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Interpreting the GeV gamma-ray excess in terms of non-standard cosmic-ray diffusion models.

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A GeV gamma-ray excess has possibly been individuated in Fermi-LAT data from the Galactic Center, and interpreted in terms of Dark Matter annihilations, either in hadronic or leptonic channels.
However, the identification of such an excess strongly relies on the capability of carefully assessing the background over which the excess is supposed to emerge. For this reason, it is crucial to critically scrutinise the role of the diffuse gamma-ray background as well as the presence of additional astrophysical emissions.
Here, making use of advanced numerical tools, we conduct such analysis focusing our attention on two crucial astrophysical ingredients that may significantly alter the diffuse gamma-ray background from the innermost region of the Milky Way galaxy.
On the one hand, motivated by simple arguments related to the motion of electrons along ordered magnetic field lines, we allow for anisotropic cosmic-ray diffusion.
On the other one, motivated by the possibility to have a population of supernovae in the region of the Galactic bulge, we explore non-standard cosmic-ray source terms.
We critically discuss how the inclusion of these two ingredients strongly affects the interpretation of the GeV gamma-ray excess in terms of Dark Matter annihilation.

Collaboration

– not specified –

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