Contribution ID: **84** Type: **Poster contribution**

Simulation Studies for the Development of the IWCD Outer Detector

Monday, August 31, 2026 6:00 PM (2 hours)

The Intermediate Water Cherenkov Detector (IWCD) will be constructed approximately 1 km downstream of the J-PARC neutrino beam target to improve neutrino oscillation measurements in Hyper-Kamiokande by reducing systematic uncertainties, particularly those associated with neutrino interaction cross sections. In this study, simulations were conducted to evaluate the performance of and optimize the design of the Outer Detector (OD). The OD is used to identify entering muons and other particles, as well as muons produced inside the Inner Detector (ID) that penetrate the OD. In the simulations, several OD design parameters, including the number and arrangement of PMTs, the reflectivity of the white reflective sheets attached to the OD surface, and the water transparency, were varied, and the numbers of hit PMTs and detected photoelectrons were compared. The results show that variations in Tyvek reflectivity have a larger impact on the detector response than changes in water transparency. To test the integrated detector system and validate the design and performance of the IWCD, including its response to entering muons, a prototype water-tank test is planned at J-PARC. This poster presents the current status of the water-tank test and the related simulation studies.

Primary author: ISE, Chisako (Tokyo University of Science)

Co-authors: Dr ISHITSUKA, Masaki (Tokyo University of Science); Dr MATSUMOTO, Ryo (Science Tokyo); Dr AKUTSU, Ryosuke (High Energy Accelerator Research Organization); Dr NISHIMURA, Yasuhiro (Keio University)

Presenter: ISE, Chisako (Tokyo University of Science)

Session Classification: Poster

Track Classification: WG6: Detector Physics