

Searching for dark matter sources in Fermi-LAT's unIDs with Machine Learning

Friday 16 July 2021 19:18 (12 minutes)

Around one third of the point-like sources in the Fermi-LAT catalogs remain as unidentified sources (UniDs) today. Indeed, these unIDs lack a clear, univocal association with a known astrophysical source identified at other wavelengths, or to a well-known source type emitting only in gamma rays (such as certain pulsars). If the dark matter (DM) is composed of weakly interacting massive particles (WIMPs), there is the exciting possibility that some of these unIDs may actually be DM sources, emitting gamma rays by WIMPs annihilation. We propose a new search methodology that uses Machine Learning classification algorithms calibrated to a mixed sample of both experimental (known astrophysical objects) and theoretical (expected DM) data. With our methodology, we can correctly classify a promisingly high percent of astrophysical sources, opening a window to robustly search for DM source association among Fermi-LAT unIDs.

Keywords

Machine Learning; dark matter; Fermi-LAT; unidentified sources; classification algorithms;

Collaboration

other Collaboration

Subcategory

Experimental Methods & Instrumentation

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Session Classification: Discussion

Track Classification: Scientific Field: DM | Dark Matter