

A Likelihood Approach for Dark Matter Searches Around the Galactic Center with VERITAS

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Abstract content

Revealing the nature of Dark Matter (DM) is a key objective of the current physical paradigm. Due to its predicted DM density at sub-pc distances, the Galactic Center should have a high number of DM interactions, making it a primary astrophysical source for DM studies. Various particle theories predict that DM annihilations over astrophysical scales can result in a gamma-ray flux. VERITAS is a terrestrial gamma-ray telescope in Arizona, USA, sensitive to gamma rays from 85 GeV to 30 TeV. It has accumulated ~ 108 hours of observations on the Galactic Center from 2010 to 2016. Major challenges when analyzing sky regions like the Galactic Center include modeling the diffuse emission from the galactic plane and the point source at the Galactic Center. By using a likelihood method, the software package ctools can fit multiple spatially- and energy-dependent models to address these complications. In this talk, I will present this new method for constraining DM mass and cross-sections from Galactic Center gamma-ray observations by VERITAS.

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