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Simulation Chain for Acoustic Ultra-high Energy Neutrino Detectors in Water

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Acoustic neutrino detection is a promising approach for large-scale ultra-high energy neutrino detectors in water. In this contribution, a Monte Carlo simulation chain for acoustic neutrino detection devices in water will be presented. The simulation chain covers the generation of the acoustic pulse produced by a neutrino interaction and its propagation to the sensors within the detector. Currently, ambient and transient noise models for the Mediterranean Sea and simulations of the data acquisition hardware, similar to the one used in ANTARES/AMADEUS, are implemented. A pre-selection scheme for neutrino-like signals based on matched filtering is employed, as it can be used for on-line filtering. To simulate the whole processing chain for experimental data, signal classification and acoustic source reconstruction algorithms are integrated. An overview of the design and capabilities of the simulation chain will be presented, and some applications and preliminary studies will be discussed.

Author: Mr NEFF, Max (ECAP - Uni Erlangen)

Presenter: Mr NEFF, Max (ECAP - Uni Erlangen)

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