

Searching for Dark Matter with the Southern Wide-field Gamma-ray Observatory (SWGGO)

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1. What is this contribution about?

We present sensitivity estimates to detect dark matter (DM) particles with a future very-high-energy (\geq TeV) wide field-of-view gamma-ray observatory in the Southern Hemisphere, currently in its research and development phase under the name Southern Wide field-of-view Gamma-ray Observatory (SWGGO).

2. Why is it relevant / interesting?

Despite mounting evidence that DM exists in the Universe, its fundamental nature remains unknown. SWGGO would be able to search for gamma rays from the annihilation or decay of DM particles in many key targets in the Southern sky, such as the Galactic halo, several dwarf galaxies, including the promising Reticulum II, and the Large Magellanic Cloud.

3. What have we done?

Based on the simulations of a “straw man” detector design of SWGGO, we derived 95% C.L. sensitivity upper-limits to the annihilation cross-section and decay lifetime of DM particles from observations of the Galactic halo and Galactic subhalos targets.

4. What is the result?

With a wide field of view and long exposures, such observatory will have unprecedented sensitivity to DM in the mass range of ~ 100 GeV to a few PeV from observations of a large fraction of the Galactic halo around the Galactic Center and from Galactic subhalos targets. These results, combined with those from other present and future gamma-ray observatories, will likely probe the thermal relic annihilation cross section of Weakly Interacting Massive Particles for all masses from ~ 80 TeV down to the GeV range in most annihilation channels.