



Contribution ID: 77

Type: **Oral presentation**

Results of the first detection units of KM3NeT

Thursday, 8 September 2016 14:20 (25 minutes)

The KM3NeT collaboration is building a km³-scale neutrino telescope in the Mediterranean Sea. The current phase of construction comprises the deep-sea and onshore infrastructures at two installation sites and the installation of the first detection units for the ARCA and ORCA detector. At the KM3NeT-It site, 100 km offshore Capo Passero, Italy, the first 32 detection units for the ARCA detector are being installed and at the KM3Net-Fr, 40 km offshore Toulon, France, 7 detection units for the ORCA detector. The second phase of KM3NeT foresees the completion of ARCA for neutrino astronomy at energies above TeV and ORCA for neutrino mass hierarchy studies at energies in the GeV range. The detection unit is the basic element of the KM3NeT detectors. In the ARCA geometry, the detection unit is a 700 meter long vertical structure hosting 18 optical modules. Each optical module comprises 31 3" photomultiplier tubes, instruments to monitor environmental parameters, and the electronic boards for the digitisation of the PMT-signals and the management of data acquisition. In their final configuration, both ARCA and ORCA will be composed of about 200 hundred detection units. The first detection unit was installed at the KM3NeT-It site in December 2015. It is active and taking data since its connection to the subsea network. The time of arrival and the duration of photon hits on each of the photomultipliers is measured with a time resolution of 1 ns and transferred onshore where the measurements are processed, triggered and stored on disk. A time calibration procedure, based on data recorded with flashing LED beacons during dedicated periods, allows for synchronisation of the time in the optical modules at the nanosecond level. In May 2016, the installation of two additional detection units at the KM3NeT-It site is foreseen. If successful, the first results with three active detection units will be presented. An update of the detector status and construction will be given.

Registered

Yes

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Session Classification: Cherenkov detectors in astroparticle physics

Track Classification: Cherenkov detectors in astroparticle physics