13th Seminar "Computer Modeling in Microwave Engineering and Applications"

Advances in Determining Material Parameters

March 7-8, 2011

Swiss Federal Laboratories for Materials Science and Technology (EMPA)
Thun, Switzerland

P r e l i m i n a r y P r o g r a m

Sunday, March 6, 2011

17:00-19:00 **On-site registration: Hotel Krone**, Rathausplatz, Thun

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Monday, March 7, 2010

7:15-7:30 **On-site registration:** Hotel Krone, Rathausplatz, Thun

7:15-14:00 **Excursion to the Swiss Light Source (SLS) of the Paul Scherrer Institute in Villigen, Switzerland**

14:00-14:30 **On-site registration:** EMPA, Room 503

14:30-14:45 **Welcome & Opening remarks**
S. Vaucher, Seminar Vice-Chair & Local Organizer
EMPA, Thun, Switzerland

Introduction to the Seminar
V.V. Yakovlev, Seminar Founder and Chair
Worcester Polytechnic Institute, MA, USA

Permittivity Measurement Workshop
Chair: *P. Veronesi*

14:50-15:30 **An Overview of Dielectric Properties Measuring Techniques and Instruments**
J. M. Catalá-Civera and F.L. Peñaranda-Foix
Research Institute ITACA, Polytechnic University of Valencia, Valencia, Spain

15:40-16:30 **Electromagnetic Properties of Materials: Agilent Solutions for Characterization at Microwave Frequencies and Beyond**
S.B. Begley
Agilent Technologies, Inc., Santa Rosa, CA, USA

16:40-17:30 **Measurements of Electromagnetic Properties of Materials at Microwave Frequencies**
J. Krupka and M. Soltysiak[2]
[1]Institute of Radioelectronics and Optoelectronics, Warsaw University of Technology, Warsaw, Poland
[2]QWED sp. z o.o., Warsaw, Poland

17:30-18:45 **Reception – Presentations by the Seminar Sponsors:** EMPA, Room 503

20:00- **Seminar Gala Dinner:** Waisenhaus Ristorante, Bälliz 61, Thun

Tuesday, March 8, 2011

8:00-8:30 **On-site registration:** EMPA, Room 503

Session 1*: Measurement of Material Parameters*
Chair: *M. Radoiu*

8:30-8:50 **Microwave Dielectric Spectroscopy in Fluids in the Supercritical and Near Critical Regions**
G.A. Dimitrakis[1], *T. Fang*[1], *E.H. Lester*[1], *S.W. Kingman*[1], *A.P. Gregory*[2], *K. Lees*[2], *and R.N. Clarke*[2]
[1]NCIMP, University of Nottingham, Nottingham, U.K.
[2]Industry and Innovation Division, National Physical Laboratory, Teddington, U.K.

8:50-9:10 **Dielectric Measurements using Transmission Line Method and Different Sample Geometries in a WR340 Standard Waveguide**
D. Prastiyanto[1,3], *G. Link*[1], *and M. Thumm*[1,2]
[1]Institute for Pulsed Power and Microwave Technology, Karlsruhe Institute of Technology, Karlsruhe, Germany
[2]Institute of High Frequency Techniques and Electronics, Karlsruhe Institute of Technology, Karlsruhe, Germany
[3]Electrical and Engineering Department, State University of Semarang, Indonesia

9:10-9:30 **Robust, Compact, Reliable and Portable Dielectric Properties Measurement System for Powder Materials at Microwave Frequencies**
J.M. Catalá-Civera, F.L. Peñaranda-Foix, J.D. Gutierrez, P.J. Plaza-González, and A.J. Canós-Marín
Research Institute ITACA, Universidad Politécnica de Valencia, Valencia, Spain

9:30-9:50 **Experimental X-ray Micro Tomography: a Tool for the Development of Multi-Physics Microwave Modeling**
S. Vaucher, K. Ishizaki, M. Stir, and R. Nicula
Laboratory for Advanced Material Processing, EMPA, Thun, Switzerland

9:50-10:10 **Coffee break**

Session 2*: Models of Material Parameters*
Chair: *D. Bouvard*

10:10-10:30 **Electromagnetic Modeling of Inhomogeneous Composites with Conductive Inclusions**
B. Salski[1] *and M. Celuch*[2]
[1]QWED sp. z o.o., Warsaw, Poland
[2]Institute of Radioelectronics, Warsaw University of Technology, Warsaw, Poland

10:30-10:50 **Contemporary Models of Effective Permittivity and Permeability of Metal Powders – a Comparative Review**
E.M. Kiley and V.V. Yakovlev
Department of Mathematical Sciences, Worcester Polytechnic Institute, Worcester, MA, USA

10:50-11:10 **Modeling-Based Reconstruction of 3D Permittivity Profiles Using a Neural Network Inversion**
A.V. Brovko[1], *E.K. Murphy*[2], *and V.V. Yakovlev*[3]
[1]Department of Applied Information Technologies, Saratov State Technical University, Saratov, Russia
[2]Applied Mathematics, Inc., Gales Ferry, CT, USA
[3]Department of Mathematical Sciences, Worcester Polytechnic Institute, Worcester, MA, USA

11:15-12:15 **Tour over microwave facilities of the EMPA's Laboratory for Advanced Material Processing**

12:15-13:15 **Lunch:** EMPA, Room 503

Session 3*: Material Parameters in Modeling*
Chair: *J. Catalá-Civera*

13:30-13:50 **Influence of Dielectric Properties on the Accuracy of the Simulation of Microwave Heating**
M. Soltysiak[1] and M. Celuch[2]
[1]QWED sp. z o.o., Warsaw, Poland
[2]Institute of Radioelectronics, Warsaw University of Technology, Warsaw, Poland

13:50-14:10 **Simulation of Microwave Heating of Electronically Conductive Materials: Effect of Microstructure**
H.S. Park, A. Rosin, and M. Willert-Porada
Chair of Materials Processing, University of Bayreuth, Bayreuth, Germany

14:10-14:30 **Computational Study of High Temperature Microwave Processing of Zirconia: Effects of Frequency and Temperature-Dependent Material Parameters**
S. Allen[1], M. Fall[1], H. Shulman[1], and V.V. Yakovlev[2]
[1]Ceralink, Inc., Troy, NY, USA
[2]Department of Mathematical Sciences, Worcester Polytechnic Institute, Worcester, MA, USA

14:30-14:50 **Coffee break**

Session 4: Microwave Processing of Materials
Chair: *S. Vaucher*

14:50-15:10 **Microwave Sintering of Ceramic and Metal Powders in a Single-Mode Resonant Cavity**
A. Guyon, S. Charmont, D. Bouvard, C.P. Carry, and J.-M. Chaix
Grenoble INP, Saint Martin d'Heres, France

15:10-15:30 **Microwave Processing of Electrophoretically Deposited Nanopowders**
R. Rosa[1], P. Veronesi[1], M. Michelazzi[1], C. Leonelli[1], M. Romagnoli[1], and A.R. Boccaccini[2]
[1]University of Modena and Reggio Emilia, Italy
[2]University of Erlangen-Nuremberg, Germany

15:30-15:50 **Analysis of Optimum Conditions for Microwave Re-Heating of Silicate Glasses**
A. Rosin, T. Gerdes, and M. Willert-Porada
Chair of Materials Processing, University of Bayreuth, Bayreuth, Germany

15:50-16:10 **Coffee break**

Panel Session
Panelists: *S. Vaucher, M. Willert-Porada, and V.V. Yakovlev*

16:10-17:00 **Role of Material Parameters in Multiphysics Modeling**

17:00-17:15 **Closing remarks. Photo session. Seminar Closing**