

Detecting Dark Matter Signatures in Fermi/LAT Data

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A promising path to detect the elusive dark matter (DM) of the Universe is to measure the flux of high energy photons produced by the annihilation of two such particles in space. The Fermi Large Area Telescope (Fermi/LAT) is a satellite mission observing such high energy gamma ray photons and its full sky survey is the ideal data set to look for signatures of annihilating DM.

I will describe the statistical challenges associated with DM searches in various regions of the sky, including the Galactic Centre, dwarf galaxies and the diffuse emission. I will highlight the difficulties of designing a statistically principled approach to extracting a possible weak DM signal from dominating background noise, which is often ill-understood and ill-characterized. Robust methods (both frequentist and Bayesian) will be discussed.

Key Words: High energy astrophysics; Poisson process; on/off problem; Bayesian point source detection.