Recent Results of the ANTARES Neutrino Telescope

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Abstract

The discovery of cosmic neutrinos of astrophysical origin by IceCube has started a new chapter in the field of Neutrino Astronomy and has officially initiated the neutrino era in high-energy astrophysics. Noticeably, a small accumulation of events in the region near the Galactic Centre has been observed: a telescope in the Mediterranean Sea constitutes a great opportunity for the physics quest, since it offers a perfect complementarity to IceCube and, in particular, a better visibility of the Galactic Centre. ANTARES (Astronomy with a Neutrino Telescope and Abyss Environmental RESearch) is the first operational Cherenkov neutrino telescope in the Mediterranean Sea and the largest neutrino detector in the Northern hemisphere, covering an area of about 0.1 km$^2$; located 40 km offshore Toulon, France, at a depth of 2475m, it has been completed in June 2008 and it is currently taking data. It consists of a tri-dimensional array of 885 photo-multipliers tubes (PMTs), distributed in 12 lines. ANTARES has recently performed a search for an excess of high energy neutrinos in the direction of the Galactic Centre, close to the accumulation of the IceCube events. The results of this search will be presented, together with other achievements of the experiment, for instance the search for point-like and extended neutrino sources and the search for neutrino emission from the Fermi bubbles. A key attention is given to the multi-messenger approach, by looking for correlations of neutrinos with GeV/TeV gamma-rays, charged cosmic rays and gravitational waves from astrophysical objects. Results on the indirect search for dark matter will be presented in a separated contribution. ANTARES offers a first view of the Neutrino Sky from the Mediterranean and its results makes more compelling the expectations for the next generation experiment, KM3NeT.