HYDROACOUSTICAL DETECTION OF ULTRA-HIGH AND EXTREMELY HIGH ENERGY NEUTRINOS

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The prospects of construction of deep underwater neutrino telescopes in the World Ocean for the goals of ultra-high and extremely high energy neutrino astrophysics (astronomy) using new acoustic technologies are considered. The effective detection volume of the acoustic neutrino telescopes can be greater than a cubic kilometer.
It was argued that an existing hydroacoustic array of 2400 hydrophones in the Great Ocean near Kamchatka Peninsula could be used as a test base for an acoustic neutrino telescope which should be capable to detect acoustic signals produced in water by the cosmic neutrinos with energies 10^19-10^21 eV (search for topological defects neutrinos).
The results of simulations of the extremely high energy electron-hadron and electron-photon cascades with the Landau-Pomeranchuk-Migdal effect taken into account are presented. The acoustic signals emitted by the neutrino induced cascades with energies 10^20-10^21 eV were also calculated at distances 1 m - 10 km from the cascade axis.
The possibilities of use of the conversed hydroacoustical station MG-10 (MG-10M) of 132 hydrophones as base module for a deep water acoustic neutrino detector with the threshold detection energy 10^15 eV in the Mediterranian Sea are analysed (the aid - to search for neutrinos from the Active Galactic Nuclei). A description of the measurement system for such a module is made.The program of study of hydroacoustical background in the Mediterranean Sea using the autonomous bottom station of the Institute for Nuclear Research capable to operate at the depths up to 6 km is developed. For this goals the sensitive deep water array consisting of 6 hydrophones is designed and constructed.