



International workshop on
'Multiscale methods for fluid and plasma turbulence :
Applications to magnetically confined plasmas in fusion devices'
CIRM, Marseille, 21-25 April 2008



Program

Sponsored by



Monday April 21

8.50 *Welcome*

9.00 Pat Diamond (University of California, San Diego, USA):
'Theoretical Approaches to Model Reduction and Description of Multi-Scale Interaction in Tokamak Plasma Turbulence.'

10.00 Herman Clercx (TU Eindhoven, The Netherlands):
'Angular momentum generation in bounded 2D turbulent flows.'

10.30 **Coffee break**

11.00 J. Bryan Taylor (Wallingford, UK):
'Interacting vortices and spin-up in 2d turbulence.'

11.45 Chris Holland (University of California, San Diego, USA):
'Validation of Nonlinear Simulations of Core Tokamak Turbulence: Current Status and Future Directions.'

12.30 **Lunch**

14.00 Yanick Sarazin (Association Euratom-CEA, Cadarache, France):
'Multiscale interactions in gyrokinetic simulations of turbulent transport in tokamak plasmas.'

14.30 Madalina Vlad (Association Euratom-MEC, Bucharest, Romania):
'Multiscale trajectory structures and turbulent transport in magnetically confined plasmas.'

15.00 – 15.30 **Short talks (poster presentation)**

15.00 Shinpei Futatani (Kyoto University, Japan):
'Multiscale analysis of the spatio-temporal dynamics of impurity transport in magnetized plasmas.'

15.10 Magali Muraglia (Université de Provence, Marseille, France) :
'Nonlinear dynamics of magnetic islands imbedded in the edge Tokamak plasma microturbulence.'

15.20 Romain Nguyen van yen (ENS-Paris, France):
'Wavelets meet Burgulence: CVS filtered Burgers equation.'

15.30 **Coffee break**

- 16.00** Assad Oberai (Rensselaer Polytechnic Institute, USA):
'Progress in the Variational Multiscale Formulation of Large Eddy Simulation.'
- 16.30** Katsunori Yoshimatsu (Nagoya University, Japan):
'Coherent vortices in high resolution direct numerical simulation of homogeneous isotropic turbulence: a wavelet viewpoint.'
- 17.00** Wouter Bos (Ecole Centrale Lyon, France):
'The decay of magnetohydrodynamic turbulence in a confined domain.'
- 17.20** Silvia Perri (University of Calabria, Italy):
'Superdiffusive transport in astrophysical plasmas.'
- 17.40** Frederic Schwander (Association Euratom-CEA, Cadarache, France):
'Symmetry and evolution of radiative patterns in simulations of the tokamak edge plasma.'
- 18.00** Open discussion
- 18.30** End
- 19.30** **Dinner**

Tuesday April 22

- 9.00** Annick Pouquet (NCAR, Boulder, USA):
'MHD turbulence: interactions of eddies and waves.'
- 10.00** Grigory Vekstein (University of Manchester, UK):
'Two-fluid effects in magnetic reconnection.'
- 10.30** **Coffee break**
- 11.00** Volker Naulin (Euratom, Risoe, Denmark):
'Issues in plasma edge turbulence: simulating complex behaviour.'
- 12.00** Open discussion
- 12.30** **Lunch**
- 14.00** David Montgomery (Dartmouth College, USA):
'Boundary conditions for turbulent fluids and magnetofluids.'
- 15.00 – 15.30** **Short talks (poster presentation)**
- 15.00** Salah Neffaa (Université de Provence, Marseille, France)
'Magnetic spin-up in two-dimensional containers.'
- 15.10** Seiya Nishimura (Kyushu University, Japan):
'Rotation of magnetic islands with micro-scale fluctuations.'
- 15.20** Benjamin Kadoch (Université de Provence, Marseille, France):
'Lagrangian acceleration in confined turbulent flow.'
- 15.30** **Coffee break**

- 16.00** Eric Sonnendrucker (ULP Strasbourg, France):
'Kinetic simulation of Tokamak plasmas.'
- 16.45** Caroline Nore (LIMSI, Orsay, France):
'A finite element approach of nonlinear Magnetohydrodynamics (MHD) problems in bounded geometries.'
- 17.30** Piotr Boronski (University of Leeds, UK):
'Spectral method for matching interior elliptic problems with exterior harmonic solutions.'
- 17.50** Open discussion
- 18.30** End
- 19.30** **Dinner**
- 20.30** **Discussion on the ITER projet with Michel Chatelier,
Director of the Institut de la Fusion Magnétique du CEA, Cadarache**
- 22.00** **Fusion experiments: beer / champaign confinement**

Wednesday April 23

- 9.00** Rahul Pandit (Bangalore, India):
'MHD Turbulence: What can we learn from simple models?'
- 10.00** Edriss Titi (University of California, Irvine, USA):
'Alpha sub-grid scale models of turbulence and inviscid regularization.'
- 10.30** **Photo**
- 10.35** **Coffee break**
- 11.00** Uriel Frisch (Observatoire Nice, France)
'Hyperviscosity, Galerkin truncation and bottlenecks in turbulence.'
- 12.00** Claude Bardos (Université Paris VII, France):
'Mathematical analysis of singularity and regularity in fluid equations.'
- 12.30** **Lunch**
- 14.00** **Free afternoon**
- Calanques, Marseille downtown, ITER Cadarache*
- 19.30** **Dinner**

Thursday April 24

- 9.00** Rainer Grauer (Universität Bochum, Germany):
'Massively Parallel Simulations of Lagrangian Plasma Turbulence.'
- 10.00** Florin Spineanu (Association EURATOM-MEC, Bucharest, Romania):
'The scale length problem from Euler fluid to magnetized plasma.'
- 10.30** **Coffee break**
- 11.00** Taik Soo Hahm (Princeton University, USA):
'Gyrokinetic Description of Tokamak Core Turbulence; Theory, Simulation, and Comparisons to Experiments.'
- 12.00** Open discussion
- 12.30** **Lunch**
- 14.00** Bob Krasny (University Michigan, USA):
'Lagrangian Particle Simulations of Plasmas and Fluids.'
- 14.45** Paolo Ricci (EPFL, Lausanne, Switzerland):
'The simulation effort for the TORPEX experiment and theory-simulation comparison.'
- 15.15 – 15.35** **Short talks (poster presentation)**
- 15.15** Thierry Lehner (Observatoire de Paris- Meudon, France):
'Weakly non linear analysis of a rotating and precessing inviscid fluid in a cylinder and generation of differential rotational mean flow.'
- 15.25** Livia Isoardi (M2P2, Université Paul-Cézanne, Marseille, France):
'Numerical modeling of transport within Tokamak edge plasma.'
- 15.35** **Coffee break**
- 16.00** Claude Cambon (Ecole Centrale Lyon, France):
'Review of three-dimensional wave-turbulence in fluids. Typical instances.'
- 16.30** Guido Ciraolo (Ecole Centrale Marseille, France):
'Spreading of SOL flow patterns into the edge plasma.'
- 17.00** Vivek Aggarwal (TIFR, Bangalore, India):
'Localized Relaxation and Non-standard Finite Difference Method for Hyperbolic Conservation Laws.'
- 17.20** Open discussion
- 17.40** End
- 18.00** **Concert: Lieder from Schumann and Wagner**
- 19.30** **Dinner: Bouillabaisse**

Friday April 25

- 9.00** Frank Jenko (IPP Garching, Germany)
'Multi-scale interactions in plasma microturbulence.'
- 10.00** Robert Rubinstein (NASA Langley, USA):
'Locality in HD and MHD turbulence.'
- 10.30** **Coffee break**
- 11.00** Yasuji Hamada (NIFS, Japan):
'Three-wave coupling of drift waves in tokamak core plasmas.'
- 11.30** Philippe Angot (Université de Provence, Marseille, France) :
'Vector and scalar penalty-projection methods for incompressible and variable density flows.'
- 12.00** Open discussion
- 12.30** **Lunch**
- 14.00** Mani Mehra (IIT, New Delhi, India):
'Adaptive wavelet collocation method for PDEs.'
- 14.30** Margarete Domingues (Brazilian Space Research Institute, Brazil):
'A space-time adaptive multiresolution scheme: applications to evolutionary PDEs.'
- 14.50** Fereidoun Sabetghadam (Azad University, Tehran, Iran):
'Fourier spectral embedded boundary solution of the incompressible two-dimensional Navier-Stokes equations.'
- 15.10** Debasis Chandra (Institute for Plasma Research, Gandhinagar, India):
'Nonlinear dynamics of multiple NTMs in tokamaks.'
- 15.30** **Coffee break**
- 16.00** Round table and final discussion
animated by Xavier Garbet (CEA, Cadarache, France)
- 17.00** *Good bye*
- 19.30** **Dinner**