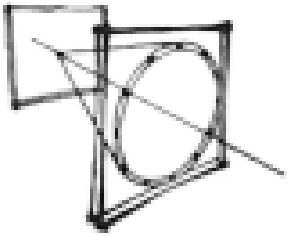

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Cherenkov light detection in underwater neutrino telescopes: technology and results of ANTARES and KM3NET

Thursday, 8 September 2016 13:30 (25 minutes)

Neutrino astronomy plays a key role in the exploration of the high-energy sky, due to excellent source pointing capabilities and an unrivaled field of view. Indeed, neutrinos can escape much denser celestial environments than light, thus behaving as tracers of the innermost processes occurring in astrophysical sources, hidden to traditional astronomy, without being deflected by the presence of magnetic fields on their path.
Neutrino telescopes are based on the detection of the Cherenkov light emitted by the secondary particles generated in high energy astrophysical neutrino interactions. The recent outstanding results achieved by IceCube have given a great boost to this field. In particular, the realization of a neutrino telescope in the boreal hemisphere will permit to cover a region of the sky complementary to the field of view of IceCube, including the Galactic Centre and a large part of the Galactic plane.
The ANTARES neutrino telescope has successfully demonstrated the feasibility of the undersea water Cherenkov technique, with ten years of data taking studded with a rich harvest of scientific results.
Building on the extensive experience gained in this project, the KM3NeT neutrino telescope will represent a big step forward in the field of neutrino astronomy. The KM3NeT research facility is currently under construction and will be realized as an installation distributed over two sites, with common detector technology and data handling. One telescope will be realized offshore CapoPassero, Italy, and will be dedicated to the high-energy neutrino sky, ARCA (Astroparticle Research with Cosmics in the Abyss). A denser detector, ORCA (Oscillation Research with Cosmics in the Abyss), will be built near Toulon (France) and will be dedicated to a lower neutrino energy range for the study of neutrino properties.
In this contribution, ANTARES and KM3NeT will be presented and compared in terms of technology, performances, scientific results and perspectives.

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