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<http://www.liiscience.org>

<http://www.vbt.uni-karlsruhe.de/specialtopic/2ndLIWS2006/Internetauftritt1.htm>

http://liiscience.org/05_workshop_home

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Organizers

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Per-Erik Bengtsson (Lund Institute of Technology, Lund)

Klaus-Peter Geigle (DLR, Stuttgart)

Boris Kock (IVG, Universität Duisburg-Essen)

Fengshan Liu (NRC Canada, Ottawa)

Hope Michelsen (Sandia National Laboratories, Livermore)

Christof Schulz (IVG, Universität Duisburg-Essen)

Greg Smallwood (NRC Canada, Ottawa)

Stefan Will (TT, Universität Bremen)

Giorgio Zizak (CNR-ENI, Milano)

Co-organized with

CRC 606 „Non-stationary Combustion“

Location

Haus der Kirche - Evangelische Akademie Baden

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Registration

Registration is possible during the get together on Wednesday (17:00, Haus der Kirche, see below) and on Thursday morning at 8:00 to 10:00.

Welcome get-together

On Wednesday, August 2 an informal get together will be offered in Haus der Kirche starting with the dinner from 17:30.

Conference dinner

The conference dinner will be held on Thursday night at Schloss Eberstein. The bus will leave at Haus der Kirche at 19:00. After the dinner bus transfer to the Haus der Kirche will be provided.



Exhibition

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Sponsors

We acknowledge the financial support of:



Program

Wednesday, Aug. 2: Conference

17:30 **Informal get together**

Thursday, Aug. 3: Conference and Workshop (Part I)

8:30 **Welcome**

Modeling

8:50 **Theoretical considerations in modeling LII at low pressures**

F. Liu, K. J. Daun, G. J. Smallwood

National Research Council of Canada, Ottawa, Canada

9:10 **Inverse analysis of time-resolved LII data**

K. J. Daun¹, F. Liu¹, G. J. Smallwood¹, B. J. Stagg², and D. R. Snelling¹

¹National Research Council of Canada, Ottawa, ON, Canada

²Columbian Chemicals Company, Marietta, GA, USA

9:30 **Heat conduction from spherical nano-particles**

F. Liu, K. J. Daun, G. J. Smallwood, and D. R. Snelling

National Research Council of Canada, Ottawa, Canada

Special LII Techniques and Combined Techniques

9:50 **Absorption correction of two-color LII-signals**

F. Migliorini, S. De Iuliis, F. Cignoli, G. Zizak

CNR-IENI, Istituto per l'Energetica e le Interfasi, Milano, Italy

10:10 **Coffee break**

10:40 **Longer laser pulses for practical LII**

J. D. Black

Strategic Research Centre, Rolls-Royce plc, Derby, UK

11:00 **TR-LII and PMS particle sizing applied to soot particles synthesized in a low-pressure flame reactor**

B. Tribalet, B.F. Kock, P. Ifecho, P. Roth, C. Schulz

IVG, Universität Duisburg-Essen, Germany

11:20 **Time-resolved LII in comparison with mass-spectrometry measurements in a premixed ethylene/air flame**

R. Stirn, K.P. Geigle, W. Meier, T. Gonzalez-Baquet, H.H. Grotheer, M. Aigner

Institute of Combustion Technology, German Aerospace Center (DLR), Stuttgart

11:40 **Temperature measurements for LII evaluation in non-premixed flames – comparison between emission spectroscopy and CARS**
M. Wendler, G. Guevara, M.C. Weikl, R. Sommer, F. Beyrau, T. Seeger and A. Leipertz
Lehrstuhl für Technische Thermodynamik, Universität Erlangen-Nürnberg, Germany

12:00 **Lunch**

Pressure Effects

13:10 **Pressure effects on LII signals**
A. Boiarciuc¹, F. Foucher¹, C. Mounaïm-Rousselle
Laboratoire de Mécanique et d’Énergétique, University of Orléans, France

13:30 **Effect of pressure on thermal accommodation coefficient**
B.J. Stagg
Columbian Chemicals Company Marietta, GA, USA

Applications

13:50 **Laser induced incandescence for measuring soot particle emission from aero-gas turbines**
J. Delhay¹, P. Desgroux¹, E. Therssen¹, John Black²
¹PC2A, UMR-CNRS 8522, Université des Sciences et Technologies de Lille, Villeneuve D’ascq, France
² Strategic Research Centre, Rolls Royce plc, Derby, UK

14:10 **Two-color time-resolved LII study of iron oxide nanoparticle formation in a premixed flat low pressure flame**
H. Dörr, H. Bockhorn and R. Suntz
Institute for Chemical Technology and Polymer Chemistry, University of Karlsruhe (TH), Germany

Poster Session (with Coffee break)

14:30 **Poster Session**

P01 **In-cylinder particulate sizing with combined TR-LII/2C pyrometry**
B. Bougie^{1,2}, L.C. Ganippa^{1,3}, A.P. van Vliet¹, W.L. Meerts¹, N.J. Dam¹, J.J. ter Meulen¹

¹Applied Molecular Physics, Institute for Molecules and Materials, Radboud University Nijmegen, The Netherlands

²Current address: Multi-Scale Physics Delft University of Technology, Delft, The Netherlands

³Current address: School of Engineering and Design, Brunel University, London, UK

P02 **Pressure effect on the determination of particle-size distributions in a sooting methane diffusion flame**
M. Charwath, R. Suntz, H. Bockhorn
Institute for Chemical Technology and Polymer Chemistry, University of Karlsruhe (TH), Germany

- P03** **Measuring accommodation coefficients using laser-induced incandescence**
K. J. Daun, G. J. Smallwood, F. Liu, and D. R. Snelling
 National Research Council of Canada, Ottawa, Canada
- P04** **Comparison of TR-LII sizing for pure carbon and hydrogen-containing carbon particles**
A. Eremin¹, M. Falchenko¹, E. Gurentsov¹, B. Kock², R. Starke², C. Schulz²
¹Institute for High Energy Density RAS, Moscow, Russia
²IVG, Universität Duisburg-Essen, Duisburg, Germany
- P05** **LII in a high vacuum and up date and LII in carbon black from a particle generator**
V. Beyer¹ and D. A. Greenhalgh¹, D. Clavel², K. Daun², F. Liu², B. Sawchuck², G. Smallwood², D. Snelling² and K. Thomson²
¹School of Engineering Cranfield University
²National Research Council of Canada, Ottawa, Canada
- P06** **Particle size measurements with two color TIRE-LII**
R. Hedef¹, R. Stirn², KP. Geigle², M. Aigner²
¹Institut de Génie Mécanique, Université Larbi Ben M'Hidi, Oum El Bouaghi, Algérie
²Institut für Verbrennungstechnik, DLR, Stuttgart, Germany
- P07** **A web-based interface for modeling laser-induced incandescence (LIISim)**
M. Hofmann, B.F. Kock, C. Schulz
 IVG, Universität Duisburg-Essen, Duisburg, Germany
- P08** **Prompt heat transfer in near-sublimation regime LII**
F. Liu, K. J. Daun, G. J. Smallwood, and D. R. Snelling
 National Research Council of Canada, Ottawa, Canada
- P09** **Effects of soot absorption and scattering on LII intensities in a laminar coflow ethylene/air diffusion flame**
F. Liu, K. A. Thomson, G. J. Smallwood
 Institute for Chemical Process and Environmental Technology, National Research Council, Canada
- P10** **Time-resolved laser-induced incandescence (TIRE-LII) coupled with spectral emission measurements for particle sizing in high-pressure diesel combustion environments**
R. Ryser, T. Gerber, T. Dreier
 Paul Scherrer Institute, Department of General Energy, Reaction Analysis Group, Villigen PSI, Switzerland
- P11** **Design optimization for high sensitivity two-color LII**
G. J. Smallwood
 Institute for Chemical Process and Environmental Technology, National Research Council, Canada
- P12** **Absolute Intensity calibration of LII detectors**
K. A. Thomson, D. R. Snelling, G. J. Smallwood
 Institute for Chemical Process and Environmental Technology, National Research Council, Canada
- 18:15** **End of Poster Session**

19:00 Bus transfer to Conference Dinner at Schloss Eberstein (return ~ 23:00)

Friday, Aug. 4: Workshop

8:30 Modeling of the LII-process

Boris Kock, IVG, Universität Duisburg-Essen, Germany

Fengshan Liu, National Research Council, Canada

Hope Michelsen, CRF, Sandia National Laboratories, Livermore, CA, US

Comparison of different models (reference flames) – particle heating and cooling mechanisms – temperature dependence of heat capacity – different Knudsen regimes – influence of particles size distribution and agglomeration on LII – consideration of radial and temporal distribution of the laser beam – influence of pressure and ambient gas temperature – material properties

10:30 Coffee break

11:00 Experimental

Klaus-Peter Geigle, VT, DLR Stuttgart, Germany

Greg Smallwood, National Research Council, Canada

Excitation wavelength – radial and temporal energy distribution – devices for homogenisation of laser fluence – one- or two-dimensional detection – detection systems – detection wavelength – potential interferences – detection at high-pressure and/or low ambient gas temperatures (detectors response function, (de)convolution of the signal) – influence of laser fluence (particle morphology, aggregate structure) – two color techniques – mass spectrometry: fragments evaporating from the particle surface – Pump and probe experiments – estimation of accommodation coefficient from shock-tube experiments – photolytically generated soot particles by decomposition of C_3O_2 – LII at high temporal resolution – single particle LII

12:00 Lunch

13:10 Experimental (continuation)

14:10 Signal evaluation

Thomas Dreier, CRL, Paul Scherrer Institut, Switzerland

Giorgio Zizak, CNR-IENI, Italy

Determination of particle size distribution (fitting of measured curves or Fredholm equation) – influence of particle shape (primary particles and agglomerates) – calibration

15:10 Coffee break

15:40 Signal evaluation (continuation)

16:40 **LII of non-soot particles**

Per-Erik Bengtsson, LIT-CP, Sweden

Stefan Will TT, Universität Bremen, Germany

Particles accessible for LII – evaporation temperature – particle constants (absorption coefficients, accommodation coefficients, etc.) – limitations – modification of the model – additional physical effects

18:00 **Summary and conclusions of the workshop, hot topics and location of the next workshop**

19:00 **Dinner**

Poster Session (continuation)

20:15 **Poster Session**