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Searching for heavy dark matter with gamma-rays

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One of the most intriguing problems in particle physics and cosmology nowadays is the called dark matter problem. We have several evidences, like galaxy rotation curves, galaxy cluster collision, baryon acoustic oscillation, structure formation, among others, implying that we need a new particle, beyond the standard model of particle physics (SM), to explain the major matter component of the universe and to address all these evidences. The attempts to discover the DM particle could be via collider, direct (DD) and indirect (ID) detection searches. In the ID scenario DM may self-annihilate on stable SM particles, such as neutrinos, cosmic-rays and gamma-rays, which can be detected by experiments on Earth. (1) A viable model for DM particle must predict the observed abundance as a thermal relic of the early universe (in the WIMP paradigm through a freeze-out mechanism). Indirect detection searches restrict the parameter space $\langle \sigma v \rangle \times m_{DM}$ and are complementary to relic abundance and direct detection limits. In this work we study the phenomenology of a specific model of DM particle (the inert doublet model) and we evaluate the sensitivity of gamma-ray observatories (like CTA) to detect a signal in the Galactic Center (GC) region. (2)

Palavras-chave: Gamma astronomy. Dark matter. Indirect detection.

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