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Nanobeacon and Laser Beacon: KM3NeT Time Calibration Devices

A very large volume neutrino telescope is being constructed in the Mediterranean Sea by the KM3NeT collaboration. Thousands of glass spheres holding a set of 31 small area photomultipliers will be deployed at high depth forming a tri-dimensional matrix. The glass spheres, called Digital Optical Modules (DOMs), will detect the Cerenkov light induced by neutrino interactions with the surrounding matter. A relative time calibration between photomultipliers is required to achieve an optimal performance. Two different types of calibration are going to be performed in KM3NeT: Intra Detection Unit (DU) calibration, where relative calibration between DOMs of the same DU is done, and Inter DU calibration, where calibration of different DU is achieved. The intra DU calibration is achieved by means of the Nanobeacon, an electronics board flashing a LED integrated in DOM, meanwhile the intra DU calibration is obtained using the Laser Beacon, an instrument installed at the bottom of the detector. In the current article both devices are presented.

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