

Hunting for cosmic neutrinos deep under the sea: The ANTARES experiment

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More than one hundred years after the first observations of cosmic rays, and in spite of the impressive amount of data that have in the meantime been collected, many of the problems connected with their origin and propagation remain unsolved.

It is a common, but poorly supported, belief that they must originate from catastrophic events which take place in our as well as in other Galaxies.

Events such as Supernova explosions, Active Galactic Nuclei, Quasars and Microquasars, which are likely sources of high energy cosmic rays and gamma rays, could be intense neutrino sources as well. The measurement of the arrival direction and energy of such neutrinos, that would clarify the production mechanisms of high energy hadrons and gammas, requires very massive targets, of sizes far beyond those of present, conventional underground detectors. A possible solution, suggested and tested over 20 years ago, is the use of the sea as a Cerenkov target-detector.

One such detector, ANTARES, has been built in the Mediterranean by a large international collaboration and is in operation since 2008.

I plan to describe the experimental technique, the sensitivity of the experiment and the first results that have been obtained in the search for neutrinos from point sources, on the neutrino diffuse flux and on several other items. I will also make a short comparison with other detectors of the same or similar type, now in operation or being designed.

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