

Contribution ID: 368

Type: Talk

Measurement of optical water properties using stopping muons in KM3NeT/ORCA

Monday 21 July 2025 13:35 (15 minutes)

The KM3NeT Collaboration is currently building two neutrino detectors at the bottom of the Mediterranean Sea. The KM3NeT/ARCA telescope is under construction off-shore Sicily, Italy, at a depth of about 3.5 km. The main goal of KM3NeT/ARCA is cosmic neutrino studies. KM3NeT/ORCA is being built off-shore Toulon, France, about 2.5 km below the sea surface. Its main physics objective is the determination of the neutrino mass ordering and precise oscillation parameter measurements. Optical water properties and light detection efficiency are among the main systematic uncertainties for these goals. In this work, reconstructed atmospheric muons that stop within KM3NeT/ORCA are explored in order to constrain these uncertainties. Such muons lose energy dominantly through ionisation when entering the etector sensitive volume which makes them an eligible light source for this measurement. The improved constraints on these uncertainties will result in better sensitivities in neutrino oscillation studies.

Collaboration(s)

The KM3NeT Collaboration

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Track Classification: Neutrino Astronomy & Physics