

# Hyper-Kamiokande Light Injection System and Detector Systematics

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The poster presents a review of the light injection (LI) system, a critical calibration tool for the upcoming Hyper-Kamiokande (Hyper-K) experiment, a next-generation Water Cherenkov detector designed to study neutrino properties with unprecedented precision. Neutrino oscillations, charge-parity (CP) violation, and proton decay searches are among the key physics goals of Hyper-K, making accurate detector calibration essential. The LI system plays a vital role in ensuring the detector's photodetectors are well-calibrated by injecting controlled pulses of light into the water volume, allowing for precise measurements of optical properties and detector response. This work also explores the impact of water parameters such as Rayleigh scattering and absorption on the system's performance using Water Cherenkov Simulation (WCSim). Understanding these effects is crucial for refining event reconstruction and improving overall detector sensitivity. The poster presents our latest simulation results and discusses their implications for the LI system's optimisation in Hyper-K.

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