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Invited Talk: The next generation neutrino telescope

Saturday, 28 June 2014 09:30 (30 minutes)

KM3NeT is a new research infrastructure consisting of a cabled network of deep-sea neutrino telescopes in the Mediterranean Sea.
The main objective of KM3NeT is the discovery and subsequent observation of high-energy neutrino sources in the Universe.

Three suitable deep-sea sites have been identified, namely off-shore Toulon (France), Capo Passero (Italy) and Pylos (Greece).
The list of design features of the KM3NeT neutrino telescope includes an optical module with 31 3-inch photo-multiplier tubes, an integrated data-transmission and clock system and a high-efficiency power network.
All data are sent from the deep sea to the shore where they are processed in real-time by a farm of commodity PCs.
The filtered data are sent to various computer centers around Europe for offline analyses.
The remote operation of the deep-sea facility and the fast access to these computer centers make it possible to take and analyse data from anywhere in the world.

The angular resolution, the geographical location and the size make KM3NeT an ideal instrument to observe neutrinos from Galactic sources.
The neutrino signal recently reported by IceCube has led KM3NeT to consider an intermediate phase to measure the IceCube signal with different methodology, improved resolution and complementary field of view.
Furthermore, a study was launched to find out whether a measurement of the mass hierarchy of neutrinos using the same technology but a different detector layout is feasible.
The KM3NeT infrastructure will also host a network of cabled observatories with a wide array of dedicated instruments for oceanographic, geophysical and marine biological research.

The status and future prospects of the KM3NeT project will be presented, with emphasis on the discovery potential of neutrino point sources.
The synergy with other sciences will be highlighted.

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