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Dark Matter Phenomenology from Upcoming Neutrino Telescopes:

Experimental developments in neutrino telescopes are drastically improving their ability to constrain the annihilation cross-section of dark matter. In this talk we project the future sensitivity of a Neutrino telescope similar to KM3NeT. Focusing on particle models for dark matter, we assess how these future limits will complement the existing landscape of dark matter searches. This brings together results from gamma-ray telescopes, measurements of the cosmic microwave background and direct dark matter detection. We will emphasise the importance of using the Angular Power Spectrum method, which is a powerful tool for reducing astrophysical uncertainties. We find that neutrino telescopes will be able to competitively probe significant portions of parameter space and will provide critical complementary information. Furthermore, we identify models that can potentially be explored where the relic abundance is achieved through thermal freeze-out. This talk is based on the work in arXiv:2103.01237 as well as ongoing projects.

Primary author: CHEEK, Andrew (CP3, UCLouvain)

Presenter: CHEEK, Andrew (CP3, UCLouvain)

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