

## LEVERHULME TRUST Ph.D. FELLOWSHIP ON THE NON-LINEAR STATES OF CONVECTION IN THE EARTH CORE AT COVENTRY UNIVERSITY (UK)

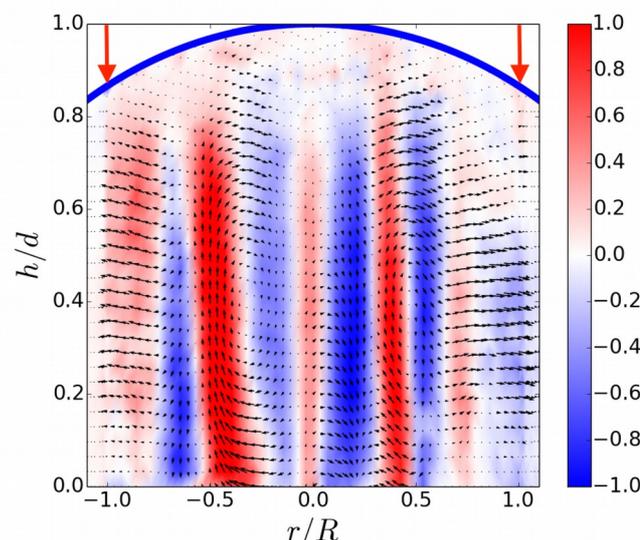
A Ph.D. position in theoretical fluid mechanics is offered at Coventry University (UK). The project concerns convection under a magnetic field in the so called “tangent cylinder” region of the Earth's core. Much of the mystery surrounding the Earth's dynamics (its magnetic field, plate tectonics) lies in the nature of the convective patterns within the Earth's liquid core, and in particular in the region called the “Tangent Cylinder”. What are the possible convective states under the combined influence of the Earth's rotation and magnetic field, and how erratic are they? This thesis is part of a theoretical and experimental research program funded by the prestigious Leverhulme Trust (<http://www.leverhulme.ac.uk>), that aims at answering these questions. The purpose of this thesis is to theoretically predict the possible nonlinear convective states for the first time. We will then evaluate which of these states are mostly likely to underpin the Earth's core convection.

The student will conduct the theoretical and numerical analysis of the problem under the joint supervision of Prof. Alban Poth rat (<http://users.complexity-coventry.org/~potherat/index.html>) and Dr Chris Pringle. The study will seek the possible structure of convection by means of advanced stability theory and branch tracking method, to unveil the possible states. In the frame of the research program, the PhD work will be conducted in collaboration with an experimental study that will seek to reproduce and visualise these non-linear states in an experimental model of the Earth Core.

Successful candidates are expected to hold or be on course for a MSc or equivalent, in fluid mechanics or a related discipline (Physics/ Mathematics), and to have demonstrated excellent abilities in mathematics and programming. Applicants having validated the theoretical part of their Masters and needing an internship to validate their Masters degree are encouraged to apply too. The student will receive a net, tax-free bursary of  15k per annum.

The successful candidate will be part the vibrant team of internationally recognised academics and PhD students forming the fluid dynamics group within the Applied Mathematics Research Centre, whose work has been ranked at 87% world-class at the UK' latest Research Excellence Framework in 2014. This unit is part of the Flow Measurement and Fluid Mechanics Research Centre, specialises in theoretical and experimental fluid mechanics. It is especially renowned for its work on magnetohydrodynamics (MHD), turbulence, stability and geophysical flows,. The group closely collaborates with partner groups in world-leading institutions in Australia, China, France, Germany and the UK.

Informal enquiries are welcome: please forward a CV and academic records to Prof. Alban Poth rat (Coventry University, [alban.potherat@coventry.ac.uk](mailto:alban.potherat@coventry.ac.uk)).



**Laboratory model for the convective patterns in the Tangent Cylinder of the Earth core (Aujogue, Poth rat, Sreenivasan & Debray, 2017)**