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Multi-wavelength search for millisecond pulsars

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The Fermi GeV excess has kept physicists busy for the past decade. First attributed to dark matter annihilation, the favored explanation to date is an unresolved population of millisecond pulsars (MSPs), hiding in the Galactic Bulge. In order to prove this hypothesis, a multi-wavelength study is now needed. In a recent work [arXiv:2012.03580], we demonstrated that if the GeV excess is caused by an MSP population, about a hundred of them could be detectable by the Chandra X-ray observatory in a region of 6 degree \times 6 degree about the Galactic Center. We found more than 3000 MSP candidates among Chandra X-ray catalogued sources, allowing us to conclude that the MSP hypothesis as explanation to the GeV excess is not excluded. Besides, we selected few hundreds of promising candidates, with good X-ray spectral knowledge and no optical counterpart for follow-up studies, which will be the focus of this talk. We looked for infrared and ultraviolet counterparts to our candidates, knowing that bulge MSPs should have none or very faint ones. With now a list of about 160 promising candidates, we aim at motivating radio searches and analysing radio data in order to detect the characteristic pulsation and/or identify them as polarized compact radio sources.

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