

Geophysical and Astrophysical Fluids and Dynamos Meeting
Thursday 12 – Friday 13 September 2024, University of Leeds, UK

PROGRAMME

Thursday 12 September

08:00-09:00	<i>Registration – Newlyn Building GR.01</i>	
09:00-09:10	Welcome and introduction	
	<i>Session chair: Andrew Gilbert</i>	
09:10-09:40	A simple model for the truncation of zonal winds at depth in Jupiter's interior	Ulrich Christensen, Max Planck Institute for Solar System Research, Germany
09:40-10:00	Testing theories of the origins of the solar hemispherical helicity rules	<u>Nicholas Brummell</u> , University of California, USA
10:00-10:20	Experimental and numerical modeling of turbulent convection with free upper surface in liquid medium	<u>Kirill Kuzanyan</u> , IZMIRAN, Russia; Nathan Kleeorin, Ben Gurion University, Israel; Rodion Stepanov, ICMM Ural Branch Russian Academy of Sciences, Russia; Andrei Sukhanovski and Andrei Vasilieve, ICMM Ural Branch Russian Academy of Sciences, Russia
10:20-10:50	<i>Refreshments – Newlyn GR.01</i>	
	<i>Session chair: Geoff Vallis</i>	
10:50-11:20	The MSS geomagnetic constellation and the geodynamo	Keke Zhang, Macau University of Science and Technology, China
11:20-11:40	Saturation of the magneto-thermal instability through the injection of available potential energy	<u>Jean Kempf</u> and Francois Rincon, IRAP, France
11:40-12:00	On the role of the electromotive force driven by the magneto rotational instability in subcritical disc dynamos	<u>Mattias Brynjell-Rahkola</u> and Gordon Ogilvie, DAMTP, University of Cambridge, UK
12:00-12:30	Poster introductions	
12:30-13:30	<i>Lunch and poster session – Newlyn GR.01 & GR.07</i>	
	<i>Session chair: Celine Guervilly</i>	
13:30-14:00	Erythroigantocoustics	Douglas Gough, University of Cambridge, UK
14:00-14:30	Mean field and flow responses in disordered systems	Michael Proctor, DAMTP/King's College, UK
14:30-14:50	A model of rotating and magnetised convection in stellar and planetary interiors	<u>Leïla Bessila</u> , CEA IRFU - Université Paris Saclay, France
14:50-15:10	Observational evidence for cylindrically oriented zonal flows on Jupiter and Saturn	<u>Yohai Kaspi</u> , Eli Galanti, Keren Duer and Nimrod Gavriel, Weizmann Institute of Science, Israel; Ryan Park, JPL, USA; Daniele Durante and Luciana Less, La Sapienza University, Italy
15:10-15:30	Non-linear states of the magnetic buoyancy instability	<u>Anvar Shukurov</u> , Newcastle University, UK
15:30-16:00	<i>Refreshments and poster session – Newlyn GR.01 & GR.07</i>	
	<i>Session chair: Steve Tobias</i>	
16:00-16:30	Going beyond the anelastic approximation to develop more realistic convective dynamo models (online presentation)	Gary Glatzmaier, University of California, USA
16:30-17:10	Chris Jones: An Appreciation	Andy Jackson, ETH Zurich, Switzerland
17:10-17:40	Low inertia reversing dynamos	Chris Jones, University of Leeds, UK
19:00	<i>Celebratory dinner for Professor Chris Jones 75th birthday - Refectory</i>	

Friday 13 September

	<i>Session chair: Graeme Sarson</i>	
09:00-09:30	Deep zonal flows in giant planets	Laura Currie, Durham University, UK
09:30-10:00	Perspectives offered by the increasing time resolution of satellite Earth's magnetic field models	Dominique Jault, The French National Centre for Scientific Research, France
10:00-10:20	Modelling of dipolar magnetic reversals for low-mass stars	Anna Guseva and Ludovic Petitdemange, The Paris Observatory, France; Charly Pinçon, Université Paris-Saclay, France
10:20-10:50	<i>Refreshments and poster session – Newlyn GR.01 & GR.07</i>	
	<i>Session chair: David Fearn</i>	
10:50-11:20	Why are Jupiter's and Saturn's magnetic fields so different? (online presentation)	Johannes Wicht, Max Planck Institute for Solar System Research, Germany
11:20-11:50	Jupiter's torsional oscillations and moist convection	Kumiko Hori, National Institute for Fusion Science, Japan
11:50-12:10	Critical-layer instabilities of equatorial waves	Stephen Griffiths, University of Leeds, UK
12:10-12:40	Bénard convection in a slowly rotating penny-shaped cylinder subject to constant heat flux boundary conditions	Andrew Soward, Newcastle University, UK
12:40-13:40	<i>Lunch and poster session – Newlyn GR.01 & GR.07</i>	
	<i>Session chair: Adrian Barker</i>	
13:40-14:10	Small parameters and the geodynamo	Emmanuel Dormy, École Normale Supérieure - PSL, France
14:10-14:30	Unified dynamics of equatorial jets on the four jovian planets	Keren Duer-Milner, Nimrod Gavriel, Eli Galanti and Yohai Kaspi, Weizmann Institute of Science, Israel
14:30-14:50	Oscillatory double-diffusive convection in a rotating spherical shell	Yue-Kin Tsang, Newcastle University, UK
14:50-15:10	The cooled fluid sphere	Andy Jackson, ETH Zurich, Switzerland
15:10-15:30	Scale separation on the weak field dynamo branch	Rob Teed, University of Glasgow, UK; Emmanuel Dormy, École Normale Supérieure, France
15:30	<i>Closing remarks</i>	
15:30	<i>Refreshments – Newlyn GR.01</i>	

Poster Presentations

- Poster 1 **Physics-constrained data-driven derivation of governing equations and turbulence closure models**
Christopher Wareing, Steven Tobias and Alasdair Roy, University of Leeds, UK
- Poster 2 **A Solar-like dynamo driven by magnetic buoyancy and rotation**
Craig D Duquid, Durham University, UK
- Poster 3 **Stratified resistive tearing instability**
Scott J Hopper, Newcastle University, UK
- Poster 4 **Linking GSF and Leibovich-Stewartson criteria in a unification theory of instabilities of swirling flows**
Oleg Kirillov, University of Northumbria, UK; Innocent Mutabazi, Universite Le Havre Normandie, France
- Poster 5 **Magnetic fields generated by thermally, chemically and thermochemically driven dynamos and their polarity reversals**
Jan Simkanin and Jura Kyselica, Institute of Geophysics CAS Prague, Czech Republic
- Poster 6 **Accessing the dipole-multipole transition in rapidly rotating spherical shell dynamos**
Andrew T Clarke, Christopher Davies and Stephen Mason, University of Leeds, UK
- Poster 7 **Stellar dynamo skin depths and the solar tachocline**
Loren Matilsky and Nicholas Brummell, University of California, USA
- Poster 8 **Nonlinear analysis of gravitational instability in a 3D gaseous disc**
Joshua J Brown and Gordon Ogilvie, University of Cambridge, UK
- Poster 9 **Reconstructions of Jupiter's magnetic field using physics-informed neural networks**
Phil Livermore, University of Leeds, UK
- Poster 10 **Spatially logarithmic simulations of extreme thermal convection and salt fingering**
Curtis J Saxton, University of Leeds, UK
- Poster 11 **Fingering convection in planetary cores**
Martin Gray, Celine Guervilly and Graeme Sarson, Newcastle University, UK
- Poster 12 **On the effects of stable stratification on 2D MHD Kolmogorov flow with application to the solar tachocline**
Velizar Kirkow, University of Exeter, UK
- Poster 13 **Force balances characteristic of aperiodically reversing dynamos**
Ayesha Sarwar, University of Glasgow, UK
- Poster 14 **Disappearance of surface banded structure produced by thermal convection in a rapidly rotating thin spherical shell**
Shin-ichi Takehiro, Keiichi Ishioka and Takeshi Enomoto, Kyoto University, Japan; Youhei Sasaki, Hokkaido Information University, Japan; Kensuke Nakajima, Kyushu University, Japan; Yoshi-Yuki Hayashi, Kobe University, Japan

- Poster 15 **Dynamics of rotating convection in earth's outer core**
Jo Kershaw, University of Leeds, UK
- Poster 16 **A parameter study on convective dynamos in a full sphere**
Fabian Burmann, ETH Zürich, Switzerland
- Poster 17 **Towards minimal seeds for the geodynamo via adjoint-based optimisation**
Calum Skene and Steven Tobias, University of Leeds, UK; Florence Marcotte, Université Côte d'Azur, France
- Poster 18 **Insights into geomagnetic excursions in numerical dynamo simulations and paleofield models**
Stephen Mason, Christopher Davies and Andrew Clarke, University of Leeds, UK; Catherine Constable, Scripps Institution of Oceanography, USA
- Poster 19 **MHD instabilities in stellar radiative regions (a linear study)**
Virgin Durepaire and Ludovic Petitdemange, Observatoire de Paris, LERMA, France; Anna Guseva, The Paris Observatory, France
- Poster 20 **Neural operators for modelling zonal jets**
Ankan Banerjee, University of Leeds, UK
- Poster 21 **Interplay between tidal waves and magnetic fields in simulations of stellar and planetary convective envelopes**
Aurélie Astoul and Adrian Barker, University of Leeds, UK
- Poster 22 **Magnetoconvection with depth-dependent magnetic diffusivity**
Matthew A Lawrence, University of Leeds, UK