

THE KM3NeT Broadcast optical system network

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The optical data transport system of the KM3NeT neutrino telescope at the bottom of the Mediterranean Sea will provide more than 6000 optical modules in the detector arrays with a point-to-point optical connection to the control stations onshore. The ARCA and ORCA detectors of KM3NeT are being installed at a depth of about 3500m and 2500 m, respectively and their distance to the control stations is about 100 kilometers and 40 kilometers. In particular, the two detectors are optimised for the detection of cosmic neutrinos with energies above about 1 TeV (ARCA) and for the detection of atmospheric neutrinos with energies in the range 1 GeV–1 TeV (ORCA).

The expected maximum data rate is 200 Mbps per optical module. The implemented optical data transport system matches the layouts of the networks of electro-optical cables and junction boxes in the deep sea. For efficient use of the fibres in the system the technology of Dense Wavelength Division Multiplexing is applied. To comply with the scientific goals of KM3NeT, accurate time calibration between the many optical modules in the detector arrays is essential for the reconstruction of the neutrino events. For the first time in a deep sea neutrino telescope the White Rabbit protocol over Ethernet is used for the clock distribution. Downstream slow control and base module signals are broadcasted to all optical modules in the detector array. Synchronisation is achieved by communication between a White Rabbit master onshore and a White Rabbit slave unit inside the optical modules. The KM3NeT broadcast optical data transport system will be presented.

Collaboration

KM3NeT

Role of Submitter

I am the presenter

Primary author: PULVIRENTI, Sara Rita (INFN - LNS)

Co-authors: Mr D'AMICO, Antonio; Dr SCHMELLING, Jan-Willem (Nikhef)

Presenter: PULVIRENTI, Sara Rita (INFN - LNS)

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