

Massive star clusters in the gamma-ray sky

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Massive Star Clusters (SCs) have been proposed as additional contributors to Galactic Cosmic rays (CRs), to overcome the limitations of supernova remnants (SNR) to reach the highest energy end of the CR spectrum. Thanks to fast mass losses due to the collective stellar winds, the environment around SCs is potentially suitable for particle acceleration up to PeV energies and the energetics is enough to account for a large fraction of the Galactic CRs, if the system is efficient enough. A handful of star clusters has been detected in gamma-rays confirming the idea that particle acceleration is taking place in this environment, however the contamination of other sources often makes it difficult to constrain the contribution arising from SCs only.

Here I present a new analysis of Fermi-LAT data collected towards a few massive young star clusters. The young age (< 3 Myr) of the clusters guarantees that no SN exploded in the region, allowing us to determine the power contributed by the star component alone, and to quantify the contribution of these types of sources to the bulk of CRs. Moreover I will present a recent statistical investigation that quantifies the degree of correlation between gamma-ray sources and these astrophysical objects and briefly discuss the observational prospect for ASTRI and CTAO.

Primary author: PERON, Giada (Istituto Nazionale di Astrofisica (INAF))

Presenter: PERON, Giada (Istituto Nazionale di Astrofisica (INAF))

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