

Programme of the
6th International Scientific
Colloquium

Modelling for Material Processing

Riga, September 16-17, 2010

Organized by

University of Latvia



Leibnitz University Hannover



Scientific Committee

- **E. Baake**, Leibniz University Hannover
- **Yu. Blinov**, Saint Petersburg Electrotechnical University
- **Y. Fautrelle**, INP Grenoble / CNRS
- **A. Jakovics**, University of Latvia
- **S. Lundström**, Luleå University of Technology
- **S. Lupi**, University of Padua
- **A. Muiznieks**, University of Latvia
- **B. Nacke**, Leibniz University Hannover

Local Organising Committee

- **Dr. J. Virbulis**, Chairman
- **Prof. A. Jakovics**
- **Ms. I. Suija**, Secretary
University of Latvia

Place and Time

- **University of Latvia, 19 Raina Blvd., 3rd floor, Riga, Latvia**
- **September 16-17, 2010**

The Organising committee gratefully acknowledges the sponsorship and support received from the



ESF Project at Latvia University
No.:2009/0223/1DP/1.1.1.2.0/09/APIA/VIAA/008



**Vereinigung zur Förderung des Instituts für Elektrowärme
e.V. (Hannover, Germany)**



**Center for the Processes' Analysis and Research, Ltd.
(Riga, Latvia)**



University of Latvia, 19 Raina Blvd., Riga

International Scientific Colloquium Agenda

Wednesday, September 15	Thursday, September 16	Friday, September 17
	08:30-09:00 Late registration	
	9:00 – 10:30 Opening Session Chairman: Prof. B. Nacke Welcome address and 3 oral presentations	10:00 – 11:10 “Metallurgical Applications” Chairman: Prof. E. Baake 4 oral presentations
	10:30 – 10:50 Coffee break	11:10 – 10:40 Coffee break
	10:50 – 12:20 “Crystal Growth” Chairman: Prof. A. Muiznieks 5 oral presentations	11:40 – 12:50 “Technology Development” Chairman: Prof. Y. Fautrelle 4 oral presentations
	12:20 – 13:30 Common Photo & Lunch	12:50 – 14:00 Lunch
	13:30 – 15:00 Poster Session Chairman: Prof J. Barglik 21 posters	14:00 – 15:10 “Rotating Magnetic Field” Chairman: Dr. G. Gerbeth 4 oral presentations
	15:00 – 15:20 Coffee break	15:10 – 15:30 Coffee break
	15:20 – 16:30 “Heating & Melting” Chairman: Prof. S. Lupi 4 oral presentations	15:30 – 16:40 “Multiphase Processes” Chairman: Dr. J. Virbulis 4 oral presentations
	16:30 – 16:50 Coffee break	16:40 – 17:00 Prime Poster Award & Closing
18:00 – 19:45 Registration	16:50 – 18:00 “Lorentz Force” Chairman: Dr. U. Lüdtke 4 oral presentations	18:00 – 20:00 Guided sightseeing in Old Riga
20:00 – 22:00 Welcome cocktail	20:00 – 23:00 Colloquium dinner	

Programme

September 15

18:00 – 19:45 Registration
University of Latvia, 19 Raina Blvd., ground floor, entrance hall

20:00 – 22:00 Welcome cocktail
Natural History Museum of Latvia
4 Kr. Barona Str., 2nd floor

September 16

University of Latvia, 19 Raina Blvd., 3rd floor

Opening Session

Chairman: **Prof. B. Nacke**

9:00 – 10:30

- Welcome address (**Prof. I. Muiznieks, Pro-rector for Science**)
- **R. Friedrich**
Compressible Turbulent Flows: Prediction and Analysis
- **V. Bojarevics, A. Roy, K. A. Pericleous**
Magnetic Levitation of Large Liquid Volume
- **S. Rose, M. Schnick, M. Hertel, J. Zschetzsche, U. Füssel**
Transient Simulation of Pulsed Gas Metal Arc Welding Processes and Experimental Validation

10:30 – 10:50 Coffee break

Session “Crystal Growth”

Chairman: **Prof. A. Muiznieks**

10:50 – 12:20

- **B. Nacke, S. Wipprecht**
3D Electromagnetic and Thermal Modelling of the EFG Process for Silicon Tube Growth

- **A. Sabanskis, A. Muižnieks, A. Krauze**

Modelling of Crystallization Velocity Dependence on Undercooling and Crystallographic Orientation for FZ Silicon Crystal Growth

- **Cramer, M. Röder, J. Pal, G. Gerbeth**

A Physical Model for Electromagnetic Control of Local Temperature Gradients in a Czochralski System

- **A. Merah, A. Bouabdallah, F. Mokhtari, S. Hanchi, A. Alemany**

Instabilities in Silicon Czochralski Crystal Growth Process in Different Geometries

- **U. Lacis, A. Muiznieks, A. Krauze**

Simplified Dynamic Mathematical Model for Heat Transfer by Radiation and Heat Conduction

12:20 – 12:30 Common Photo

12:30 – 13:30 Lunch

Poster Session

Chairman: **Prof. J. Barglik**

13:30 – 15:00

- **A. Muiznieks, A. Rudevics, H. Riemann, U. Lacis**

Comparison Between 2D and 3D Modelling of HF Electromagnetic Field in FZ Silicon Crystal Growth Process

- **F. Mokhtari, A. Bouabdallah, A. Merah, S. Hanchi, A. Alemany**

Numerical Study of the Effect of Transverse Magnetic Field on Cylindrical and Hemispherical CZ Crystal Growth of Silicon

- **K. Lacis, A. Muiznieks, A. Rudevics, A. Sabanskis**

Numerical Aspects of Modelling of Coil System for Rotating Magnetic Field

- **B. Ubbenjans, Ch. Frank-Rotsch, J. Virbulis, B. Nacke, P. Rudolph**

Influence of Ultrasonic Treatment on Crystal Growth from Melt

- **Ya. Kompan, I. Protokovilov, Y. Fautrelle, Yu. Gelfgat, A. Bojarevics**

Magnetically Controlled Electroslag Melting of Titanium Alloys

- **M. Hertel, M. Schnick, U. Füssel, S. Gorchakov, D. Uhrlandt**

Numerical Simulation of GMAW Processes Including Effects of Metal Vapour and Sheath Mechanisms at the Electrodes

- **J. Neumeyer, M. Mach, B. Nacke**
Numerical Simulation of Induction Assisted Hybrid Welding Processes
- **M. Zlobina, B. Nacke, S. Galunin, Yu. Blinov, A. Nikanorov**
Induction Heating for Aluminum Extrusion Process: Concepts, Simulation, Design
- **K. Van Reusel, M. Manconi**
Stability in Position and in Temperature for a Conical and a Cylindrical Levitator
- **V. Geza, U. Krieger, A. Jakovics, B. Halbedel**
Influence of Material Properties on the Electromagnetic Homogenization of Glass Melt in the Special Melter
- **R. Ž. Milenković, S. Dementjevs, J. Patorski**
Recent Calculations and Experiments for Liquid Metal Targets Development at PSI
- **U. Schadewald, B. Halbedel, M. Ziolkowski, H. Brauer**
The Manipulation of Paramagnetic Ions by Magnetic Field Gradient Forces
- **J. Cīmurs, J. Evertovskis, S. Lācis**
Dipole Approximation Limits for Magnetic Interaction Forces between Spheres
- **S. Spitans, A. Jakovics**
Turbulence Model Affect on Heat Exchange Characteristics through the Beam Window for European Spallation Source
- **I. Barmina, M. Zake**
Effects of Magnetic Field on Swirling Flame
- **Arshanitsa, I. Barmina, A. Andersone, G. Telysheva, M. Zake**
Processing and Complex Research of the Main Characteristics of Pelletized Lignocellulosic Materials for Clean and Effective Energy Production
- **P. Mannberg, K. Giannadakis, A. Jakovics, J. Varna**
Moisture Absorption and Degradation of Glass Fiber/Vinylester Composites
- **J. Grečenkovs, A. Jakovičs, S. Gendelis**
3D Numerical Analysis of Heat Exchange in Building Structures with Cavities
- **A. Gedroics, H. Kalis, I. Kangro**
About of Blow-up Phenomena for Nonlinear Heat Transfer Problem Between Two Infinite Coaxial Cylinders
- **M. Lencmane, A. Buikis**
Analytical Two - Dimensional Solution for Transient Process in the System with Rectangular Fins

- **A. Piliksere, A. Buikis**

Analytical Solution for Intensive Quenching of Cylindrical Sample

15:00 – 15:20 Coffee break

Session “Heating & Melting”

Chairman: **Prof. S. Lupi**

15:20 – 16:30

- **M. Jestremski, H. Schülbe, A. Nikanorov, B. Nacke**

Numerical Investigation of Transverse-Flux Induction Heating of Ferromagnetic Strip

- **M. Bullo, M. Forzan, S. Lupi, C. Pozza**

Recent Investigations on LELs for Levitation Melting

- **S. Galunin, M. Zlobina, Yu. Blinov, A. Nikanorov, B. Nacke**

Numerical Optimization as an Effective Approach to Modern Design of Induction Heating Installations

- **A. Kharicha, A. Ludwig**

Liquid-Liquid Interface Instability in the Electro-Slag Remelting Process

16:30 – 16:50 Coffee break

Session “Lorentz Force”

Chairman: **Dr. U. Lüdtkke**

16:50 – 18:00

- **A. Alferenok, U. Lüdtkke**

Numerical Simulation and Magnet System Optimization for the Lorentz Force Velocimetry (LFV) of Low-Conducting Fluids

- **M. Kirpo, T. Boeck, A. Thess**

Eddy Current Interaction of a Magnetic Dipole with a Translating Solid Bar

- **U. Lüdtkke, A. Kelm, B. Halbedel, U. Krieger**

Numerical Simulation of Lorentz Force Enhanced Flow Patterns within Glass Melts

- **M. Werner, B. Halbedel, E. Rädlein**

Numerical Study of Magnet Systems for Lorentz Force Velocimetry in Electrically Low Conducting Fluids

20:00 – 23:00 Colloquium dinner
24 Kugu Str., *Radison Blu Daugava* Hotel, ground floor, room “Talavera”

September 17

University of Latvia, 19 Raina Blvd., 3rd floor

Session “Metallurgical Applications”

Chairman: **Prof. E. Baake**

10:00 – 11:10

- **K. Timmel, X. Miao, D. Lucas, S. Eckert, G. Gerbeth**
Experimental and Numerical Modelling of the Steel Flow in a Continuous Casting Mould under the Influence of a Transverse DC Magnetic Field
- **S. Spitans, A. Jakovics, E. Baake, B. Nacke**
Numerical Modelling of Free Surface Dynamics of Melt in Induction Crucible Furnace (ICF)
- **E. Baake, A. Jakovics, S. Pavlovs, M. Kirpo**
Numerical Analysis of Turbulent Flow and Temperature Field in Induction Channel Furnace with Various Channel Design
- **M. Ščepanskis, A. Jakovičs, B. Nacke**
Homogenization of Alloying Particles in Induction Crucible Furnaces

11:10 – 11:40 Coffee break

Session “Technology Development”

Chairman: **Prof. Y. Fautrelle**

11:40 – 12:50

- **R. Ž. Milenković, S. Dementjevs, M. Wohlmuther**
Recent Computations and Experiments for Water-Cooled Rod Bundle Targets Development at PSI
- **I. Kaldre, Y. Fautrelle, J. Etay, A. Bojarevics, L. Buligins**
Investigation of Liquid Phase Motion Generated by the Thermoelectric Current and Magnetic Field Interaction
- **V. Geza, R. Milenkovic, S. Dementjev, R. Kapulla, A. Jakovics**
PIV Validation of Numerical Models for Turbulent Flows in a Water Test Section for Liquid Metal Target

- **Barina, M. Purmalis, J. Valdmanis, M. Zake**

Electric Field Effects on the Combustion Characteristics of Renewable Fuel

12:50 – 14:00 Lunch

Session “Rotating Magnetic Field”

Chairman: **Dr. G. Gerbeth**

14:00 – 15:10

- **I. Grants, G. Gerbeth**

Suppression of Temperature Fluctuations by Rotating Magnetic Field in a Large Scale Rayleigh-Bénard Cell

- **J. Barglik, D. Dołęga, A. Smagór**

Coupled Temperature-Electromagnetic – Flow Fields in Electromagnetic Stirrer with Rotating Magnetic Field

- **B. Mikhailovich**

Rotational MHD Flow under Crossed Electrical and Magnetic Fields

- **A. Bojarevičs, T. Beinerts**

Experiments on Liquid Metal Flow Induced by Rotating Magnetic Dipole Moment

15:10 – 15:30 Coffee break

Session “Multiphase Processes”

Chairman: **Dr. J. Virbulis**

15:30 – 16:40

- **S. Johansson, V. Geza, L.G. Westerberg, A. Jakovics**

Characteristics of Flow and Temperature Distribution in a Ruthner Process

- **A. L. Ljung, V. Frishfelds, T. S. Lundström, B. D. Marjavaara**

Heat Transport in Drying of Iron Ore Pellets in a Two-Dimensional Bed

- **T. Sile, J. Virbulis, A. Timuhins, J. Sennikovs, U. Bethers**

Modelling of Cavitation and Bubble Growth during Ultrasonic Cleaning Process

- **D. Goško, S. Lācis**

Magnetorheological Suspension Composed of Fiber Particles: Numerical Simulation of Anisotropic Behavior

16:40 – 17:00

- **Prime Poster Award and Closing of Colloquium**

18:00 – 20:00 Guided sightseeing in Old Riga
Gathering on the ground floor of University of Latvia, 19 Raina Blvd.

Useful information

Reference address and telephone numbers

Laboratory for Mathematical Modelling of Environmental and Technological Processes (LMMETP)
University of Latvia
8 Zellu Str., LV-1002 Riga, Latvia
Tel./Fax.: +371–7 033 780/81, mob.: 28369272; E-Mail: inese@modlab.lv
<http://www.modlab.lv/mmp2010>

Colloquium language

English will be the official language of the Colloquium.

Proceedings

The full text of all the papers (oral and poster) will be published in the Colloquium Proceedings and issued to delegates when they register at the Registration Desk. Extra copies can be bought at the Registration Desk or ordered by the LMMETP at the price of 15,00 EUR (10,00 LVL).

Selected papers after colloquium will be published in the scientific journal (ISCI) „Magnetohydrodynamics”.

Registration

Registration of participants will take place on Wednesday September 15 at 19 Raina Blvd., main building of University of Latvia between 18:00 and 19:45, at the entrance-hall. Late registration can be done at 19 Raina Blvd. on Thursday, September 16 between 8:30 and 9:00, on the 3rd floor.

Welcome reception

All participants and accompanying persons are invited to a welcome cocktail party on Wednesday, September 15th between 20:00 and 22:00. The party will take place at Natural History Museum of Latvia, 4 Kr. Barona Str., 2nd floor (in 5 minutes walk from the main building of University)

Lunch

Lunch for registered participants will be served in the restaurant “Amica”, 19 Raina Blvd., in basement.

Dinner

The dinner (included in conference fee) will take place at the *Radison Blu Daugava* Hotel, ground floor, 24 Kugu Str., on Thursday, September 16, starting at 20:00. Price for accompanying persons – 50,00 EUR (35,00 LVL).

Transport from the Airport

The Riga Airport is situated in 20 minutes of taxi drive from the city centre. The approximate cost for the taxi is 7,00 LVL (10,00 EUR).

More information about Riga

<http://www.inyourpocket.com/latvia/en/>
<http://www.riga.lv>
<http://www.riga.com>
<http://www.rigatourism.lv>

Guidelines for presentation

Oral presentations

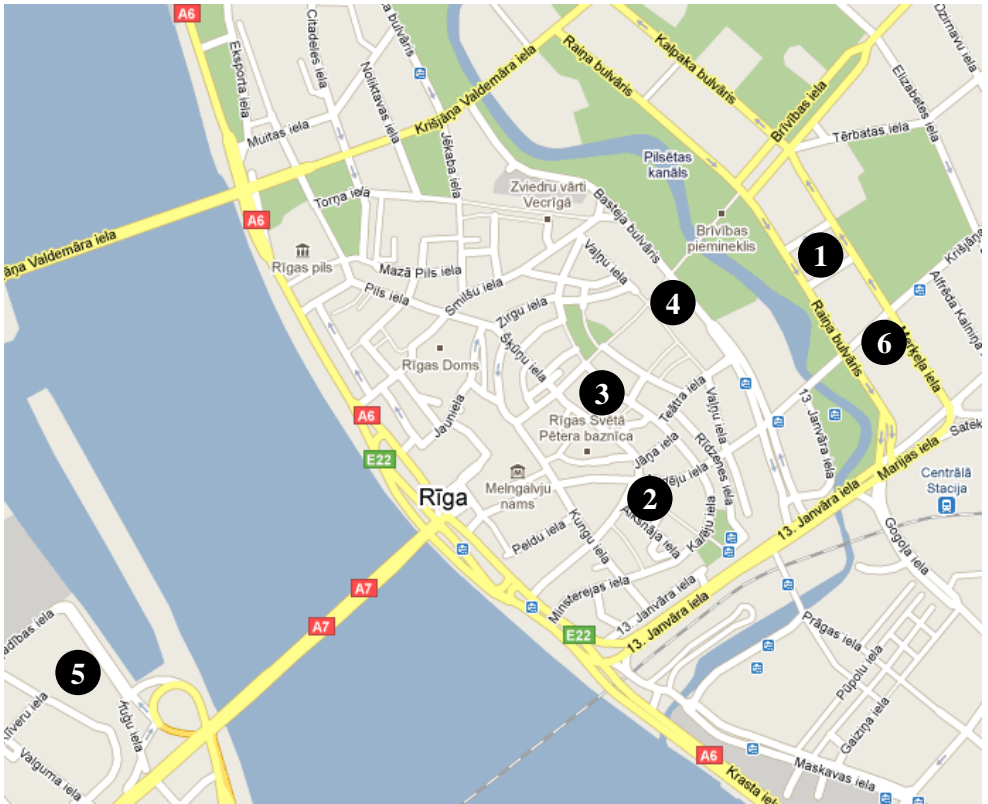
Time allotted for each presentation including discussion is 18 minutes; 45 minutes will be allowed for invited paper.

The projector (PowerPoint) and PC will be available for oral presentations.

Poster presentations

Posters will be exhibited on stands in a conference room. You are kindly asked to attach posters during the first coffee break on September 16. The space of 0.9 m (horizontally) by 1.2 m (vertically) will be provided for each poster. Adhesive tapes will be provided. The poster should be readable at the distance of about two metres. Contact the Secretariat in advance if special equipment is required.

Poster session (authors in attendance time) is scheduled on September 16 from 13:30 till 15:00. The best poster will be awarded.



- 1** University of Latvia (*19 Raina Blvd.*)
- 2** Hotel "Radi un Draugi" (*1/3 Marstalu Str.*)
- 3** Hotel "Konventa Sēta" (*9/11 Kaleju Str.*)
- 4** Hotel "De Rome" (*28 Kalku Str.*)
- 5** Radisson Blu Daugava Hotel (*24 Kugu Str.*)
- 6** Natural History Museum of Latvia (*4 Kr. Barona Str.*)