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The role of the Galactic Centre region at TeV energies: a study of diffuse emission phenomenological models

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The central region of the Milky Way is a peculiar target even for observations at the highest energies in the gamma-ray regime. For that reason the Galactic Centre (GC) represents an ideal laboratory where studying physical processes and testing theories and models. A definitive and conclusive explanation of the measured flux at GeV and TeV bands is still unknown. Among the most plausible interpretations there are the emission associated with the supermassive black hole SgrA, *annihilation of Dark Matter, a nowadays unresolved population of millisecond pulsars and/or pulsar wind nebulae and/or supernova remnants and/or particle accelerators associated with strong winds of massive stars. The key-role assumed by the diffuse gamma-ray emission in such complex region has to be considered as part of the observed flux since it is measured both at GeVs—first by EGRET and then by Fermi*-LAT—and TeVs, as recently shown by Tibet AS- γ and LHAASO experiments.*

In view of the next generation gamma-ray experiments and observatories, a detailed analysis of several phenomenological models for the dubbed Cosmic-Ray Sea—computed with DRAGON and GAMMASKY codes—is scrutinised in comparison with the observed spectra from the inner Galaxy. This study assumes a fundamental role in the analysis-chain of such data since represents the only method providing the background model for analyzing extended sources, as the GC region, and unveiling the nature and origin of the emission.

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