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Indirect detection of Dark Matter in dwarf galaxies with the Southern Wide-field Gamma-ray Observatory

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Despite its overwhelming presence, dark matter, comprising approximately 85% of the universe's total matter, continues to elude detection. Indirect detection, which involve searching Standard Model particles resulting from the decay or self-annihilation of dark matter particles, represent one approach to unveil signs of dark matter. When the dark matter particles possess masses in the GeV-TeV range, the detection of γ -rays emanating from astrophysical entities densely populated with dark matter becomes a viable method of detection. (1) Among the celestial bodies, dwarf galaxies, despite not boasting the highest densities, assume significance as they are predominantly composed of dark matter and are relatively close to our planet. Particularly, dwarf spheroidal galaxies (dSphs), characterized by an aged stellar population and lack of active star formation, become invaluable since they would exhibit negligible γ -ray emissions in the absence of dark matter. The objective of this study is to predict the potential detectability of signals arising from dark matter annihilation or decay in dwarf galaxies utilizing the Southern Wide-field Gamma-ray Observatory (SWGO), a future observatory to be constructed in South America. (2) The collective observations of SWGO are shown to yield competitive constraints on dark matter within the mass range of hundreds of GeV to hundreds of TeV. (3)

Palavras-chave: Dark matter. Dwarf galaxies. SWGO.

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