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WIMP Dark Matter Searches from the Galactic Centre with KM3NeT

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Weakly Interacting Massive Particles (WIMP) are interesting dark matter (DM) candidates because they exhibit the usual DM properties (such as being non-relativistic and electrically neutral), while having the advantage of weakly interacting with Standard Model particles, which makes them detectable in principle. When DM decays or annihilates, neutrinos are produced. Therefore, an indirect detection of DM involves searching for an excess of neutrinos in astrophysical targets such as the Galactic Centre or the Sun, where large amounts of DM are believed to accumulate. Such an excess of neutrinos could then be observed by large-scale Cherenkov detectors such as KM3NeT, which is currently under construction in the abyss of the Mediterranean Sea, while taking data in partial detector configurations. KM3NeT is composed of two undersea Cherenkov neutrino detectors: KM3NeT/ORCA, a dense-geometry detector optimised for the measurement of low energy (GeV) neutrinos, and KM3NeT/ARCA, a cubic kilometer-sized detector, intended for the detection of high energy astrophysical neutrinos. In this contribution, we present an un-binned likelihood analysis looking for WIMP-like DM annihilations occurring at the Galactic Centre, where we consider DM with masses ranging from approximately 10 GeV up to 100 TeV. We use data from various partial ORCA-detector configurations with 6, 10, 11 and 15 lines to explore the low DM mass region. For the higher DM mass regions, we use data from the KM3NeT/ARCA detector with 8, 19 and 21 lines. Finally, we show the combined results with the latest analysis from ANTARES, KM3NeT's predecessor.

Collaboration(s)

KM3NeT Collaboration

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