Protostellar Magnetism: Heritage vs Evolution
The PROMETHEE Project

https://promethee-anr.github.io

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Context

Magnetic fields play an important role during the star formation by regulating angular momentum, fragmentation, outflows, disk formation, and accretion onto the star. While our knowledge on the magnetic properties is now well advanced in the pre-stellar stages (in molecular clouds, filaments, and cores), and also in the pre-main sequence phase (e.g. T Tauris stars), it is however poor during the protostellar stage.

Problematics

- What are the properties of the protostellar magnetic fields?
- Can protostars trigger MAE processes ?
- How protostellar magnetic fields emerge, evolve and impact the protostellar evolution ?
- How core collapse phases influence the protostellar magnetic fields ?

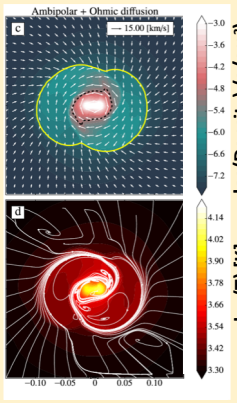
Objectives

To address the problematics the PROMETHEE project aims at

- **Characterising the magnetic properties** of class I /Flat-Spectrum (FS) objects using near-IR spectropolarimeters (SPIRou and CRIRES+)
- **Building 3D MHD dynamo models** of accreting protostars at different protostellar evolutionary stages using initial condition predictions from core-collapse (CC) models, protostellar evolutionary models, and observational constraints
- **Characterising the magnetosphere** of the protostars using SPIRou and CRIRES+ spectra, and GRAVITY+/VLTI observations
- **Constraining magnetospheric accretion/ejection (MAE) models in a strong accretion regime** by the observations

Summary of the PROMETHEE project

Newborn protostar



WP4 - CC models

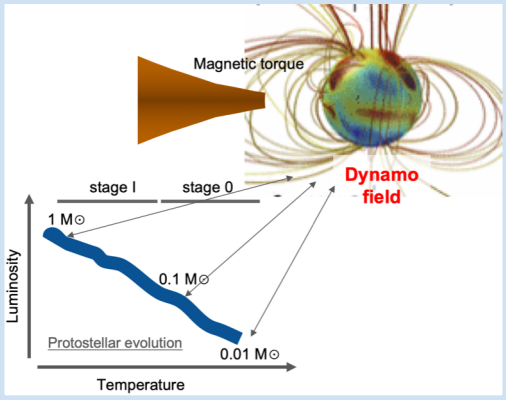
B. Commerçon +
ANR PhD student

CRAL

CENTRE DE RECHERCHE ASTROPHYSIQUE DE LYON

+

Newborn protostar ⇨ Stage I Evolution



WP3 - dynamo models at different ages

L. Petitdemange +
ANR 3-yr post-doc

l'Observatoire de Paris

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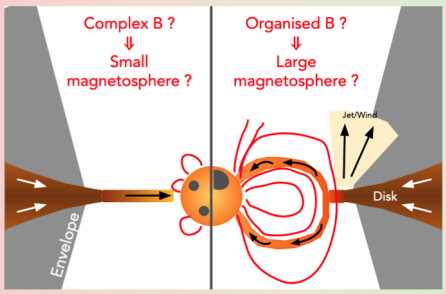
Stage I
(Class I / FS sources)



WP1 - magnetic field observations

E. Alecian +
ANR PhD student (open)

WP2 - magnetosphere observations

C. Dougados +
ANR 2-yr post-doc (open)

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Timeline

anr agence nationale de la recherche AU SERVICE DE LA SCIENCE

cnrs

Contact us !

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