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Status and Recent Results of the Acoustic Neutrino Detection Test System AMADEUS of ANTARES

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The technique of acoustic neutrino detection is a promising approach for future large-scale ultra-high-energy neutrino detectors in water. To investigate this technique in the deep sea, the AMADEUS system has been integrated into the ANTARES neutrino telescope in the Mediterranean Sea. Installed at a depth of more than 2000m, the 36 acoustic sensors of AMADEUS are based on piezo-ceramics elements for the broadband recording of signals with frequencies ranging up to 125kHz.
Acoustic data are continuously acquired and processed by applying online filter algorithms to pre-select a high-purity sample of neutrino-like signals. Transient signals in the deep sea are of manifold origin and can mimic the acoustic signature of a neutrino interaction. In order to assess the background for acoustic neutrino detection in the deep sea, the characteristics of these transient signals and of the ambient noise have been investigated. To this end, an offline analysis package for the pre-selected data was developed, including signal classification and acoustic source reconstruction algorithms. To test and validate the performance of the analysis package and to simulate the response of the system to neutrino interactions, a complete simulation chain was developed.
In the presentation, the AMADEUS system will be described. Selected recent AMADEUS results will be discussed and first conclusions concerning the feasibility of acoustic detection of ultra-high-energy neutrinos in the Mediterranean Sea presented.

Summary

In the presentation, the AMADEUS system will be described and selected recent AMADEUS results will be discussed.

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