

The Calibration Units of KM3NeT : multi-purpose calibration devices

Tuesday, July 13, 2021 1:18 PM (12 minutes)

KM3NeT is a deep-sea infrastructure composed of two neutrino telescopes being deployed in the Mediterranean Sea : ARCA, near Sicily in Italy, designed for neutrino astronomy and ORCA, near Toulon in France, designed for neutrino oscillations. These two telescopes are 3D arrays of optical modules used to detect the Cherenkov radiation, which is a signature of charged particles created in the neutrino interaction and propagating faster than light in the sea water.

To achieve the best performance for the event reconstruction in the telescopes, the exact location of the optical modules, affected by the sea current, must be known at any time and the timing resolution between optical modules must reach the sub-nanosecond level. Moreover, the properties of the environment, in which the telescopes are deployed, such as temperature and salinity, are continuously monitored to allow best modelling of the acoustic signal propagation in the water.

KM3NeT is going to deploy several dedicated Calibration Units hosting instruments dedicated to meet these calibration goals. The Calibration Base will host a Laser Beacon for time calibration and a long-baseline acoustic emitter and a hydrophone, which are part of the positioning system for the optical modules. Some of these Calibration Units will also be equipped with an Instrumentation Unit hosting environmental monitoring instruments.

This poster describes all the devices, features and purposes of the Calibration Units, with a special emphasis on the first such unit that will be deployed on the ORCA site in 2021.

Keywords

KM3NeT; Neutrino; Calibration; Calibration Unit

Collaboration

KM3NeT

other Collaboration

Subcategory

Experimental Methods & Instrumentation

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Session Classification: Discussion

Track Classification: Scientific Field: NU | Neutrinos & Muons