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# dark matter searches in the centre of the Milky Way with IceCube

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Neutrino detectors, such as the IceCube telescope, can be used to perform indirect dark matter searches. Under the assumption that dark matter is made of Weakly Interacting Massive Particles (WIMPs), Standard Model particles are expected to be created by its annihilation or decay. These Standard Model particles could in turn produce neutrinos detectable by the IceCube neutrino telescope. As our galaxy is believed to be embedded in a halo of dark matter whose density increases towards its centre, the Galactic Centre represents an ideal target for indirect searches, with the strongest dark matter annihilation signal at Earth being expected from this direction. In this contribution, the sensitivities of a low energy indirect search for dark matter in the Galactic Centre are presented, along with the results of a dark search towards higher energies, both using IceCube data. The low energy dark matter search uses eights years of DeepCore data and probes dark matter masses ranging from 5 GeV to 1 TeV, for annihilation through $\nu_e\bar{\nu}_e$, $\nu_\mu\bar{\nu}_\mu$, $\nu_\tau\bar{\nu}_\tau$, $\mu^+\mu^-$, $\tau^+\tau^-$, $W^+W^-$ and $b^+b^-$. When considering dark matter annihilation into $\tau^+\tau^-$, the sensitivities on the thermally-averaged WIMP self-annihilation cross-section achieved by this analysis demonstrate an improvement by an order of magnitude over previous searches with IceCube and other neutrino telescopes. For the second analysis included in this contribution, five years of IceCube data are considered to search for neutrinos from the annihilation and the decay of dark matter particles with masses between 10 GeV and 40 TeV. When considering the $\nu\bar{\nu}$ channel, this analysis provides the best limits on the thermally-averaged self-annihilation cross-section for masses below 1 TeV, as well as the leading lower limits in terms of dark matter decay lifetime from neutrino experiments.

## In-person participation

Yes

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