

European Summer School

# "Low Temperature Plasma Physics: Basics and Applications"

October 6 – 11<sup>th</sup>, 2012

Physikzentrum Bad Honnef



**Chairman:** J. Winter / M. Böke (Ruhr-Universität Bochum)

**Organization:** V.M. Scharf (Ruhr-Universität Bochum)

**Webpage:** <http://www.plasma-school.org>

**Support:**

*Arbeitsgemeinschaft  
PLASMAPHYSIK*

■ **RESEARCH DEPARTMENT**  
Plasmas with Complex Interactions



# Scope of the Course

## **1. The level of the course.**

The level of the course is aimed at *Ph.D.-students in first year* and *Diploma- and M.-Sc.-students in last year*.

## **2. The aim of the course.**

The aim of the course is to make the students become acquainted with the present status of the field of low temperature plasma physics. It is assumed that the students have followed introductory physics courses in their home university. However, the basic principles will be summarized at the beginning of the course. The course offers a broadening of knowledge in plasma physics and in the interaction of plasmas with surfaces including a description of advanced diagnostics. In addition, the students will be able to interact with the teachers of the course and they will meet fellow-students from other universities in Europe and the rest of the world. Participants are invited to bring with them presentation material in form of posters.

## **3. All lectures and discussions are in English.**

## **4. Well-known experts in the field will present lectures in the following areas:**

- fundamentals of plasma physics,
- plasma sources,
- thermal and low pressure plasmas,
- atomic processes,
- electron kinetics,
- diagnostics and plasma spectroscopy,
- modeling,
- plasma-surface interactions,
- etc.

## **Please notice:**

### **Breakfast, lunch and dinner:**

Breakfast, lunch and dinner are organized by the Physikzentrum. Please notice that every meal starts punctually.

Breakfast: 7.30 hours

lunch: 12.15 hours,

dinner: 18.30 hours.

**Some participants will also stay overnight in the hotel Seminaris or Avendi and have breakfast in the same hotel. All other meals (and drinks!) will be available at the Physikzentrum – the School location.**

On Monday evening, there will be the Summer School dinner at 18.30 hours.

**Beverages are not included** in the course fee, except for the drinks during the Summer School dinner on Monday evening. After putting your name on a list, you may take beverages out of the refrigerators. **We kindly ask you to pay** the total amount for your beverages at the office of the Physikzentrum (room #1) **before you leave Bad Honnef.**

### **Lecture Notes**

The lecture notes are meant to give support to the students attending the course. Hence, the distribution is restricted to the students attending the course and reproduction of (part of) the lecture notes is not permitted without permission of the authors.

### **Poster session**

The poster session will take place on Sunday evening on the ground floor. The participants who present posters are kindly asked to display their posters during the whole course.

### **Entrance Physikzentrum**

To enter the Physikzentrum, please use the door code (phone-like keyboard on the right hand side of the main entrance) for entering the Physikzentrum in Bad Honnef. This code is valid during the whole School. **The code is: C2012.** C” stands for “clear” and is a reset in a case of a previous error.

# Program of the School 2012

**Saturday, Oct. 6: Arrival/Registration from 17.00 - 21.00 (Dinner included)**

**Sunday, Oct. 7:**

08.30-8.45	Welcome and introduction (Plot of the School, Plasma Science) ( <i>M. Böke, Bochum</i> )
8:45-10.15	Introduction I ( <i>A. von Keudell, Bochum</i> )
10.30-12.00	Introduction II ( <i>A. von Keudell, Bochum</i> )
15:00 - 16:30	Capacitively and inductively coupled plasmas ( <i>P. Chabert, Paris</i> )
17.00-18.30	Plasma diagnostics I: Measuring electron density and ion flux ( <i>H. Kersten, Kiel</i> )
20.00	Poster Session

**Monday, Oct. 8:**

08.30-10.00	Global Model ( <i>M. Turner, Dublin</i> )
10.30-12.00	Plasma diagnostics II: Basics of plasma spectroscopy ( <i>V. Schulz-von der Gathen, Bochum</i> )
15.00-16.30	Modelling of plasmas ( <i>A. Bogaerts, Antwerp</i> )
17.00-18.30	High Pressure Thermal Plasmas and Sources ( <i>A. Murphy, CSIRO, Australia</i> )
18.30	Summer School Dinner

**Tuesday, Oct. 9:**

08.30-10.00	Electron Kinetics in Atomic and Molecular Plasmas ( <i>L.L. Alves, IST Lisbon</i> )
10.30-12.00	Fluid Modeling of Discharge Plasmas ( <i>L.L. Alves, IST Lisbon</i> )
14.00	<b>Excursion</b>
<b>Afternoon &amp; evening</b>	<b>Workshop: Hands on a Boltzmann solver</b> ( <i>L.L. Alves, IST Lisbon</i> )

**Wednesday, Oct. 10:**

08.30-10.00	Corona and barrier discharges ( <i>F. Massines, Perignan</i> )
10.15-12.15	Magnetron Discharges ( <i>A. Hecimovic, Bochum</i> )
15:00-16:30	Physics of Microplasmas ( <i>P. Bruggeman, Eindhoven</i> )
17:00-18:30	Plasma diagnostics III: Advanced optical diagnostics ( <i>R. Engeln, Eindhoven</i> )

**Thursday, Oct. 11:**

08.30-10.00	Dusty Plasmas ( <i>L. Boufendi, GREMI Orléans</i> )
10.30-12.00	Plasma-Surface Interaction: Diagnostics ( <i>J. Benedikt, Bochum</i> )

# Program of the Master Class 2012

Thursday, Oct. 11: Arrival/Registration from 17.00 - 21.00 (Dinner included)

## Friday, Oct. 12:

08.30-10.00	Plasma fuel reforming: fundamentals and applications ( <i>T. Nozaki, Tokyo</i> )
10.30-12.00	Plasma processing of carbon dioxide into value-added products ( <i>S. Paulussen,, VITO</i> )
15:00-16:30	Plasma assisted combustion ( <i>C. Laux, Paris</i> )
17:00-18:30	Plasma technology for bio-syngas production (from biomass) or hydrocarbon and alcohol steam reforming ( <i>J.-M. Cormier, GREMI, Orléans</i> )

## Saturday, Oct. 13:

08.30-10.00	Plasma catalysis for environmental applications ( <i>C. Whitehead, Manchester</i> )
10.30-12.00	Renewable Energy Storage through CO <sub>2</sub> Harvesting: A Plasma Perspective ( <i>S. Welzel, Eindhoven</i> )