

Gravitational-wave astronomy and multi-messenger astrophysics

Gamma-ray pulsars in the Galactic bulge: a multiwavelength quest

Joanna Berteaud, Francesca Calore, Maïca Clavel

A vast majority of gamma-ray pulsars were detected by the Fermi-LAT, in the Galactic disk and in globular clusters, but no discovery was ever made in the Galactic bulge. However, strong hints indicate that the latter hosts a population of millisecond pulsars (MSPs). One of them is the existence of an extended gamma-ray emission detected by the Fermi-LAT, the Fermi GeV excess, interpreted as the cumulative emission of MSPs too faint to be detected individually. In this talk, I will present the multiwavelength method we developed to search for bulge MSPs. We first demonstrated that about a hundred MSPs, unresolved by the Fermi-LAT and contributing to the GeV excess, should already have been detected by the Chandra X-ray observatory. We selected promising MSP candidates among X-ray sources with no UV counterpart and no or very faint IR and optical counterpart, while considering a radio counterpart as a strong hint in favor of a pulsar nature. Some candidates were identified as compact objects, possibly being magnetic cataclysmic variables, quiescent low-mass X-ray binaries or, of course, pulsars. We are now collecting novel radio data towards our candidates and investigating the challenging pulsation detection.