

## Hybrid Force-free-PIC numerical approach to model pulsar magnetospheres.

The study of pulsar magnetospheres has developed quickly in recent years thanks to the development of high-performance computing. Two complementary numerical methods have been used to model these objects thus far: the magnetohydrodynamic (MHD) and the particle-in-cell (PIC) techniques. The MHD approach (in the force free regime) is well-suited to describe the plasma at large scales while the PIC method is appropriate to capture the microphysics but it is computationally expansive. Our objective is to combine the strengths of both approaches into the same numerical framework in order to achieve a larger scale separation and magnetic field strength. This new hybrid approach will allow us to make realistic predictions of particle and electromagnetic spectra for pulsars, therefore bridging the gap between observations and ab-initio models. In this contribution, I will describe the numerical approach and present its first application to the magnetosphere of a weak aligned pulsar.