

MEDITERRANEAN: SUCCESS IN THE MARINE OPERATION FOR THE KM3NET/ARCA NEUTRINO DETECTOR



The complex marine operation, which began on 2 June, carried out by the KM3NeT Scientific Collaboration at the deep sea site off Capo Passero, Sicily, to expand the ARCA (*Astroparticle Research with Cosmics in the Abyss*) device was concluded with complete success in the early hours of 14 June. KM3NeT is the ambitious international project, a collaboration of nearly 60 institutes worldwide, for neutrino research in the Mediterranean Sea, which includes the ARCA submarine devices for searching for cosmic neutrinos up to extreme

energies, and ORCA (*Oscillation Research with Cosmics in the Abyss*), dedicated to the study of neutrino oscillation mechanisms. The ARCA device consists of a network of strings, called detection lines, up to 700 metres high and anchored to the seabed, each of which has more than 500 ultra-sensitive detectors (photomultipliers) installed in 18 optical modules. The installation site is at a depth of 3,500 metres, approximately 80 kilometres off the coast.

The one just ended was KM3NeT first marine campaign that lasted a full two weeks and was divided into two phases: one for the installation of two junction boxes, the underwater structures used to connect the detection lines and which allow communication with the device's control station on shore, and 4 new detection lines; the other for the installation of 7 new detection lines. The size of the ARCA submarine device has thus more than doubled, now comprising 19 detection lines, equipped with more than 10,000 photomultipliers in total. The volume of the device is already approximately 2.5 times larger than its predecessor ANTARES (<https://home.infn.it/it/news-infn/4789-passaggio-di-consegna-da-antares-a-km3net-sul-fondo-del-mare>).

INFN is among the major research organisations involved in KM3NeT, with active research groups at the Southern National Laboratories and the INFN divisions in Bari, Bologna, Catania, Genoa, Naples with the related group in Salerno, and Rome, in collaboration with the corresponding universities.

This operation marks nearing completion of the IDMAR project, co-financed by the Sicily Region within the scope of Po-Fesr 2014-2020, action 1.5.1 for the enhancement of maritime research infrastructures in Sicily.