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Neutrino telescopes in the Mediterranean sea for multimessenger astrophysics

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Neutrino telescopes aim to help in solving long-standing problems in astrophysics, such as the origin of cosmic rays. High-energy neutrinos of cosmic origin have been recently observed by the IceCube detector in the South Pole. However, the sources and production mechanisms of those neutrinos are still largely unknown. In addition to possible Galactic sources, extragalactic plausible candidates are gamma-ray bursts and active galactic nuclei. Combining neutrino data with electromagnetic measurements and, possibly, gravitational waves in a multimessenger approach will increase our ability to identify neutrino sources.
Neutrino telescopes in the Northern Earth hemisphere are possible only undersea and the transparency of the Mediterranean water allows for a very good angular resolution in the reconstruction of interactions from neutrinos of all flavours. This yields an unprecedented sensitivity in the searches for neutrino sources located in the Southern Sky (including most of the Galactic plane) and in the energy range below 100 TeV.
So far, valuable complementary observations have been performed in the Mediterranean Sea by the ANTARES telescope and constraints have been set on the origin of the cosmic neutrino flux. ANTARES has also actively developed a manifold multimessenger program, both in real time and offline. The high quality of the results obtained with a small detector (compared to IceCube) and the competitiveness of the results achieved demonstrate the tremendous potential of the new, much larger array, KM3NeT, now under construction. ANTARES results and the perspectives for the KM3NeT telescope are highlighted in the presentation.

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