

Probing the Nature of Dark Matter with Gamma Rays: Prospects for the Cherenkov Telescope Array at the Galactic Center

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Revealing the nature of dark matter is one of the most riveting open tasks of modern astronomy and cosmology. To this end, observing and analyzing high-energy gamma-rays provides a promising and highly-effective tool which is, in particular, well-suited to constrain Weakly Interacting Massive Particle (WIMP) models.

Being currently in its pre-construction phase, the Cherenkov Telescope Array (CTA) will soon observe the high-energy gamma-ray sky in the 20 GeV - 300 TeV energy range. Thus, it will open the possibility to explore the parameter space of heavy dark matter (above 100 GeV) with unprecedented sensitivity.

One of the main targets for searches for signals of dark matter annihilation or decay is the center of our Galaxy. Due to its lower energy threshold and significantly larger effective area when compared to the current generation of ground-based Cherenkov telescopes, the CTA is expected to be sensitive to diffuse astrophysical emission which is present in that region.

In this talk, we present the status of the collaboration effort to estimate the sensitivity of CTA to various diffuse gamma-ray components in the surroundings of the Galactic Center. Moreover, based on the astrophysical emission observed with the LAT at lower energies, we report on the impact of these diffuse astrophysical emission backgrounds on dark matter searches and suggest promising data analysis and observational strategies for the upcoming CTA data.

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