

# GAFDEM 2023

## Program

### Monday, 11th September:

8h30: Welcome/Registration

8h50: Informations

9h00: ***Planetary cores*** (chair: Thierry Alboussière)

- Michael Le Bars: Iron snow in planetary cores: insight from laboratory experiments
- Dali Kong: Onset of thermal inertial convection in a rapidly rotating, self-gravitating oblate spheroidal liquid core
- Chris Jones: Low inertia reversing geodynamo models

10h30: coffee break

11h00: ***Oceans*** (chair: Patrice Le Gal)

- Greg Chini: 3D Self-Sustaining Processes in Shear Flows with and without Surface Waves
- Pierre Augier: Comprehensive open datasets of stratified turbulence forced in vertical vorticity or wave modes
- Noé Lahaye: Dipolar vortices and instabilities in rotating shallow water hydrodynamics

12h30: lunch

14h: ***Wave turbulence*** (chair: Giorgio Krstulovic)

- Pierre-Phillipe Cortet: Turbulence of internal waves in a stratified fluid with and without eigenmodes of the fluid domain
- Vincent Labarre: Kinetic equation of weakly nonlinear internal gravity waves: Theory and Numerics
- Nicolas Lanchon: Phenomenological predictions for stratified wave turbulence spectra
- Sébastien Galtier: Wave turbulence in rotating fluids

16h00: coffee break

16h30: ***Convection*** (chair: Steve Tobias)

- Laura Currie: Viscous dissipation in strongly stratified convection
- Andy Jackson: High Rayleigh number internally-heated convection
- Yi-Chao Xie: Flow states and heat transport in liquid metal convection
- Andreas Tilgner: Staircases in double diffusive finger convection

19h00 **Welcome party (Hôtel St Paul)**

## Tuesday 12th:

9h00: *Asymptotics 1 - Thin layers* (chair: Andrew Jackson)

- David Hughes: Magnetic diffusion and dynamo action in shallow water magnetohydrodynamics
- Andrew Gilbert: MHD on a sphere: semicircle rules and the clamshell instability
- Jim Thomas: Upscale transfer of waves in one-dimensional rotating shallow water

10h30: coffee break

11h00: *Disk turbulence* (chair: Dario Vincenzi)

- Christophe Gissinger: An accretion disk in the laboratory
- Nathan Magnan: The stability of dusty vortices, with application to planet formation
- Fabiola Gerosa: Clustering of heavy particles in Keplerian turbulence

12h30: lunch

14h: *The Sun* (chair: Mike Proctor)

- Nic Brummell: Testing theories of the solar hemispherical helicity rules
- Leïla Bessila: The influence of magnetism on the stochastic excitation of acoustic modes in solar-type stars
- Lionel Bigot: Is the Quiet Sun really quiet ?
- George Mamatsashvili: Mutual conversion of sound and Alfvén waves in the solar atmosphere — recent developments in laboratory experiments and simulations.

16h00: coffee break and **poster session**

18h00: end

Free evening.

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## Wednesday 13th:

9h00: *Tides* (chair: Michael Le Bars)

- Frank Stefani: Sunny beats and resonances
- Aurélie Astoul: Tides in convective envelopes of stars and planets: toward a non-linear and magnetised modelling
- Niels de Vries: Tidal dissipation in Hot Jupiters due to non-linear interactions of the elliptical instability and convection

10h30: coffee break

11h00: *Dynamos 1: triggering transitions* (chair: Rich Kerswell)

- Paul Mannix: Systematic route to subcritical dynamo branches
- Calum Skene: Minimal seeds for the geodynamo via adjoint-based optimisation
- Anna Guseva: Weak and strong dynamos: a data-driven analysis

12h30: lunch

14h: ***Stellar interiors*** (chair: Florence Marcotte)

- Kasturi Shah : Stratified turbulence at moderate and low Prandtl number
- Daniel Lecoanet: Gravity Wave-Magnetic Field Interactions in Stellar Interiors
- Andrea Chiavassa: Modeling stellar convection in evolved cool and giant stars

15h30: coffee break

16h00: ***Asymptotics 2: (Very) fast rotation*** (chair: Andrew Soward)

- Paul Billant : Is the Taylor-Proudman theorem exact?
- Stéphane Le Dizès: Inertial wave structure in a spherical shell

17h00: end of the session.

**18h00:** Bus travel Hotel St Paul→ Observatoire ([two buses departing at the same time, don't miss them!!](#))

~18h30: Tour of the Grande Coupole Eiffel and the Observatoire's museum.

~19h45: **Drinks and Conference dinner at the Observatory.**

22h30: Bus travel Observatoire→ Hotel St Paul

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## Thursday 14th:

9h30: ***Dynamos 2: in the lab*** (chair: Yannick Ponty)

- Andre Giesecke: A precession-driven flow in a cylindrical geometry
- Franck Plunian: Fury: an experimental dynamo with anisotropic electrical conductivity

10h30: coffee break

11h: ***Stellar magnetism*** (chair: Hélène Politano)

- Sacha Brun: Powering solar-type stars magnetism: How are magnetic cycles established and driven?
- Florentin Daniel: Subcritical transition to turbulence in stably-stratified stellar layers
- Ludovic Petitdemange: Magnetic effects in planetary and stellar dynamos driven by convection

12h30: lunch

14h00: ***Turbulence theory*** (chair: Annick Pouquet)

- Laura Cope: Magnetized turbulent-laminar dynamics in shear flows
- Jean-Baptiste Gorce: Cascade and statistical equilibrium in turbulence
- Rodion Stephanov: Spectral and correlation properties of turbulent convection in a rectangular cell
- Tommaso Alberti: Chameleon attractors in turbulent flows: non-universality and singularities
- Alexei Kritsuk: Towards the vKHM equation for energy transfer in compressible turbulence

16h30: coffee break and **poster session**

18h00: end of session

Free evening.

## Friday 15th:

9h00: *Atmospheres 1* (chair: Sacha Brun)

- Aymeric Spiga: How do turbulence and convection occur in the atmospheres of solar system planets?
- David Dritschel: A new Lagrangian model for simulating turbulent cloud convection
- Simone Mestici: Scaling features of small scale magnetic field fluctuations in the polar ionosphere

10h30: coffee break

11h00: *Atmospheres 2* (chair: Aymeric Spiga)

- Tao Cai: A rotating turbulent convection model for Jupiter's large-scale vortices
- Benjamin Favier: Bistable jets and vortex clusters in beta and gamma plane experiments
- Yuchen Lian: Jupiter's equatorial quasi-quadrennial oscillation and jets forced by internal thermal forcing

12h30: lunch

**End of the conference.**

## Posters

Alboussiere	Thierry	Bounds on heat transport for compressible Rayleigh-Bénard convection
Chen	Xiuyu	The exploration of triadic resonance of fluid driven by latitudinal libration in a triaxial ellipsoid
Dorel	Valentin	An experimental analogous of moist convection: first results
Dritschel	Gregory	Basics State Analysis of the Rainy-Bénard Model
Duguid	Craig	A solar-like dynamo driven by magnetic buoyancy and rotation
Dymott	Robert	The GSF instability in differentially rotating stellar interiors
Elias-López	Albert	Vorticity and magnetic dynamo from subsonic expansion waves
faurobert	marianne	Rotational shear in the low photosphere of the Sun
Gay	Benoît	Multiple time scale approach for quartic wave interactions
Gomez	Paul	Numerical simulations of a dynamo in an anisotropic medium
Gostelow	Luke	Shear Instabilities in QG Shallow Water MHD
Kalluri	Manohar Teja	Role of magnetic reconnection on the growth of magnetic Rayleigh Taylor mixing layer
Kimbley	Alexander	Nonlinear evolution of axisymmetric instabilities in stellar and planetary atmospheres
Kumar	Vivaswat	Effects of varying nutation angle on a precessional flow inside a cylinder — comparison of simulations and experiments

Le Gal	Patrice	A new instability and the formation of localized layers of turbulence in stratified horizontally sheared Poiseuille flow
Magnan	Nathan	The impact of a radiative boundary condition on convection, in the regime relevant to icy moons
Maller	Augustin	Instability and turbulent fragmentation by giant planetary impacts
Mishra	Himanshu	Inertial effects on the transport of an anisotropic particle in surface gravity waves
Mishra	Ashish	Simulations of magnetorotational instability in magnetised Taylor-Couette flow in preparation for upcoming DRESDYN-MRI experiment
Myers	Samuel	Magnetohydrodynamic Instabilities in Astrophysical Thin Layers
Niu	Zhaodong	Experimental Study of Stratospheric Vortices Generated by Wildfires
Nowakowska	Kasia	Short-Term Forecasting of Atmospheric Convection using a Simplified Model for Moist Convection
Passot	Thierry	Simulations of kinetic Alfvén wave turbulence with a 2-field gyrofluid model
Personnetaz	Paolo	Modeling non-spherical effects with parametrized boundary conditions
Radureau	Gonzague	Using artificial intelligence to improve the performance of radiative hydrodynamics simulations
Sanders-Farmer	Sol	Laboratory Analogue of the Quasi-Biennial Oscillation
Saxton	Curtis	1/ Rotating thermal convection under generalised quasilinear approximations
		2/ Entropy, complexity, and causality in direct and approximated fluid simulations
Segretain	Paul	Dynamical collapse of a pebble and gas cloud : constraints on the resulting planetesimals
Skipp	Jonathan	Condensation in quasi-geostrophic and drift wave turbulence
Tassi	Emanuele	Finite ion temperature effects on secondary instabilities and turbulence induced by collisionless reconnection
Tobias	Steven	Magnetic and hydrodynamic instabilities in the solar tachocline using an anelastic spherical shell model
Vine	Matthew	Influence of a Magnetic Field on Stellar Internal Waves
Viswanathan Sreekumari Nath	Anu	Lagrangian dynamics of heavy inertial particles in vortical flows
Wareing	Chris	Data-driven derivation of equations for the evolution of transport in turbulent flows