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P1.095 **The KM3NeT multi-PMT digital optical module**

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The KM3NeT collaboration is currently constructing the first phase of a cubic kilometer-scale neutrino detector in the Mediterranean Sea. The scientific goals of the experiment are twofold: firstly, KM3NeT wants to study the flux of extra-terrestrial neutrinos and to discover its sources. Secondly, using a denser detector layout, fundamental (oscillation) properties of neutrinos will be studied, in particular the neutrino mass hierarchy. These goals will be achieved by detecting Cherenkov light emitted by products of neutrino interactions in the deep waters of the Mediterranean Sea.

The basic KM3NeT detection element, the Digital Optical Module (DOM), houses 31 three-inch PMTs inside a 17 inch glass sphere. This multi-PMT concept yields a factor three increase in photocathode area, compared to a design with a single 10 inch PMT - as used in ANTARES for example - leading to a significant cost reduction. Moreover, this concept allows for an accurate measurement of the light intensity (photon counting) and offers directional information with an almost isotropic field of view. This poster presents the DOM concepts and the associated technologies, which include 3D-printed PMT support structures, a LED-beacon for time calibration, a hydrophone for acoustic DOM positioning and custom-built low-powered PMT bases that provide the HV and digitisation of the analog signal. An FPGA-based readout system transfers all sub-ns timestamped photon signals to shore via optical fibers.

The first KM3NeT detector string with 18 DOMs was deployed in December 2015 and is currently taking data at the Italian KM3NeT site at 3500m depth.