

# Production and Performance of mPMT Modules for the Water Cherenkov Test Experiment

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The Hyper-K experiment employs a near detector to measure and study neutrino interactions approximately 1 km downstream from the production point, where the oscillation effect is negligible. This detector is known as the Intermediate Water Cherenkov Detector (IWCD). A new detector technology called the multi-PMT (mPMT) has been developed due to its better timing and spatial resolution compared to the 20-inch Photomultiplier Tubes (PMTs) used in the Super-Kamiokande or Hyper-Kamiokande (Hyper-K) experiments. Hyper-K and IWCD will utilise mPMTs as their primary photon detection systems. Currently, the Water Cherenkov Test Experiment (WCTE) with a 40-ton water tank is under construction at CERN and will serve as a testbed for the IWCD. An mPMT optical module - a water-tight vessel containing 19 3-inch PMTs with readout electronics, offers several advantages, including enhanced granularity, weak sensitivity to Earth's magnetic field, and more. A total of 100 mPMTs have been produced for use in WCTE, and based on their performance, approximately 300 additional mPMTs will be produced for the IWCD. This presentation will provide a detailed overview of the novel assembly procedures developed for constructing these mPMT modules, along with comprehensive information about the mechanical and electronic components used. Additionally, we will present a production summary of the mPMTs for WCTE and discuss the challenges encountered and how they were overcome during development.

## Do you need a VISA letter for traveling to Canada ?

No

**Author:** GOLA, Mohit (TRIUMF (CA))

**Presenter:** GOLA, Mohit (TRIUMF (CA))

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