

**Euromech/Ercoftac Colloquium 589 “Turbulent Cascades II”**

**Ecole Centrale de Lyon - Amphi 1 building W1**

**Tuesday, December 5**

8:15-8:40 *Registration and welcome coffee*

8:40-9:00 *Opening:*

Welcome and opening remarks: Mikhael Gorokhovski (on behalf of the Organizing Committee)

Inaugural words by Jean-Pierre Bertoglio (Scientific Director, Ecole Centrale de Lyon)

9:00-18:00 *Multi-scales interactions and non-stationary cascades: physics, models and tools*

9:00-10:00 Chair: Fabien Godeferd

9:00-9:30 Javier Jimenez (Universidad Politécnica de Madrid, Spain)

The turbulent cascade as unsteady process

9:30-10:00 Christos Vassilicos (Imperial College, London, UK)

Inhomogeneous turbulence cascades in periodic turbulence

10:00-10:30 *Refreshment Break*

10:30-12:30 Chair: Joachim Peinke

10:30-11:00 Charles Meneveau (Johns Hopkins University, USA)

A multiple-time scale, Navier-Stokes based Lagrangian model for the velocity gradient tensor and intermittency

11:00-11:30 Alain Pumir (Ecole Normale Supérieure de Lyon, France)

Extreme events in turbulent flows at very high Reynolds numbers

11:30-12:00 George Haller (ETH Zürich, Switzerland)

Material barriers to diffusive transport

12:00-12:30 Pierre Sagaut (Université d’Aix-Marseille, France)

Anomalous fast decay regimes in isotropic turbulence

12:30–14:00 *Lunch*

14:00 – 16:10 Chairman: Wouter Bos

14:00-14:30 Martin Oberlack (Technische Universität Darmstadt, Germany)

Does the statistics of 2D turbulence admit the conformal group – answers to an old conjecture

14:30-15:00 Joseph Mathew (Indian Institute of Science, Bangalore, India)

Evolution of local structure of turbulent flow along pathlines

15:00-15:20 Aurore Naso (Ecole Centrale de Lyon, France)

Dual cascades in axisymmetric turbulence

15:20-15:50 Guido Boffetta (Università di Torina, Italy)

The Rayleigh-Taylor turbulence

15:50-16:10 Laurent Chevillard (Ecole Normale Supérieure de Lyon, France)

A multifractal model for the velocity gradients dynamics in turbulent flows

16:10-16:40 *Refreshment Break*

16:40-18:00 Chair: Claude Cambon

16:40-17:00 Patricio Clark Di Leoni (Università di Roma "Tor Vergata", Italy)

Taming turbulence via spectral nudging

17:00-17:20 Joachim Peinke (Universität Oldenburg, Germany)

A rigorous entropy law for the turbulent cascade

17:20-17:40 Alberto Vela-Martín (Universidad Politécnica de Madrid, Spain)

The structure of information entropy production in the turbulence cascade

17:40-18:00 Antoine Briard (Institut Jean-Le-Rond-d'Alembert, Paris, France)

Decay and statistics of helicity in skew-isotropic turbulence

18:00-19:30 *Welcome cocktail combined with posters session*

## **Wednesday, December 6**

8:30-10:30 *Presence of free gas/liquid interface*. Chair: Mikhael Gorokhovski

8:30-9:00 Olivier Desjardins (Cornell University, USA)

Interactions between Turbulence and Interfaces with Surface Tension.

9:00-9:30 Marcus Herrmann (Arizona State University, Tempe, USA)

A Dual Scale Approach for Modeling Turbulent Liquid/Gas Phase Interfaces

9:30-10:00 Frédéric Moisy (Université Paris-Sud, France)

Imprint of a turbulent boundary layer over a free surface

10:00-10:30 Stephane Zaleski (Institut Jean-Le-Rond-d'Alembert, Paris, France)

Turbulent two-phase mixing layers

10:30-11:00 *Refreshment Break*

11:00-12:30 *Turbulence under "active" particles*. Chair: Pablo Mininni

11:00-11:30 Toshiyuki Gotoh (Nagoya Institute of Technology, Japan)

Cloud turbulence and droplets.

11:30-12:00 Rodney Fox (Iowa State University, Ames, USA)

Cluster-Induced Turbulence in Particle-Laden Flow

12:00-12:30 Frederic Risso (IMFT, Toulouse, France)

Bubble-induced turbulence

12:30-14:00 *Lunch*

14:00-16:00 *Turbulence under “active” particles.* Chair: Mickael Bourgoïn

14:00-14:30 Jérémie Bec (Observatoire de la Côte d'Azur, France)

Scaling laws in dusty turbulence

14:30-15:00 Eric Climent (IMFT, Toulouse, France)

Modulation of turbulence in wall-bounded shear flows by finite size particles

15:00-15:20 Remi Zamansky (IMFT, Toulouse, France)

Turbulent cascade and broadband forcing in thermal convection driven by heated particles

15:20-15:40 Arakel Petrosyan (Space Research Institute of the Russian Academy of Sciences, Moscow, Russia)

Large-scale structures in a turbulent fluid with solid particles and with gas bubbles

15:40-16:00 Leonardo Primavera (Università della Calabria Rende, Italy)

Parametric instability and turbulent cascades in space plasmas

16:00-16:30 *Refreshment Break*

16:30-17:40 *Compressibility  $\Leftrightarrow$  turbulence; turbulence  $\Leftrightarrow$  atomization.* Chair: Martin Oberlack

16:30-17:00 Alexei G. Kritsuk (University of California, San Diego, USA)

Cascades and scaling in two-dimensional compressible turbulence

17:00-17:20 Sergei Chefranov (Obukhov Institute of Atmospheric Physics, RAN, Moscow, Russia)

Exact Time-Dependent Solution to the Three-Dimensional Euler-Helmholtz and Riemann-Hopf Equations for Vortex Flow of a Compressible Medium

17:20-17:40 Amirezza Movaghar (Chalmers University of Technology, Göteborg, Sweden)

Assessment of a One-Dimensional Turbulence Atomization Model using Direct Numerical Simulation of Multiphase Homogeneous Isotropic Turbulence

17:40-18:10 *Posters*

19:00 *Departure for the Gala dinner (by bus)*

19:30-22:30 Gala dinner at the “Brasserie Léon de Lyon”

23:30 Departure of the bus to hotel Campanile Ecully

## **Thursday, December 7**

9:00-10:10 *Interplay of waves and turbulence; quantum turbulence.* Chair: Raffaele Marino

9:00-9:30 Eran Sharon (The Hebrew University of Jerusalem, Israel)  
Nonlinearities of inertial waves in rotating turbulence

9:30-9:50 Nicolas Mordant (Université Grenoble Alpes, France)  
The energy cascade of surface wave turbulence: toward identifying the active wave coupling

9:50-10:10 Emmanuel Lévêque (Ecole Centrale de Lyon, France)  
Turbulent cascade in superfluids

10:10-10:30 *Refreshment Break*

10:30-12:00 *Effects of shear and rotation.* Chair: Charles Meneveau

10:30-11:00 Carlo Massimo Casciola (Università di Roma "La Sapienza", Italy)  
Energy transfer between scales and position in a turbulent recirculation bubble

11:00-11:20 Fabien Godeferd (Ecole Centrale de Lyon, France)  
Anisotropic turbulent cascades in rotating homogeneous turbulence

11:20-11:40 George Mamatsashvili (Ilia State University, Tbilisi, Georgia)  
Nonlinear transverse cascade – a key factor of sustenance of subcritical turbulence in shear flows

11:40-12:00 Romain Volk (Ecole Normale de Lyon, France)  
Small scale statistics of turbulent fluctuations close to a stagnation point

12:00-13:00 *Turbulence  $\Leftrightarrow$  Scalars.* Chair: Rodney Fox

12:00-12:30 Luminita Danaila (Université de Rouen-Normandie, France)  
Internal intermittency and finite Reynolds number effects for turbulent mixing of passive and active scalars

12:30-13:00 Benoit-Joseph Gréa (CEA, Bruyères le Châtel, France)  
From instability to turbulence in freely evolving buoyancy-driven mixing

13:00-14:00 *Lunch*

14:00-16:30 *Particles under the turbulence.* Chair: Nicolas Mordant

14:00-14:20 Mickael Bourgoin (Ecole Normale Supérieure de Lyon, France)  
The role of the turbulent cascade in pair dispersion

14:20-14:50 Federico Toschi (Technische Universiteit Eindhoven, Netherlands)

Tracers and particles in rotating Rayleigh-Bénard convection

14:50-15:20 Pablo Mininni (University of Buenos Aires, Argentina)

Horizontal winds and particle dispersion in stably stratified turbulence

15:20-15:50 Kai Schneider (Université Aix-Marseille, France)

Multiscale geometrical statistics of trajectories with applications to football players and particles in fluid turbulence

15:50-16:10 Martin Obligado (Université Grenoble Alpes, France)

Clustering and settling dynamics of inertial particles under turbulence

16:10-16:30 Stefano Berti (Université de Lille, France)

Relative dispersion in direct cascades of generalized two-dimensional turbulence

16:30-17:30 *Wrap up and farewell drinks*

## **Posters session**

Thomas von Larcher and Rupert Klein (Freie Universität Berlin, Germany)

On identification of self-similar characteristics in multiscale flows using the Tensor Train decomposition method with application to channel turbulence flow

Alexis Giauque and Christophe Corre (Ecole Centrale de Lyon, France)

Direct numerical simulations of forced homogeneous isotropic turbulence in a dense gas

José I. Cardesa, Alberto Vela-Martin, Javier Jimenez (Universidad Politécnica de Madrid, Spain)

A 5D approach to study the energy cascade in homogenous turbulence

I.U. Atthanayake, P. Denissenko, Y. M. Chung & P. J. Thomas (University of Warwick, UK)

Precession of plumes in the presence of background rotation

Miguel Calpe Linares, Pierre Augier & Nicolas Mordant (Université Grenoble Alpes, France)

Two-dimensional numerical simulations of stratified turbulence

Nikki Vercauteren, Larry Mahrt, Rupert Klein, Davide Faranda and Danijel Belušić (Freie Universität Berlin, Germany)

Investigating turbulence intermittency in the stable boundary layer via multiscale analysis and non-stationary statistics

Ernesto Horne, Paul Billant, Jean-Marc Chomaz (Ecole Polytechnique, France)

Turbulence produced by columnar dipoles in a stratified and rotating fluid

Thomas Le Reun, Benjamin Favier and Michael Le Bars (Université d'Aix-Marseille, IRPHE, France)

Homogeneous internal wave turbulence driven by tidal flows, a comparison with classical stratified turbulence

Yuyao Yang, Robert Chahine, Robert Rubinstein, Wouter Bos (LMFA/Ecole Centrale de Lyon, France)

Periodic forcing is not good for turbulent mixing.

Rémi Zamansky and Wouter Bos (IMFT/Toulouse and LMFA/Ecole Centrale de Lyon, France)  
Universality of energy input fluctuations in turbulence

Alexis Barge and Mikhael Gorokhovski (LMFA/Ecole Centrale de Lyon)

Lagrangian acceleration in homogeneous shear : DNS, stochastic subgrid models and applications to heavy particle dynamics.

Alexandr Eremin, Julian Scott, Fabien Godefert and Anne Cadiou (Ecole Centrale de Lyon, LMFA, France)

Wave-turbulence closure of turbulence in a rotating channel

Juan Ignacio Polanco, Ivana Vinkovic, Nicolas Mordant, Mickaël Bourgoin (LMFA/Ecole Centrale de Lyon, LP/ENS de Lyon, LEGI/Université Grenoble Alpes)

Relative dispersion of particle pairs in turbulent channel flow

B.-J Grea, J. Griffond, D. Souffland and O. Soulard (CEA, Bruyères le Châtel, France)

Turbulent mixing at interfaces: from observations to modeling

Martin Obligado and Mickaël Bourgoin (LEGI/Université Grenoble Alpes , LP/ENS de Lyon)

Dynamics of towed particles in a turbulent flow