

Research Associate position in the field of stellar modelisation

ANR PROMETHEE

A Research Associate position in theoretical and numerical fluid dynamics is offered at LERMA located in Paris Observatory, France. The project concerns the modelling of stellar interiors by using global spherical 3D MHD models. Previous modelling of fully convective stars have studied separately the physical processes that play a decisive role during the embedded phases of star formation. The aim of the project is to include these effects in a unique global stellar model to study the nonlinear interactions between different physical processes. To do so, the recruited postdoc researcher will have to adapt the 3D code (MagIC or PaRoDy) to consider a proper density profile from an evolutionary model and MHD effects induced by the surrounding accretion disk. The effects of global rotation, the magnetic field, turbulence, as well as their mutual interactions, will be investigated by extensive parameter studies. With such global models, we can predict the magnetic field properties and track its evolution during the multifold embedded phase. Initial conditions, such as the magnetic field strength and its topology, are expected to play an important role and we will use results from star formation collapse models and observations from our collaborators located in Lyon and in Grenoble to better constrain them. This method will allow us to build 3D spherical models of fully convective protostars as realistic as possible.

The Research Associate will conduct the theoretical and numerical analysis of the problem under the supervision of Dr. L. Petitdemange (LERMA) and Dr R. Raynaud (AIM-CEA). In this context, interactions with members of the ANR Project PROMETHEE (PI : Evelyne Alecian IPAG-Grenoble) will be expected.

Candidates are expected to hold, a PhD in fluid mechanics or a related discipline, and to have demonstrated excellent abilities in mathematics and programming. Knowledge on stellar physics is also derivable. The net salary will range from 2400 € to 3200 € depending on experience. The duration is at least two years.

The application documents are : CV, list of publications, research statement and a cover letter and should be sent to ludovic.petitdemange@obspm.fr. Do not hesitate to ask by email for further information. The application deadline is February 1st. Ideally, the candidate should start before April 2023, but the start date is negotiable.

The web site of the ANR project PROMETHEE :

<https://promethee-anr.github.io/>