

## Measurement Techniques for Steady and Transient Multiphase Flows

### Wednesday, September 18, 2002

10:00	<b>F. Pobell</b> (FZR, Scientific Director)	Welcome
10:05	<b>F. P. Weiss</b> (FZR, Institute of Safety Research, Director)	Welcome and short introduction to the Institute of Safety Research
10:20	<b>H.-M. Prasser</b> (FZR)	Opening, technical remarks
	<b>Bubbly Flow</b>	
10:30	<b>Akio Tomiyama</b> (Kobe University, Japan)	Motion of single bubble in stagnant liquids and simple shear flows ( <b>Invited keynote lecture</b> )
11:30	<b>COFFEE BREAK</b>	
12:00	<b>D. Lucas</b> (FZR)	Transient flowmaps for vertical pipe flow
12:30	<b>S. Luther, J. Rensen, D. Lohse</b> (University of Twente, Netherlands)	Time series analysis of turbulent bubbly flow
13:00	<b>LUNCH</b>	
	<b>Local Measurements</b>	
14:00	<b>Hein Auracher, W. Marquardt</b> (TU Berlin, Germany, Institute for Energy Technology)	Micro-sensors for boiling heat transfer studies ( <b>Invited keynote lecture</b> )
15:00	<b>R. Belt</b> (TU Delft, Netherlands)	Liquid film thickness measurements based on electrical conductivity
	<b>Optical Methods</b>	
15:30	<b>D. Bröder, M. Sommerfeld</b> (Martin-Luther-Universität Halle, Germany)	An optical method for studies on bubble behaviour in turbulent flows
16:00	<b>A. Grahn</b> (FZR)	Flow instabilities at liquid-liquid interfaces – experimental validation of direct numerical simulations using synthetic shadowgrams
16:30	<b>END / Transfer to the hotel / guided walk through the city of Dresden</b>	

### Thursday, September 19, 2002

	<b>Radiation Tomography</b>	
9:30	<b>Masaki Misawa, I. Tiseanu, N. Ichikawa, M. Akai</b> (AIST, Tsukuba, Japan)	Ultra-fast X-ray tomography for multi-phase flow interface dynamic studies ( <b>Invited keynote lecture</b> )
10:30	<b>H.-M. Prasser, D. Baldauf, J. Fietz, U. Hampel, D. Hoppe, C. Zippe, J. Zschau</b> (FZR), <b>M. Christen, G. Will</b> (TU Dresden)	Gamma-tomography of the gas fraction distribution inside an axial pump delivering two-phase mixture
11:00	<b>COFFEE BREAK</b>	
	<b>Industrial problems</b>	
11:30	<b>A. Dudlik, S.B.H. Schönfeld, O. Hagemann</b> (Fraunhofer UMSICHT Oberhausen, Germany), <b>H. Fahlenkamp</b> (Uni Dortmund)	Water Hammer and Cavitation Hammer in Process Plant Pipe Systems
12:00	<b>Drobkov V.P., Melnikov V.I., Shtoppel L.K.</b> (TU Nizhny Novgorod, Russia)	About measurement of debit liquid and gas factions oil-water-gas flow by acoustic sensors
12:30	<b>T. Gocht, A. Traichel, R. Hampel</b> (University of Applied Sciences Zittau/Görlitz), <b>H.-M. Prasser</b> (FZR)	Innovative methods for level measurement in pressure vessels

13:00 **LUNCH**

**Wire-Mesh Sensors**

14:00 **W. Wangjiraniran, Y. Motegi, S. Richter, H. Kikura, M. Aritomi** (Tokyo Institute of Technology, Japan) Intrusive Effect on Gas Liquid flow Measurement by Wire Mesh Tomography

14:30 **V.I. Melnikov, V.N. Khokhlov, V.V. Ivanov, V.V. Kontelev, V.R. Zoi, A.A. Savinov** (TU Nizhny Novgorod, Russia) First experiments visualization two-phase high pressure and temperature flows by ultrasonic mesh sensor

**Large-scale Experiments**

15:00 **A. Schaffrath, H. Carl, A.-K. Krüssenberg, H.-M. Prasser, F.-P. Weiss** (FZR) TOPFLOW - a new multipurpose test facility for the study of transient two-phase phenomena

15:30 **Visit of laboratories**

1. TOPFLOW - thermofluiddynamic test facility, 4 MW heating power, 7 MPa max. pressure, two-phase flow in vertical pipes  $\varnothing$  50 and  $\varnothing$  200
2. ROCOM - mixing test facility for Pressurized Water Reactors
3. MTLoop - visualisation of two-phase flow with wire-mesh sensors

18:30 **END**

19:00 **DINNER** Luisenhof - the balcony of Dresden  
Concert of the Rossendorfer Kammermusik

22:00 Transfer to the hotel

**Friday, September 20, 2002**

**Wire-Mesh Sensors (2)**

9:30 **H.-M. Prasser** (FZR), **M. Misawa** (AIST Tsukuba, Japan) Comparison between wire-mesh sensor and fast X-ray tomograph applied to an air-water flow in a vertical pipe

**Local Measurements (2)**

10:00 **J. Rensen, S. Guet and S. Luther** (University of Twente, Netherlands) Bubble aspect ratio estimate using an optical probe

**Industrial problems (2)**

10:30 **S. Alt** (University of Applied Sciences Zittau/Görlitz) Measuring of dynamic heat and mass transfer within accumulators for PWR's

11:00 **COFFEE BREAK**

11:30 **V. Drobkov** (TU Nizhny Novgorod, Russia) Determination of phase volume flow rates based on measurement of local parameters of upstream gas/liquid mixture

**Condensation**

12:00 **M. Goldbrunner, J. Karl, D. Hein** (TU Munich, Germany) Concentration and temperature measurements by means of Raman spectroscopy in case of condensation with non condensable gas

12:30 **H.-M. Prasser, A. Böttger, J. Zschau** (FZR), **T. Gocht** (University of Applied Sciences Zittau/Görlitz) Needle shaped conductivity probes with integrated micro-thermocouple and their application in rapid condensation experiments with non-condensable gases

13:00 **CONCLUSION**

**LUNCH**