



Contribution ID: 16

Type: **Contributed Talk**

Dynamic positioning and orientation calibrations of the KM3NeT/ORCA detector

Wednesday, October 1, 2025 11:40 AM (20 minutes)

KM3NeT/ORCA is a water Cherenkov neutrino detector currently under construction in the Mediterranean Sea as part of the wider KM3NeT observatory, at a depth of 2450m offshore from Toulon, France. In its current configuration, it consists of 24 detection units out of a planned 115, each with 18 Digital Optical Modules comprising an 18" glass sphere containing 31 3" photomultiplier tubes. In order to obtain the desired accuracy for the reconstructed directions of detected neutrino events, both the positions and orientations of each DOM must be known, as these can change due to the movement of the detection units with deep sea currents. The positions are measured using the detection of acoustic signals from known base emitters by piezo-electric receivers, and orientations are recorded with compasses within each DOM. We detail the methods used and show the evolution of these calibrated positions and orientations for KM3NeT/ORCA up to the present day, demonstrating the bootstrapping mechanism used to derive newer configurations from old, and the stability of the deployed detector units through their operation.

Neutrino Properties

No

Neutrino Telescopes & Multi-messenger

Yes

Neutrino Theory & Cosmology

No

Data Science and Detector R&D

Yes

Author: CLARK, Rogan (UCLouvain CP3)

Presenter: CLARK, Rogan (UCLouvain CP3)

Session Classification: Data Science and Detector R&D

Track Classification: Data Science and Detector R&D