

Gamma-ray Emission from Molecular Outflows

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Many star-forming galaxies and those hosting active galactic nuclei (AGN) show evidence of massive outflows of material in a variety of phases including ionized, neutral atomic, and molecular outflows. Molecular outflows in particular have been the focus of recent interest as they may be responsible for removing gas from the galaxy, thereby suppressing star formation. As the material is ejected from the core of the galaxies, interactions of accelerated cosmic rays with the interstellar medium can produce high-energy gamma rays. However, the gamma-ray emission from these individual objects is expected to be below the threshold for LAT detection and has yet to be directly observed. In order to search for this faint gamma-ray signal we conduct a stacked analysis of a sample of molecular outflows in the nearby universe using 11 years of Fermi-LAT data and present preliminary evidence of a detection. Confirmed observations of gamma-ray emission from these sources can have significant implications for our understanding of AGN feedback mechanisms and the extragalactic gamma-ray background.

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