations through showers, and how to implement more effective background rejection techniques using this information. This could lead to new physics results, as both solar and Diffuse Supernova Neutrino Background studies are background-limited, and reducing backgrounds by even a factor of a few could quickly lead to new discoveries. This work is in collaboration with Prof. John Beacom.

**Primary author:** LI, Shirley (The Ohio State University)

**Presenter:** LI, Shirley (The Ohio State University)

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