



## RESEARCH INFRASTRUCTURES

### NEUTRINOS: FIRST SIX COMPONENTS OF THE KM3NET UNDERSEA TELESCOPE INSTALLED AT A DEPTH OF 3500 METRES

The expansion of the IDMAR submarine infrastructure – coordinated by the INFN Southern National Laboratories and co-funded by the Sicily Region - with a new junction box delivering electricity and allowing submarine connections and the installation of five new strings of detectors of the neutrino telescope KM3NeT/ARCA were concluded with success. The operations took place at approximately 80 km off Capo Passero, in Sicily, at a depth of up to 3,500 metres. The ARCA telescope, together with ORCA situated off Toulon in France, will constitute the multi-site KM3NeT submarine telescope that, in its final configuration, will occupy a total volume of one cubic kilometre, exploiting the interaction of sea water with neutrinos. The submarine observatory will thus enable scientists to identify the sources of high-energy neutrinos coming from catastrophic events in the universe and to study the fundamental properties of these particles. In its final configuration, the KM3NeT/ARCA experiment includes a network of more than 200 strings of detectors that are 700 metres high; each string is made of 18 optical modules. These modules are equipped with ultra-sensitive light sensors able to record the extremely weak flashes of light generated by the particles produced when cosmic neutrinos interact with water in pitch darkness and in the depths of the Mediterranean Sea. In total, six strings of detectors are now operating, representing the initial nucleus of the KM3NeT/ARCA neutrino telescope. In addition to the six strings already operating in ORCA, the ARCA strings enable KM3NeT to exceed the sensitivity of the previous ANTARES experiment, in data acquisition since 2008, which was also set up with a strong Italian contribution.

INFN, with its Southern National Laboratories, the divisions of Catania, Genoa, Naples, Bologna, Bari and Rome, and the Salerno associated group, is involved in integrating the recently installed measurement lines, part of the optical modules, all of the basic modules and part of the electronic and mechanical components. ■