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Dynamic positioning and orientation calibration for the KM3NeT detectors

The KM3NeT infrastructure comprises two water Cherenkov detectors in the Mediterranean Sea. Each detector is composed of multiple optical modules that are subject to movement due to deep-sea currents. To ensure an accurate reconstruction of neutrino events, the position and orientation of each optical module needs to be tracked continuously. This is performed by means of a dedicated positioning system made of a set of acoustic emitters placed on the seabed, and acoustic receivers integrated into the optical modules. The positions of the detector elements are determined via a global fit of the acoustic data. To archive the envisaged angular resolution of 0.05 degrees in KM3NeT/ARCA, the position of each optical module must be resolved with an accuracy better than 20 cm. The orientations of the optical modules are determined using compass data and need to be resolved with an accuracy of about 3 degrees. This contribution presents the global fit method that is currently used for the positioning calibration in both KM3NeT telescopes, KM3NeT/ORCA and KM3NeT/ARCA, as well as the status of the orientation calibration.

Collaboration(s)

KM3NeT

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