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Multi-wavelength probes of the Fermi GeV excess

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More than a decade after its discovery, the Fermi GeV excess is still an exciting subject of research. Thus far, an unresolved population of millisecond pulsars (MSPs) in the Galactic bulge shining in gamma rays is the favorite explanation to the excess, but other explanations exist. Data from the Fermi-LAT have been thoroughly studied and, in order to discriminate between the different hypotheses, a multi-wavelength approach is now needed. In this talk, I will present the main rationale and results of [1], where we investigated the sensitivity of current X-ray telescopes to a Galactic bulge MSP population. We created a synthetic population of MSPs based on models fitted to observational data and constructed an empirical connection between gamma- and X-ray emission based on observed source properties. By comparing our mock population to the Chandra sensitivity towards the Galactic center, we concluded that a non negligible amount of MSPs should be detectable in X-rays. Using the latest Chandra source catalog, we selected yet unidentified sources based on spectral observables and optical astrometry with Gaia, and found a significant number of them being potential MSPs candidates. Finally, I will present some new developments aimed to further reduce our X-ray candidate selection, and to make predictions for radio observations.

[1] arXiv:2012.03580

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