

Considerations for Calibration Source Deployment in Hyper-Kamiokande

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The in situ deployment of radioactive and light sources is among the most important means of calibrating and understanding the response of large water Cherenkov detectors. Such calibration data are the primary means by which the optical properties of the water and the response of the photomultipliers are understood. Given that the Hyper-Kamiokande design calls for ten optically isolated detector volumes that must be individually calibrated, consideration must be given to automation that may reduce the necessary manpower and downtime. Inspired by the SNO “Universal Interface”, we propose an automated deployment system that allows the positioning of a source along a plane in the detector volume via pulleys and cables, allowing a large range of source positions to be sampled from a single portal at the top of the detector volume. Control of the manipulator, along with the monitoring of cable tensions, can be automated and computerized to allow remote and automated operation, apart from interchanging sources.

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