WE-Heraeus Summer School

Course on Low Temperature Plasma Physics and Applications (CLTPP-7)

September 8 – 13, 2002

and

Master Class on Hot Topics in Plasma Physics and Technology: Modelling of Reactive Plasmas

September 15 – 17, 2002

Physikzentrum Bad Honnef

Chairman: Prof. Dr. J. Winter, Ruhr-Universität Bochum
Co-Chairman: Prof. Dr. D.C. Schram, Technical University Eindhoven
Organization: M. Böke, Ruhr-Universität Bochum

Support:

Graduiertenkolleg "Hochtemperatur-Plasmaphysik"
Fakultät für Physik und Astronomie, Ruhr-Universität Bochum

Scope of the Course and Master Class

The level of the course is aimed at:

Ph.D.-students in first year
Diploma- and M.-Sc.-students in last year

The aim of the course is to make the students become acquainted with the up-to-date 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. Also the students will be able to interact with the teachers of the course and they will meet fellow-students from other universities in Europe during the Course and the Master Class. During the course a special session will be devoted to presentations of the students to encourage interaction. Participants are invited to bring with them presentation material in form of posters.

All lectures and discussions are in English.

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,
- modelling,
- plasma-surface interactions,
- etc...

During the **Master Class on Hot Topics in Plasma Physics and Technology** the topic of **Modelling of Reactive Plasmas** will be discussed at a level of forefront research.

Please Notify:

Breakfast, lunch and dinner: (especially: weekend)

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

During the weekend only breakfast and dinner will be served for those who stay at the Physikzentrum.

On monday evening there will be the special **"Heraeus"-Conference** dinner.

Except from this dinner all **beverages are not included** in the course fee. After putting your name on a list you may take beverages out of two refrigerators. We kindly ask you to pay the total amount for your beverages at the office of the Physikzentrum (room # 1) **before** you leave.

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 the notes or parts of the notes is not permitted without permission of the authors.

Poster Session:

The poster sessions will take place on tuesday and thursday evening on the ground floor. The participants who present posters are invited to display their posters during the whole course. The maximum poster size is 110 cm width x 90 cm height.

PROGRAM

Course on Low Temperature Plasma Physics and Applications (CLTPP-7)

	MON 9-Sep-02	TUE 10-Sep-02	WED 11-Sep-02	THU 12-Sep-02	FRI 13-Sep-02
7:45			BREAKFAST		
8:30 – 10:00	Welcome (Winter) Fundamentals 1 (Braithwaite)	Helicon, ECR (Krämer)	Electron Kinetics (Ferreira)	Diagn.1: Spectroscopy (Schram)	Dusty Plasmas (Hollenstein)
10:00			COFFEE BREAK		
10:30 – 12:00	Fundamentals 2 (van de Sanden)	Thermal Plasmas I (Fauchais)	PIC-, MC-, Fluid Models (Longo)	Diagn.2: Laser, CRDS (Sadeghi)	Surface Processes (von Keudell)
12:00			LUNCH		
14:00 – 15:30	CCP and ICP (Czarnetzki)	Thermal Plasmas II (Fauchais)	**Outing**	Diagn.3: IR & Probes (Soltwisch)	End of the Course
15:30	COFFEE BREAK			COFFEE BREAK	
16:00 – 17:30	Microwave Plasmas (Berndt) About WE-Heraeus (Dreisigacker)	DBD (Wiesemann)		Molecular Plasmas (Bretagne)	
18:00			DINNER		
19:00 – 21:30		Poster Session I		Poster Session II	

PROGRAM

Master Class on Hot Topics in Plasma Phys. and Techn.: Modelling of Reactive Plasmas

	MON 16-Sep-02	TUE 17-Sep-02
7:45	BREAKFAST	
8:30 – 10:00	Global Model *(M. Turner)*	Deposition and Dust in Silane Plasmas *(W. Goedheer)*
10:00	COFFEE BREAK	
10:30 – 12:00	Simulation of Technical Plasmas (Etching Reactors, Hierarchy Model) *(R.P. Brinkmann)*	Reactive Low Temperature Plasmas in Fusion *(D. Reiter)*
12:00		LUNCH
14:00 – 15:30	The Plasma Sheath Problem *(K.U. Riemann)*	End of the Master Class
15:30	COFFEE BREAK	
16:00 – 17:30	Surface Chemistry Processes *(D. Graves)*	
18:00	DINNER	

Program of the Course

Sunday, Sept. 8: Arrival/Registration

Monday, Sept. 9:

08.30-08.45	Welcome and introduction
08.45-10.15	Fundamentals of Gas Discharges I *N.St.J. Braithwaite*
10.30-12.00	Fundamentals of Gas Discharges II *M.C.M. van de Sanden*
14.00-15.30	Capacitively and Inductively Coupled Discharges *U. Czarnetzki*
16.00-17.30	Microwave Discharges, Surface Wave Discharges *J. Berndt*
17.30	About WE-Heraeus Foundation *E.Dreisigacker*
18.00	**"Heraeus"- Conference Dinner**

Tuesday, Sept. 10:

08.30-10.00	ECR and Helicon *M. Krämer*
10.30-12.00	High Pressure Thermal Plasmas and Sources I *P. Fauchais*
14.00-15.30	High Pressure Thermal Plasmas and Sources II *P. Fauchais*
16.00-17.30	Dielectric Barrier Discharge *K.Wiesemann*
19.00-21.30	Poster Session I

Wednesday, Sept. 11:

08.30-10.00	Electron Kinetics in Atomic and Molecular Plasmas *C. Ferreira*
10.30-12.00	Monte Carlo Models of Electron and Ion Transport in Non-Equilibrium Plasmas *S. Longo*

Wednesday afternoon: Outing

Thursday, Sept. 12:

08.30-10.00	Diagnostics I: Basics of Plasma Spectroscopy *D.C. Schram*
10.30-12.00	Diagnostics II**:** Laser, Cavity Ring Down, etc. *N. Sadeghi*
14.00-15.30	Diagnostics III**:** IR and Probes *H.Soltwisch*
16.00-17.30	Processes in Molecular Plasmas *J. Bretagne*
19.00-21.30	Poster Session II

Friday, Sept. 13:

08.30-10.00	Dust Formation and Plasma Crystal *Chr. Hollenstein*
10.30-12.00	Surface Processe during Thin-Film Growth *A. von Keudell*

End of the Course

Weekend (Participants of Course **and** Master Class**):** Free for Excursions

Program of the Master Class

Sunday, Sept. 15: Arrival/Registration

Monday, Sept. 16:

08.30-10.00	Global Model *M. Turner*
10.30-12.00	Simulation of Technical Plasmas (Etching Reactors, Hierarchy Model) *(R.P. Brinkmann)*
14.00-15.30	The Plasma Sheath Problem *(K.U. Riemann)*
16.00-17.30	Surface Chemistry Processes *(D. Graves)*

Tuesday, Sept. 17:

08.30-10.00	Deposition and Dust in Silane Plasmas *(W. Goedheer)*
10.30-12.00	Reactive Low Temperature Plasmas in Fusion *(D. Reiter)*

End of the Master Class