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Indirect search of dark matter with the KM3NeT-ORCA neutrino telescope

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Dark matter is one of the pillars of the Standard Cosmological Model, but its nature is today still unknown. Its possible connection with theories beyond the Standard Model of particle physics makes dark matter one of the most important open problems in modern cosmology and particle physics, as witnessed by the enormous theoretical and experimental effort that is being put towards its identification. WIMPs (Weakly Interacting Massive Particles) are well-motivated dark matter candidates and they can be searched in an indirect way with neutrino telescopes. In particular, IceCube, Super-Kamiokande and ANTARES searched for Dark Matter annihilation in the Sun and in the Galactic Center but up to now they had null results. The KM3NeT-ORCA neutrino telescope is an interesting candidate to improve this kind of research. KM3NeT is a new infrastructure consisting of a network of deep-sea neutrino telescopes in the Mediterranean Sea. The main objectives of the KM3NeT Collaboration are i) the discovery and subsequent observation of high-energy neutrino sources in the Universe and ii) the determination of the mass hierarchy of neutrinos and improved studies of their parameters. It is divided in two blocks according to the energy regime. One block (ARCA - Research with Cosmics in the Abyss) will be optimized to fully explore the high energy IceCube signal. The second block is densely configured to precisely measure atmospheric neutrino oscillations. The same energy regime is suitable to detect neutrinos from possible annihilation of dark matter. In this talk, I will show how competitive can be ORCA in this kind of research.

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