

# KM3NeT Detection Unit Line Fit reconstruction using positioning sensors data

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KM3NeT is constructing two large neutrino detectors in the Mediterranean Sea: KM3NeT/ARCA, located near Sicily and aiming at neutrino astronomy, and KM3NeT/ORCA, located near Toulon and designed for neutrino oscillation studies.

The two detectors, together, will have hundreds of Detection Units (DUs) with 18 Digital Optical Modules (DOMs) maintained vertical by buoyancy, forming a large 3D optical array for detecting the Cherenkov light produced after the neutrino interactions. To properly reconstruct the direction of the incoming neutrino, the position of the DOMs must be known precisely with an accuracy of less than 10 cm, and since the DUs are affected by sea current the position will be measured every 10 minutes.

For this purpose, there are acoustic and orientation sensors inside the DOMs. An Attitude Heading Reference System (AHRS) chip provides the components values of the Acceleration and Magnetic field in the DOM, from which it is possible to calculate Yaw, Pitch and Roll for each floor of the line. A piezo sensor detects the signals from fixed acoustic emitters on the sea floor, so to position it by trilateration.

Data from these sensors are used as an input to reconstruct the shape of the entire line based on a DU Line Fit mechanical model. This poster presents an overview of the KM3NeT monitoring system, as well as the line fit model and its results.

## Keywords

## Collaboration

KM3NeT

## other Collaboration

## Subcategory

Experimental Methods & Instrumentation

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