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Indirect dark matter search with neutrino telescopes

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In recent years, thanks to the construction of large Cherenkov neutrino detectors, dark matter has become one of the main research topics for the neutrino astronomy. At present, there are two big neutrino telescopes based on the Cherenkov technique in ice and water: IceCUBE at the South Pole and ANTARES in the northern hemisphere.

Both ANTARES and IceCUBE are performing an indirect search for dark matter by looking for a statistical excess of neutrinos coming from astrophysical massive objects, such as the Sun, the Earth and the Galactic Centre. This excess could be an evidence of the possible annihilation of dark matter particles in the centre of these objects.

In one of the most popular scenario the dark matter is composed by WIMP particles. These particles lose kinetic energy through elastic scattering and then are gravitationally trapped in massive objects (like the Sun) and “fall down” reaching their inner core. Here they can interact with other WIMPs, in self-annihilation reactions, producing some standard model particles that, in subsequent steps, originate neutrinos that can be detected at Earth.

The preliminary results of the sensitivity of the ANTARES neutrino telescope to the indirect detection of dark matter fluxes will be presented, as well as the last IceCUBE published results, for different dark matter models and sources.

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