

## The study of the population of pulsars and magnetars

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**Abstract :** Pulsars are rotating neutron stars, born in a core-collapsed supernova, they are highly magnetized and surrounded by a plasma-filled magnetosphere emitting regular pulses of radiation at their spin frequency. More than 3000 pulsars have been discovered thanks to radio, gamma and x-rays surveys. With the advent of future surveys such as the Square Kilometre Array (SKA) or the Cherenkov Telescope Array (CTA), much more pulsars are expected to be detected. That is why, during my thesis I study the whole population of pulsars and magnetars (magnetars are pulsars, but with an even higher magnetic field) of the Milky Way in a simulation, this kind of work is called Pulsar Population Synthesis (PPS). My goal is to be able to reproduce the currently observed population of pulsars, in order to be able then to replace the current parameters of instruments in the simulation by the parameters of the future instruments that are going to be deployed, this will allow us to make prediction about the future observations. Furthermore, this kind of simulation also allows to constrain the properties of the Galactic population of pulsars and to have a better understanding of the radio and high-energy emission processes of these objects. In this presentation, I plan to show my current progress on my simulations where I worked on millisecond pulsars, normal pulsars (Sautron et al., 2024 A&A submitted recently) and magnetars which are 3 subpopulations of pulsars in the Galaxy.