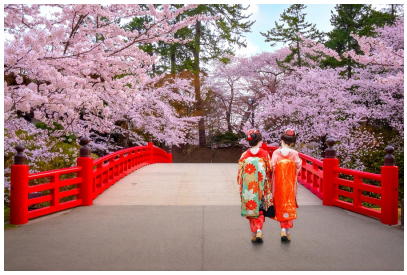

ID de Contribution: **57** Type: **Non spécifié**

Study of energy scale calibration and monitoring of detector stability using cosmogenic neutron in SK-Gd

Super-Kamiokande is the world's largest underground water Cherenkov detector placed 1000m underground in Kamioka. The experiment aims to observe neutrinos from various sources as well as nucleon decays. In 2020, the new phase of Super-Kamiokande, SK-Gd, was started by dissolving gadolinium to pure water to about 0.01% concentration. Furthermore, in 2022, additional gadolinium was introduced, increasing its concentration from 0.01% to 0.03%. This significantly increased neutron detection efficiency, thanks to gadolinium's large thermal neutron capture cross section and following gamma-ray emission with the total energy of ~8 MeV. We are developing a new energy scale calibration method and monitoring the stability of detector response using spallation neutrons produced by cosmic-ray muons. Using spallation neutrons has advantages that they are uniformly distributed across the entire detector and that they have large statistics. I will present the status of these studies in this poster.

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Classification de Session: Poster session