Contribution ID: **32** Type: **Invited talk**

Acoustic detection of UHE neutrinos in the Mediterranean sea: status and perspective.

Wednesday, 8 June 2016 11:20 (25 minutes)

In recent years the astro-particle community is involved in the realization of experimental apparatuses for the detection of high energy neutrinos originated in cosmic sources or produced in the interaction of Cosmic Rays with the Cosmic Microwave Background.
For neutrino energies in the TeV-PeV range, kilometre square optical Cherenkov detector, that has been so far positively exploited by IceCube and ANTARES, is considered optimal. For higher energies, three experimental techniques are under study: the detection of radio pulses produced by showers following a neutrino interaction, the detection of air showers initiated by neutrinos interacting with rocks or deep Earth's atmosphere and the detection of acoustic waves produced by deposition of energy in the interaction of neutrinos in acoustically transparent mediums. The potential of the acoustic detection technique, first proposed by Askaryan in 1957, to build very large neutrino detectors is appealing, thanks to the optimal properties of mediums such as water or ice as sound propagator.
Though the studies on this technique are still in an early stage, acoustic positioning systems used on optical Cherenkov detectors, like AMADEUS and NEMO, give the possibility to study the ambient noise and provide important information for the future analysis of acoustic data. KM3NeT with its equipment of acoustic sensors will monitor the underwater acoustic signals; its infrastructure could be used for the implementation of dedicated array of acoustic sensors namely for the acoustic neutrino detection.
Results obtained by AMADEUS and NEMO in the Mediterranean will be summarised and perspectives of acoustic detection of UHE neutrinos will be discussed.

Summary

The acoustic detection of astrophysical neutrinos with energies exceeding 100 PeV will be discussed. The potential of the acoustic detection technique, first proposed by Askaryan in 1957, to build very large neutrino detectors is appealing, thanks to the optimal properties of mediums such as water or ice as sound propagator. Results obtained by AMADEUS and NEMO in the Mediterranean will be summarised and perspectives of acoustic detection of UHE neutrinos will be discussed.

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Session Classification: Presentations