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## A multi-photomultiplier detector for the Hyper-Kamiokande experiment

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Hyper-Kamiokande (HK) is a next-generation water Cherenkov detector under construction, featuring a large cylindrical tank measuring 71 meters high and 68 meters in diameter, with a fiducial volume of 188 kilotons. Its physics program includes studying neutrino oscillations, astrophysical neutrinos, and searching for nucleon decay, with a primary focus on investigating leptonic CP violation. To achieve this, HK will be equipped with approximately 20,000 50 cm photomultiplier tubes (PMTs) and around 800 multi-photomultiplier (mPMT) modules, which represent a novel technology initially developed for KM3NeT. Each mPMT module consists of 19 small PMTs, 7.7 cm in diameter, housed within a pressure vessel. The mPMT has several advantages such as improved granularity, reduced dark rate, and enhanced directional information, all while offering an almost isotropic field of view and the ability to detect local coincidences. These characteristics will significantly enhance HK's physics capabilities. Structurally, the mPMT module has an upper section where the PMTs are positioned beneath an acrylic dome, while the underside contains the main electronics mounted on a cooling steel backplate. The module is powered via POE, with each PMT having its own high-voltage board. The final design of the mPMT is almost complete, with mass production set to begin in 2025 and HK scheduled to start data collection in 2027. This contribution outlines the mPMT design, its advantages, and testing results.

### Primary experiment

Hyper-Kamiokande

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