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Unveiling the nature of the “Fermi GeV excess”: robust characterisation and possible interpretations

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Recently, a spatially extended excess of gamma rays collected by the *Fermi*-LAT from the inner region of the Milky Way has been claimed by different and independent groups. I will present a robust characterisation of the morphology and spectral properties of such an extended diffuse emission, including systematic uncertainties that are related to the high density of cosmic rays, gas, magnetic fields and abundance of point sources [1]. I will show that this re-assessment of the excess properties in light of background model systematics is significantly different from what claimed before and that it allows more freedom for models fitting the excess. In particular, I will scrutinise one of the most promising non-dark-matter astrophysical interpretations, namely the gamma-ray emission from leptonic cosmic rays interacting with gas and ambient photons and injected during burst-like events. I will show how well burst events during an active past of the Galactic center might account for the *Fermi* GeV excess and how we can disentangle this process from other viable interpretations.

[1] F. Calore, I. Cholis, and C. Weniger, *Background model systematics for the Fermi GeV excess*, Accepted for publication in JCAP, arXiv:1409.0042

Collaboration

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