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Indirect Dark Matter Searches with VERITAS

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The standard model of cosmology requires dark matter (DM) to account for the 83% of the total mass density of the Universe. Assuming that the DM is composed of self-annihilating weakly interacting massive particles (WIMPs), its nature could be unraveled through the detection of the annihilation products, including photons with energies up to the WIMP mass. Annihilation of WIMPs with masses larger than 50 GeV could therefore produce very high energy gamma rays, potentially detectable by ground-based gamma-ray telescopes like VERITAS. We report on the VERITAS DM Program, an extensive set of observations of well motivated targets for indirect DM detection: dwarf spheroidal galaxies orbiting the Milky Way, the Galactic Center, galactic DM subhalo candidates amongst unassociated Fermi-LAT sources. We present VERITAS exclusion regions obtained on the thermally averaged annihilation cross section of the WIMP derived from these observations, and elaborate on the searches for DM subhalo candidates in the gamma-ray band.

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