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Strong support for a millisecond pulsar origin of the galactic center GeV excess

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Using gamma-ray data from the Fermi Large Area Telescope, various groups have identified an excess emission in the inner Galaxy centred around energies of a few GeV. This excess resembles remarkably well a signal from dark matter annihilation. One of the most plausible astrophysical interpretations is in terms of the combined emission from an undetected population of dim gamma-ray sources. In particular, millisecond pulsars are the best candidates due to their spectral similarity to the excess emission. We search for this hypothetical source population using a novel approach based on a wavelet decomposition of the gamma-ray sky and using the latest pass 8 data. Assuming a spatial distribution compatible with the GeV excess emission, we find evidence for the existence of such a population of dim sources in the inner galaxy at high significance. For plausible values of the luminosity function, this component can explain 100% of the observed excess emission.

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