

The 22nd international workshop on Next Generation Nucleon Decay and Neutrino Detectors (NNN23)



Contribution ID: 59

Type: Abstract for a "contributing talk"

The ANTARES and KM3NeT neutrino telescopes: status and perspectives for neutrino physics and astrophysics

Thursday, 12 October 2023 11:45 (30 minutes)

The ANTARES neutrino telescope was operational in the Mediterranean Sea from 2006 to 2022. The detector array, consisting of 12 lines with a total of 885 optical modules, was designed to detect high-energy neutrinos covering energies from a few tens of GeV up to the PeV range. Despite the relatively small size of the detector, the results obtained are relevant in the field of neutrino physics and astrophysics due to the good angular resolution of the telescope.

KM3NeT is a research infrastructure housing the next generation of Cherenkov neutrino telescopes. It consists of two detectors (ARCA and ORCA) currently under deployment in two locations in the Mediterranean Sea. Although both telescopes are based on the same detection technology, their key science goals are different: ARCA (located off-shore Sicily, Italy) aims at studying neutrinos with energies in the TeV–PeV range coming from distant astrophysical sources. ORCA (located off-shore Toulon, France) is optimized for neutrino physics studies at 1–100 GeV energies, providing information on their fundamental properties.

This presentation will give an overview of the legacy results of ANTARES and an overview on the KM3NeT infrastructure, the detector performances, the basic analysis techniques. We will also show, among others, the expected sensitivities for the complete detector configuration on the search for cosmic neutrino sources with ARCA, the sensitivity to the neutrino mass ordering and the measurement of the neutrino oscillation parameters with ORCA. In addition, by searching for an excess of coincidences above the optical background, KM3NeT can detect low energy neutrinos coming from Galactic Core-Collapse SuperNova. I discuss how the uniquely complex structure of the optical modules in the KM3NeT would allow this wide physics and astrophysics program.

Presenter: SPURIO, Maurizio (Università degli studi di Bologna, Italy)

Session Classification: Second Day - Contributed Talks