

Postdoctoral Research Position in Geophysical and Astrophysical Fluid Dynamics (Ecole Normale Supérieure, Paris)

Closing date for applications: April, 01, 2023

We invite applications for a post-doctoral position in the numerical study of geophysical and astrophysical flows. The successful candidate will work with François Petrelis and Christophe Gissinger at the Ecole Normale Supérieure (Paris) on the understanding of different systems in which magnetohydrodynamic effects produce complex dynamics, similar to what is observed in planetary cores or extraterrestrial oceans.

A first part of the postdoc will be devoted to the realization and analysis of direct numerical simulations modelling the Earth's core and producing chaotic reversals of the magnetic field polarity. The theoretical part will consist in understanding these reversals in the framework of low dimensional models and dynamical systems. In particular the postdoc will investigate the effect of equatorially asymmetric heat flux on the flow and on the dynamo process, first with simple distributions of departure from symmetry and later with more realistic distributions.

The second part of the postdoc will be devoted to the hydrodynamics of ocean worlds. With the increasing number of telescope observations and space missions in recent years, it is becoming increasingly clear that subsurface ocean worlds are ubiquitous. For example, a vast saltwater ocean is thought to be present beneath the surface of several moons and planets in the solar system (Ganymede, Europa, Enceladus, Ceres, Titan, etc.). The postdoc will conduct both a theoretical study and numerical modeling of these oceans. By taking into account for the first time the magnetic field, thermal convection and tidal forces in a single model, the simulations will provide a first step towards a complete numerical model of this *exo-oceanography*. This numerical study aims to elucidate the mechanisms maintaining water in a liquid state and the origin of the surprising geology of the surface of Europa (water plumes and terrain chaos).

This postdoc position is funded by the ANR, with funding available for up to two years.

How to apply: contact Christophe Gissinger (christophe.gissinger@phys.ens.fr) and François Petrelis (petrelis@phys.ens.fr) for more information.