



CEMRACS 2010

Centre d'Été **Mathématique de Recherche Avancée**
en Calcul Scientifique

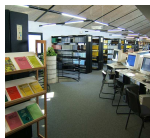
<http://smai.emath.fr/cemracs/cemracs10/>

Centre International de Rencontres Mathématiques (CIRM)

Marseille, 19 July - 27 August 2010



Numerical Methods for Fusion

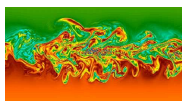
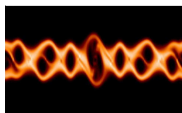
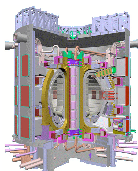


Lectures SMF session (19 - 23 July):

- **Pierre Degond** (CNRS, Univ. Toulouse)
Asymptotic preserving schemes for fusion modelling.
- **Bruno Després** (Univ. Paris VI) and **Xavier Blanc** (CEA Bruyères le Châtel)
Numerical methods for inertial confinement fusion.
- **Virginie Grandgirard** (CEA Cadarache)
Gyrokinetic simulations of magnetic fusion plasmas.
- **Stephen C. Jardin** (PPPL, Princeton)
MHD simulations for fusion applications.
- **Cédric Villani** (ENS, Lyon)
Landau damping.

Research projects:

- Financial Supports



Organizers:

- Nicolas Crouseilles (INRIA Nancy Grand Est)
- Hervé Guillard (INRIA Sophia-Antipolis)
- Boniface Nkonga (Univ. Nice and INRIA)
- Eric Sonnendrücker (Univ. Strasbourg and INRIA)

Informations and registration:

e-mail: cemracs@acm.emath.fr

<http://smai.emath.fr/cemracs/cemracs10/>



Presentation

The Summer Mathematical Research Center on Scientific Computing and its Applications (CEMRACS) will host its tenth international session in post graduate courses and research in applied mathematics and scientific computing from July 19 to August 27, 2010.

This research center is primarily aimed at promoting newest achievements in applied mathematics and scientific computing while stimulating interdisciplinary interactions. The goal is to lead the research effort of scientists coming from various fields and involved either in academic research or in technology development in order to perform significant achievements in the derivation and/or the validation or original numerical solvers within the frame of applied problems of vivid interest.

Scientific objectives

The 15th session of CEMRACS is devoted to the application of mathematics and scientific computing in the topics of confinement fusion: inertial and magnetic fusion. Typical problems are:

- Mathematical modelization of magnetized plasmas
- Gyrokinetic study of the turbulence in the plasma core
- Fluid study of edge plasmas
- Numerical study of inertial confinement fusion

CEMRACS general structure

CEMRACS 2010 will consist of two events:

- A summer school "session état de la recherche de la SMF" (July 19 - July 23).
- A intensive research program of five weeks (July 26 - August 27). A one-hour talk will be given each morning in the conference room. The remaining part of the day will be devoted to the research activity in teams.

Partners and sponsors

The CEMRACS is a scientific event of the SMAI (the french Society of Applied and Industrial Mathematics). The 2010 session is also an event of the INRIA Large Scale Initiative "Fusion". Industrials and academic partners can promote to finance the research projects (see the CEMRACS 2010 web site for more informations).

Program of the Summer School (19/07/10-23/07/10)

The lectures will be given by:

- Pierre Degond (CNRS, Univ. Toulouse)
Asymptotic preserving schemes for fusion modelling
- Bruno Després (Univ. Paris VI) and Xavier Blanc (CEA)
Numerical methods for inertial confinement fusion
- Virginie Grandgirard (CEA)
Gyrokinetic simulations of magnetic fusion plasmas
- S. Jardin (PPPL, Princeton)
MHD simulations for fusion applications
- Cédric Villani (ENS Lyon)
Landau damping

Program of the Research Center (26/07/10-27/08/10)

In the research program, every participant will work in a team on a project proposed by an industrial or an academic partner. Each team will be composed of young researchers assisted by one or more senior researchers. The commitment for the young researchers is to be present for the whole period of the research center. The commitment for the senior researchers is to ensure the management of the project that is mainly precise definition of the subject and supervision of the project. Other visiting scientists, interested in the ongoing research, can be associated to the program for shorter periods. The projects will be posted on the CEMRACS 2010 web site. Possible topics are:

- Mathematical study of approximate models used for the simulation of magnetized plasmas
- Gyrokinetic study of the turbulence in the plasma core
- Fluid study of edge plasma - MHD
- Development of novel numerical techniques for the large scale simulation of plasma turbulence in tokamaks
- Identification and control of plasma equilibria
- Materials and plasma-wall interaction
- Numerical modelling of inertial confinement fusion

Organizers

- Nicolas Crouseilles (INRIA Nancy Grand Est)
- Hervé Guillard (INRIA Sophia-Antipolis)
- Boniface Nkonga (Université de Nice and INRIA)
- Eric Sonnendrücker (Université de Strasbourg and INRIA)

Scientific committee

- Patrick Lascaux, CEA
- Patrick Le Tallec, École Polytechnique
- Pierre-Louis Lions, Collège de France
- Yvon Maday, Université Paris VI
- Etienne Pardoux, Université de Provence
- Olivier Pironneau, Université Paris VI
- Pierre-Arnaud Raviart, Directeur de Recherches à l'École Polytechnique
- Denis Talay, INRIA Sophia-Antipolis

Venue

The three events of CEMRACS 2010 will take place at the International Center of Mathematical Research (CIRM), located in Luminy, Marseille. All the facilities of the CIRM center will be available for the participants 24 hours a day, 7 days a week, including its computer rooms, its library and wireless connections. For further information about CIRM, please visit the web sites:

<http://www.cirm.univ-mrs.fr>

<http://smi.emath.fr/cemracs/cemracs10>

Application form

First Name

Family Name

Affiliation

Address

Zip code

City

Country

Phone

Fax

E-mail

Payment

- By check to the SMAI CEMRACS
- By bank transfer
- By order form (french institutions only)

Request for financial support

(young researchers only, see General informations)

- Yes
- No

Date

Signature

Please, return this form filled to

CEMRACS 2010
IRMA, Université de Strasbourg
7, rue René Descartes
67084 Strasbourg Cedex
France

General informations

Fees for housing and meals

- Single room, 3 meals: 90 euros per day
- Double room, 3 meals: 80 euros per day

Registration fees for the Summer School:

- Standard: 550 euros
- Academic: 220 euros
- Student: 110 euros
- Free for CNRS agents

Application process (according to availability): to apply to CEMRACS 2010, please use rather the online application form available at the following address:

<http://smai.emath.fr/cemracs/cemracs10>

Otherwise, use the included application form and send it to the mentioned address.

Payments should be made - only in euro - by sending a check or an order form to SMAI CEMRACS, or by bank transfer to:

SMAI CEMRACS 2010,
Institut H. Poincaré
11, rue Pierre et Marie Curie
75231 Paris Cedex 05

RIB (France):
30004-00042-00010009617-27
BNP Paribas Paris Jussieu

International bank account no.:
FR76-3000-4000-4200-0100-0961-727

A copy of the bank transfer should be enclosed with the registration form.

Please, notice that:

- Young researchers attending the Research Center must also attend to the Summer School.
- Young researchers coming for the whole period to work on a project can apply for a financial support. In any case, young researchers are invited to send a CV and a letter detailing their scientific experience and their motivation.