

Star-forming regions as potential contributors to Galactic cosmic rays: the case of NGC 3603

Thursday 15 July 2021 18:12 (12 minutes)

The identification of the sources contributing to the acceleration of Galactic Cosmic Rays (CRs) is a long-standing puzzle. Star-forming regions (SFRs) may be one of these potential contributors, in fact, the detection of gamma rays from the Cygnus Cocoon indicates the existence of freshly accelerated high-energy particles in the region, making it the first case of a firm detection of CR acceleration in SFRs. However, the limited number of such gamma-ray detections are preventing any conclusion about the prevalence of SFRs as CR sources. In this talk, we present a detailed morphological and spectral study of the unidentified source 4FGL J1115.1–6118 using about ten years of data above 10 GeV taken with Fermi-LAT. This source is positionally coincident with the young massive stellar cluster NGC 3603, and represents one of the few cases already studied in gamma rays. We will also present perspectives for a systematic search of gamma-ray emitting SFRs. These are the first steps towards potentially establishing these types of sources as fundamental CR emitters.

Keywords

Gamma-rays; Star forming Regions; Galactic cosmic rays; Non-thermal radiation sources; Young massive clusters; Star clusters; Gamma-ray sources;

Collaboration

Fermi-LAT

other Collaboration

Subcategory

Experimental Results

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Session Classification: Discussion

Track Classification: Scientific Field: GAD | Gamma Ray Direct