

Low T Plasma Physics 1996

COURSE NOTES

Intensive Course ERASMUS, ICP-95-NL-1111/13

ERASMUS Committee

M. Capitelli
J. Conrads
P. Fauchais
C.M. Ferreira
M. Fitaire
C.H. Hollenstein
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D.C. Schram
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Local Committee

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Support/Auspices:

ERASMUS Program
Faculty Technical Physics, Eindhoven University of Technology
Research School for Plasma Physics and Radiation Technology
Graduierten Kollegen Hochtemperatur Plasmaphysik
Plasma Physics Groups: ETP/EPG

Note: These course notes are meant to give support to the students following the course. Hence the distribution is restricted to the students following the course and reproduction of the notes or parts of it is not permitted.

I	De Hoog	8 juli 1996
II	Capitelli	8 juli 1996
III	Ricard	8 juli 1996
IV	Schram	
V	Goedheer	8 juli 1996
VI	Longo	8 juli 1996
VII	Conrads/Schmidt	
VIII	Fauchais	8 juli 1996
IX	Fauchais	8 juli 1996
X	Fauchais	8 juli 1996
XI	Fitaire	
XII	Uhlenbusch	
XIII	Uhlenbusch	
XIV	Von Keudell	8 juli 1996
XV	Von Keudell	8 juli 1996
XVI	Van de Sanden	
XVII	Kroesen	

Bring this sheet with you for receiving the lecture notes of the ERASMUS Intensive Course

Note for students:

The examination of students, if relevant, will in general be performed by the home university.

For students from The Netherlands students are requested to contact either prof. de Hoog/dr. Kroesen or prof. Schram/dr. Van de Sanden on this matter.

ERASMUS COURSE - Low T Plasma Physics

Lecture Program

Monday July 8, 1996

- 8.15 - 8.45 Student registration
- 8.45 - 9.15 Welcome and short introduction.
F.W. Sluijter, D.C. Schram
- 9.15-10.45 Gasdischarge principles, introduction, conformity rules, types, cathode drop.
F.J. de Hoog
- 10.45-11.15 Coffee
- 11.15-12.45 Electron kinetics, processes, distribution function, reactions with molecules, H₂, N₂ kinetics.
M. Capitelli
- 12.45-14.00 Lunch
- 14.00-15.30 Processes in molecular gases N₂, O₂, H₂.
A. Ricard
- 15.30-16.00 Break
- 16.00-17.30 Excitation and radiation in plasmas, collision radiative models.
D.C. Schram

Tuesday July 9, 1996

- 9.00-10.30 RF discharges, electron distribution functions, D.C. potentials, ion energy distribution, charge exchange collisions.
W.J. Goedheer
- 10.30-11.00 Coffee
- 11.00-12.30 RF discharges, electron kinetics, Monte Carlo model.
S. Longo
- 12.30-14.00 Lunch
- 14.00-15.30 PIC and fluid models, numerical problems.
W.J. Goedheer
- 16.00-17.30 Plasma production, plasma sources.:
DC glow, RF plasma capacitive, inductive, surfatron, helicon, ECR, microwave plasmas.
J. Conrads, M. Schmidt
- 19.00-21.00 Course dinner

Wednesday July 10, 1996

- 9.00-10.30 Thermal plasmas, fundamentals, characteristic lengths, distribution functions, equilibrium, radiation etc..
P. Fauchais
- 10.30-11.00 Coffee

- 11.00-12.30 Thermal plasmas, generation, arcs etc., RF discharges, inductive, cap. torch design.
P. Fauchais
- 12.30-14.00 Lunch
- 14.00-15.30 Application, cutting, welding etc..
P. Fauchais
- 15.30-16.00 Break
- 16.00-17.30 Breakdown phenomena, starting of discharges.
M. Fitaire

Thursday July 11, 1996

- 9.00-10.30 Plasma diagnostics I
probes, interferometry, mass spectrometry,
emission/absorption, spectroscopy, line profiles,
LIF, TALIF, Thomson/Rayleigh scattering, CARS.
J. Uhlenbusch
- 10.30-11.00 Coffee
- 11.00-12.30 Plasma diagnostics II
J. Uhlenbusch
- 12.30-14.00 Lunch
- 14.00-15.30 Surface processes: reflection, absorption, desorption, polymerization,
abstraction, sputtering
A. Von Keudell
- 15.30-16.00 Break
- 16.00-17.30 deposition amorphous layers
a-C:H, a-Si:H compounds, others, deposition mechanisms
X-line layers: diamond
examples
A. Von Keudell

Friday July 12, 1996

- 9.00-10.30 VHF deposition a-Si:H, frequency dependence, α/γ regimes, negative ions,
dust.
W.J. Goedheer
- 10.30-11.00 Coffee
- 11.00-12.30 Deposition mechanisms, a-Si:deposition.
M.C.M. van de Sanden
- 12.30-14.00 Lunch
- 14.00-15.30 Radical interactions, infrared spectroscopy, powder.
G.M.W. Kroesen
- 15.30-16.00 Break
- 16.00-17.30 Conclusions, summing up, closure.