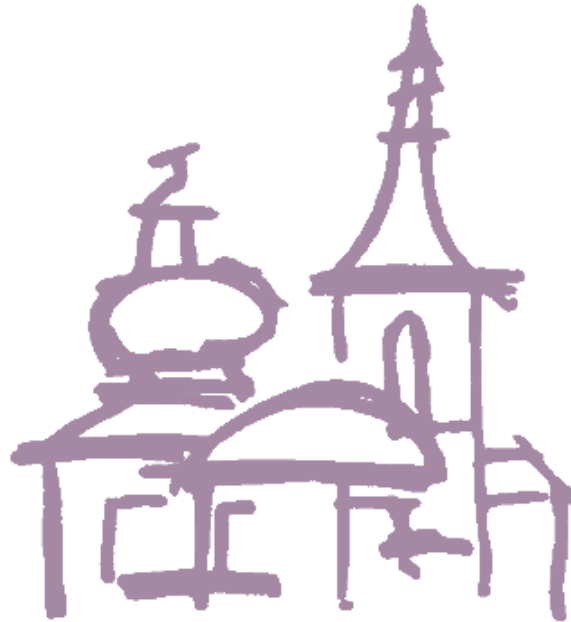


17TH EUREGIONAL WELTPP

Workshop on the Exploration of Low Temperature Plasma Physics



November 20 and 21, 2014

"Rolduc"

Kerkrade, the Netherlands

Jointly sponsored and organized by

**RUHR
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TU/e Technische Universiteit
Eindhoven
University of Technology

RESEARCH DEPARTMENT
Plasmas with Complex Interactions

UNIVERSITY of York

 **SFB-TR 87**

 **DIFFER**
Dutch Institute for
Fundamental Energy Research

17TH EUREGIONAL WELTPP

Workshop on the Exploration of Low Temperature Plasma Physics

Welcome to the 17th *Workshop on the Exploration of Low Temperature Plasma Physics* (WELTPP-17). This workshop is intended for active scientists working in the field of low temperature plasma physics.

The aim of this workshop is to create a forum for young low temperature plasma scientists, that is graduate students and postdoctoral researchers, to meet, learn from each other, exchange knowledge, present results and establish new contacts. The emphasis is on the presentation of the work of the people new in this field.

The workshop is sponsored and organised by Eindhoven University of Technology (TU/e) and the Research Department "Plasmas with complex interactions" of the Ruhr-Universität Bochum in the framework of SFB-TR 87. WELTPP was born in close collaboration between the Eindhoven groups Plasma and Materials Processing (PMP) and Elementary Processes in Gas Discharges (EPG) and the Ruhr-Universität Bochum. Recently, York Plasma Institute and the Dutch Institute for Fundamental Energy Research (DIFFER) have joined the organising committee.

We wish you a fruitful and pleasant conference.

Organizing committee:

Erik Wagenaars (York Plasma Institute)
Jan Trieschmann (Ruhr-Universität Bochum)
Jan van Dijk (Eindhoven University of Technology)
Richard Engeln (Eindhoven University of Technology)
Stefan Welzel (FOM Institute DIFFER & Eindhoven University of Technology)
Jeanne Loonen (Eindhoven University of Technology)

Friday, November 21st

08.00 Breakfast in the “Grote Eetzaal”

Please return your room key to the reception before attending Session 4!

- Session 4 HF Plasmas** (Conference room 4)
- 09.00-09.20** O12 **Generation of highly energetic electrons through interaction with modulated plasma sheaths**
S. Wilczek (Ruhr-Universität Bochum)
- 09.20-09.40** O13 **Infrared absorption techniques applied to transient species measurements**
A. Nave (INP Greifswald)
- 09.40-10.00** O14 **Direct measurements of plasma power dissipation in RF atmospheric pressure plasma jets**
A. West (York Plasma Institute)
- 10.00-10.20** O15 **A VHF-CCP for sterilization - mechanisms and effectiveness on a macromolecular level**
K. Stapelmann (Ruhr-Universität Bochum)
- 10.30** Coffee/Tea in the Foyer
- 11.00-12.30** **Poster session** (Conference room 3)
All poster numbers greater than P13 can be posted
- 12.30** Lunch in the “Grote Eetzaal”
- Session 5 Plasma & Applications II** (Conference room 4)
- 13.45-14.05** O16 **Plasma-plasma interaction - Simulations of ionization wave propagation on micro cavity plasma arrays**
A. Wollny (Ruhr-Universität Bochum)
- 14.05-14.25** O17 **CO₂-to-CO conversion in vortex-stabilised microwave plasmas**
S. Welzel (DIFFER)
- 14.25-14.45** O18 **Study of the influence of the gas mixture on the CO density in a DBD**
C. Douat (Eindhoven University of Technology)
- 14.45-15.05** O19 **Dimension reduction of non-equilibrium plasma models using principal component analysis**
K. Peerenboom (Université Libre de Bruxelles & TU/e)
- 15.05** Closure of the workshop



List of Posters

Thursday, November 20th

- P1: **A sketch of the philosophy of science – From Aristotle to post-normal science**
N. Al Shami^{1,2} and C. Leicht-Scholten²
¹ Ruhr-University Bochum, Institute for Theoretical Electrical Engineering
44780 Bochum, Germany
² RWTH Aachen University, Department of Gender and Diversity in
Engineering, 52056 Aachen, Germany
- P2: **Gas temperature in a dielectric-barrier discharge in open air**
J.M. Beentjes, M. van der Schans, A. Sobota
Eindhoven University of Technology, Department of Applied Physics,
P.O. Box 513, 5600 MB Eindhoven, the Netherlands
- P3: **FTIR-measurement of rotational and vibrational temperatures in a CO₂ microwave plasma**
D.C.M. van den Bekerom, G. Berden, A. Berthelot, R.A.H. Engeln,
N. den Harder, T. Minea, M.C.M. van de Sanden, G.J. van Rooij
FOM Institute DIFFER, P.O. Box 1207, 3430 BE Nieuwegein, The
Netherlands
- P4: **Effect of oxygen on the CO₂ to CO dissociation in a CO₂/O₂ DBD**
T. Boumans¹, C. Douat¹, O. Guaitella^{1,2}, S. Ponduri¹, S. Welzel^{1,3}, R. Engeln¹
¹ Eindhoven University of Technology, Department of Applied Physics,
P.O. Box 513, 5600 MB Eindhoven, The Netherlands
² LPP, Ecole Polytechnique, UPMC, Université Paris Sud XI, CNRS,
Palaiseau, France
³ FOM Institute DIFFER, P.O. Box 1207, 3430 BE Nieuwegein, The
Netherlands
- P5: **Evolution of quantum wave functions using the Particle-In-Cell method**
S. Dirkmann, Z. Youssef, T. Hemke, T. Mussenbrock
Ruhr-University Bochum, Theoretical Electrical Engineering, Germany
- P6: **Atmospheric pressure dielectric barrier discharge assisted PECVD synthesised silica-like thin films: A polarised ATR-FTIR study of thin film morphology**
F. M. Elam¹, S. A. Starostin², J. B. Bouwstra¹, M. C. M. van de Sanden², H.
W. de Vries²
¹ FujiFilm Manufacturing Europe B.V. Tilburg, The Netherlands
² FOM Institute DIFFER, P.O. Box 1207, 3430 BE Nieuwegein, The
Netherlands

- P7: Modelling of the DIFFER plasma reactor for CO₂ dissociation with Plasimo**
P.W.C. Groen¹, W.A. Bongers¹, J. van Dijk², M.F. Graswinckel¹, K.S.C. Peerenboom², M.C.M. van de Sanden^{1,2}, G.M.W. Kroesen²
¹ FOM Institute DIFFER, P.O. Box 1207, 3430 BE Nieuwegein, The Netherlands
² Eindhoven University of Technology, Department of Applied Physics, P.O. Box 513, 5600 MB Eindhoven, The Netherlands
- P8: Shake it off - Real-time dynamics of particle release by vibration**
L.C.J. Heijmans, S. Nijdam, J. Beckers and G.M.W. Kroesen
Eindhoven University of Technology, , Department of Applied Physics, P.O. Box 513, 5600 MB Eindhoven, The Netherlands
- P9: Absorption/Emission spectroscopy and Thomson scattering measurements on an Ar/O₂/SiCl₄ surfatron plasma**
S. Hofmann, K.J.E. Albertz, E.M. van Veldhuizen and S. Nijdam
Eindhoven University of Technology, , Department of Applied Physics, P.O. Box 513, 5600 MB Eindhoven, The Netherlands
- P10: The electron density in an extreme ultra-violet generated plasma**
R.M. van der Horst, J. Beckers, S. Nijdam and G.M.W. Kroesen
Eindhoven University of Technology, , Department of Applied Physics, P.O. Box 513, 5600 MB Eindhoven, The Netherlands
- P11: Spatio-temporal discharge behaviour of high-current DBDs in a roll-to-roll configuration under atmospheric pressure PECVD conditions**
Y. Liu¹, S.A.Starostin¹, S. Welzel^{1,2}, H. de Vries¹, M.C.M van de Sanden^{1,2} and J. Bouwstra³
¹ FOM Institute DIFFER, 3430 BE, Nieuwegein, The Netherlands
² Eindhoven University of Technology, Department of Applied Physics, P.O. Box 513, 5600 MB, Eindhoven, The Netherlands
³ FUJIFILM Manufacturing Europe b.v., P.O. Box 90156, Tilburg, The Netherlands
- P12: The surface dynamic evolution of SiO₂-like films grown by AP-PECVD on polymeric substrate**
A. Meshkova¹, S.A. Starostin¹, B.C.A.M. van der Velden-Schuermans², S. Quan², M.C.M. van de Sanden¹, H.W. de Vries¹
¹ FOM Institute DIFFER, 3430 BE, Nieuwegein, The Netherlands
² FUJIFILM Manufacturing Europe b.v., P.O. Box 90156, Tilburg, The Netherlands

- P13: Spectral predictions in air and mixtures involving SiCl₄**
J.F.J. Janssen¹, J. van Dijk¹, J.L.G. Suijker², K.S.C. Peerenboom¹, S.Nijdam¹,
G.M.W. Kroesen¹
¹ *Eindhoven University of Technology, Department of Applied Physics,
P.O. Box 513, 5600 MB Eindhoven, The Netherlands*
² *Philips Lighting, LightLabs, P.O. Box 80020, 5600 JM Eindhoven*
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Friday, November 21st

- P14: Rotational Raman scattering on CO₂ at elevated pressure in DBDs**
B.L.M. Klarenaar¹, F. Brehmer^{1,2}, S. Welzel^{1,3}, H.J. van der Meiden³,
M.C.M. van de Sanden^{1,3}, R. Engeln¹
¹ *Eindhoven University of Technology, Department of Applied Physics,
P.O. Box 513, 5600 MB Eindhoven, The Netherlands*
² *AFS GmbH, 86497 Horgau, Germany*
³ *FOM Institute DIFFER, 3430 BE Nieuwegein, The Netherlands*
- P15: Study of defects in barrier films deposited on polymers**
F. Mitschker¹, S. Steves¹, M. Rudolph¹, N. Bibinov¹, M. Gebhard², A. Devi²
and P. Awakowicz¹
¹ *Ruhr-Universität Bochum, Electrical Engineering and Plasma Technology,
Germany*
² *Ruhr-Universität Bochum, Chemistry of Inorganic Materials, Germany*
- P16: Study of O₂ plasma etching of a single dust particle by means of ellipsometry**
B. Platier, L.P.T. Schepers, J. Beckers and G.M.W. Kroesen
*Eindhoven University of Technology, , Department of Applied Physics,
P.O. Box 513, 5600 MB, Eindhoven, The Netherlands*
- P17: Characterization of electrical filaments in a CO₂ dielectric barrier discharge**
S. Ponduri¹, O. Guaitella^{1,2}, C. Douat¹, M.C.M. van de Sanden^{1,3}, R. Engeln¹
¹ *Eindhoven University of Technology, , Department of Applied Physics,
P.O. Box 513, 5600 MB Eindhoven, The Netherlands*
² *LPP, Ecole Polytechnique, UPMC, Université Paris Sud XI, CNRS,
Palaiseau, France*
³ *FOM Institute DIFFER, 3430 BE, Nieuwegein, The Netherlands*
- P18: Application of ILDM technique for simplifying complex plasma chemistry**
T. Rehman¹, K. Peerenboom^{1,2}, E. Kemaneci¹, W. Graef¹, Jan van Dijk¹
¹ *Eindhoven University of Technology, Department of Applied Physics,
P.O. Box 513, 5600 MB Eindhoven, The Netherlands*
² *Aero-Thermo-Mechanics Department, Université Libre de Bruxelles,
Belgium*

- P19: Measured energy distribution of ions in a multi frequency CCP**
 S. Ries¹, C. Corbella², S. Bienholz¹, D. Grochla⁴, R. Brugnara⁵, D. Eremin³,
 K. Bobzin⁵, A. Ludwig⁴, T. Mussenbrock³, A. v. Keudell², P. Awakowicz¹
¹ Ruhr-University Bochum, Institute for Electrical Engineering and Plasma
 Technology
² Research Group Reactive Plasmas
³ Ruhr-University Bochum, Institute for Theoretical Electrical Engineering
⁴ Ruhr-University Bochum, Institute of Materials
⁵ Institute of Surface Engineering (IOT)
- P20: Influence of electron temperature and electron density on
 the particles' mean free paths in cold subsonic expanding
 argon plasmas**
 R.H.J. Westermann¹, M.C.M. van de Sanden^{1,2} and R. Engeln¹
¹Eindhoven University of Technology, Department of Applied Physics,
 P.O. Box 513, 5600 MB Eindhoven, The Netherlands
² FOM Institute DIFFER, 3430 BE, Nieuwegein, The Netherlands
- P21: Light scattering on dusty plasmas for enhanced color
 management in white LEDs**
 L.P.T. Schepers¹, J. Beckers¹, T.W. Tukker², W.L. IJzerman³
¹Eindhoven University of Technology, Department of Applied Physics,
 P.O. Box 513, 5600 MB Eindhoven, The Netherlands
²: Philips Research
³: Philips Lighting
- P22: Analytical study of the mode propagation along the
 PLASMALINE**
 D. Szeremley, D. Eremin, R. P. Brinkmann, T. Mussenbrock
 Ruhr-University Bochum, Institute for Theoretical Electrical Engineering,
 Bochum, Germany
- P23: Ion energies in EUV-induced plasmas**
 T.H.M. van de Ven, J. Beckers, E. Osorio, V. Banine, G.M.W. Kroesen
 Eindhoven University of Technology, Department of Applied Physics
 P.O. Box 513, 5600 MB Eindhoven, The Netherlands
- P24: Role of surface processes in CO₂ containing DBDs**
 S. Welzel^{1,2}, O. Guaitella^{1,3}, F. Brehmer^{1,4}, R. Engeln¹,
 M.C.M. van de Sanden^{1,3}
¹ Eindhoven University of Technology, Department of Applied Physics
 P.O. Box 513, 5600 MB Eindhoven, The Netherlands
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 Palaiseau, France
⁴ AFS GmbH, 86497 Horgau, Germany

P25: Ion velocity distribution measurements on the TU/e fusor plasma using LIF diagnostics

A.J. Wolf, R.J.E. Jaspers, A.Sobota, G.M.W. Kroesen
*Eindhoven University of Technology, Department of Applied Physics
P.O. Box 513, 5600 MB, The Netherlands*

P26: An ELM resolved study on divertor erosion in the JET ITER- like wall

N. den Harder², S. Brezinsek¹, G.F. Matthews¹, S. Marsen¹, A. Meigs¹,
M.F. Stamp¹, I. Nunes¹, P. Monier-Garbet¹, L. Aho-Mantila¹, C. Giroud¹,
G J van Rooij² and JET EFDA contributors*

¹*EURATOM/CCFE Fusion Association, Culham Science Centre,
Oxon. OX14 3DB, United Kingdom*

* *See the Appendix of F. Romanelli et al., Proc. 24th IAEA FEC,
San. Diego 2012*

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