



## Reconstructing the Magnetic field of the Milky way via Astrophysical Techniques and Numerical Simulations (MAGMASIM)

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### ABSTRACT

Project MagMASim (Reconstructing the Magnetic field of the Milky way via Astrophysical Techniques and Numerical Simulations) is based on a multidisciplinary synergy between experiments, numerical magnetohydrodynamic simulations of the evolution of galaxies through cosmic time, numerical methods for boundary value problems, and statistical inference methods, in order to study and reconstruct the magnetic field of the Galaxy. This is a problem of great importance in astrophysics, as the Galactic magnetic field affects a wide range of high-interest astrophysical phenomena of active research, including star formation and the astrophysics of the highest-energy particles in the Universe. Instead of the usual model fitting, we perform a numerical reconstruction of Galactic magnetic via numerical simulations subject to constraints obtained from the experimental measurements. In this way, we aim to develop a methodology that will then be applied to real experimental data. In this talk we discuss the general aspects of the project from both the astrophysical and the numerical point of view, our current progress, the case of simulating the experimental data and the application of statistical inference methods to extract statistical properties from them.