

Research Result Report

ICRR Inter-University Research Program 2024

Research Subject: Water Transparency Measurement in Super Kamiokande

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Summary of Research Result :

- Maintenance and operation of the laser calibration system

Our group maintains and operates the laser calibration system to monitor the water quality of Super-Kamiokande (SuperK). The automated laser system provides the water transparency varying in time and the performance and measured results have been reported at every steering meeting and calibration group and collaboration meetings of the SuperK.

- Monitoring results of water quality of SuperK in Apr. 2024~Mar. 2025

The water quality is monitoring by analyzing the scattered light of vertical light injectors installed in top and bottom of SuperK tank. After water convection in SuperK 8, the attenuation length has been gradually increasing for all wavelength laser. We confirmed this trend using a parameter developed by our group that is specifically sensitive to absorption as well. The monitoring results by our system is well matched with the results by other calibration systems.

- Development of analysis for water quality monitoring

Currently, attenuation length is being measured by vertical light injector. Our group aims to confirm the z-dependent result of water quality by utilizing 5 horizontal injectors installed evenly spaced interval along the barrel of SuperK tank. During this research period, we resumed the water quality monitoring using horizontal light injectors and the preliminary result on relative absorption over time has been reported for 5 barrel injectors. To determine the attenuation length as function of z position based on this measurements, Monte-Carlo study is underway.

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