A multi-PMT photodetector system for the Hyper-Kamiokande experiment

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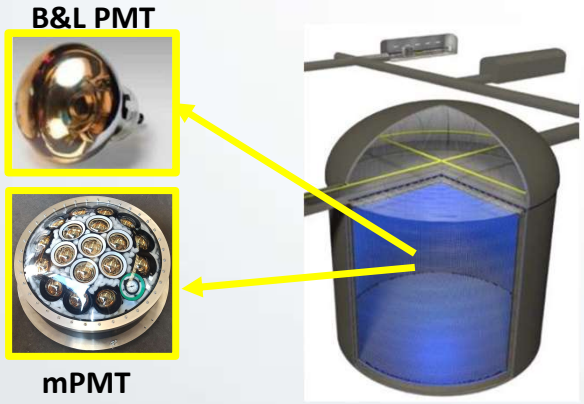
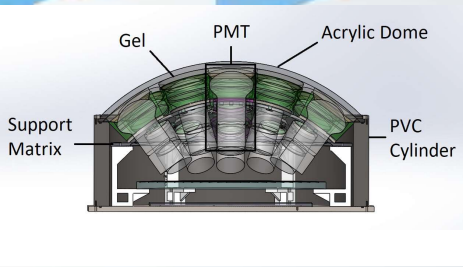
Hyper-Kamiokande (HK) is the next generation Water-Cherenkov detector with multi-purpose scientific goals in neutrino physics and non-standard physics.

In HK Far Detector (FD) there are plans to adopt a hybrid configuration which consists of 20'' B&L PMTs and multi-PMT.



The multi-PMT (mPMT) is a novel technology for photo-detection, first designed for the KM3NeT experiment, which consists of 19 3'' PMTs and a full electronics system arranged inside a pressure vessel covered by an acrylic dome.



Advantages of mPMTs over single 20'' PMTs:

- Increased granularity;
- Overall lower dark rate;
- Better vertex resolution;
- Superior photon counting;
- Improved angular acceptance;
- Extension of dynamic range;
- Intrinsic directional sensitivity;
- Local coincidences.

Several prototypes have been realized and tested for electronics and mechanical optimization