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Research Result Report
ICRR Inter-University Research Program 2022

Research Subject:

Light Scattering Measurement in the water using the Super-Kamiokande Detector

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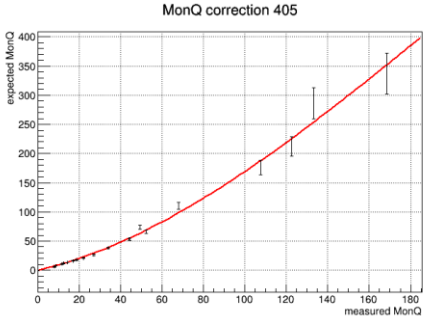
Summary of Research Result :

The laser calibration system has 5 laser wavelengths to measure the attenuation of the purified water inside the Super-Kamiokande detector.

After Gd-loading, the Korea group keep monitoring water quality using 4 wavelengths of laser (337, 375, 405 and 445 nm). The water quality has been stable since 2022 Jan. And the laser monitoring has shown consistent results with those of cosmic muon studies.

We overhauled the optical switching box which was installed to change the injection wavelength of laser mechanically. And the laser intensity of 473nm wavelength had been increasing continuously during several months for unknown reason and we decreased the intensity of 473nm laser at the laser module.

Monitoring PMT calibration was performed using ND filters to adjust the monitoring PMT linearity. We measured the monitoring PMT charge precisely with various transmittance using independent DAQ system. The correction function of the monitoring PMT charge was obtained using the measured result for each wavelength respectively.



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The PMTs of the SK detector were connected to the electronic huts, and the stability of charge and time was checked using the laser system. There were several timing shifts within 1 ns for PMTs of electronic hut 3 during a part of SK5 and SK6 periods. And the laser intensity gradually decreased over the entire SK5 and SK6 periods, but no correlation was found between charge and timing shift. The timing shifts were corrected with TQ map.

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