

# The Intermediate Water Cherenkov Detector for the Hyper-Kamiokande Experiment

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Hyper-Kamiokande (Hyper-K) is a next-generation long baseline neutrino oscillation experiment designed to make precision measurements of neutrino oscillations. These measurements will have greater sensitivity to CP violation in the lepton sector than previously possible. To measure CP violation, Hyper-K will look for the appearance of electron neutrinos coming from the flavor changing oscillations of a muon neutrino beam and compare this to electron anti-neutrino appearance with a muon anti-neutrino beam. To accomplish this goal the interaction rates of electron neutrinos and antineutrinos must be well understood. An intermediate water Cherenkov detector (called IWCD) will be constructed about 1 km from the origin of the neutrino beam. It will be able to measure the electron to anti-electron neutrino cross section using intrinsic electron neutrino contamination in the Hyper-K neutrino beam. Additionally, the IWCD is designed to be movable between different off-axis angles from the primary neutrino beam direction, sampling different neutrino flux spectra as it does so. The neutrino cross section will then be measured at different neutrino energy spectra to constrain the relationship between the observed lepton and the true neutrino energy. The IWCD is carefully designed to control the backgrounds to these measurements, including those from particles produced in interactions between the neutrino beam and the material outside the detector. This poster focuses on the physics goals of IWCD and the simulation work to understand the backgrounds and how they influence the design of the detector.

## Poster prize

Yes

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Hyper-Kamiokande

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**Classifica Sessioni:** Poster session and reception 1

**Classificazione della track:** Accelerator neutrinos