

The 4th International Conference on
HEAT TRANSFER and FLUID FLOW
in MICROSCALE

HTFFM-IV

September 4-9, 2011, Fukuoka, Japan

PROGRAM

Co-sponsored by

Heat Transfer Society of Japan

Engineering Conferences International

International Center for Heat and Mass Transfer

International Research Center for Hydrogen Energy, Kyushu University

International Institute for Carbon-Neutral Energy Research, Kyushu University

Japan Society for the Promotion of Science

General Information

Floor Plan of the Meeting Area

All the technical sessions will be held in the NAVIS ballroom on the first floor of Hilton Fukuoka Sea Hawk from September 4 to 9, 2011.

Registration

Registration desk will open at 15:30 on Sunday evening, September 4, 2011, at the First-floor Lobby of Hilton Fukuoka Sea Hawk. From Monday to Friday, Registration will be located in front of the session room, NAVIS, on the first floor. On-site registration is available only by cash of Japanese Yen. Attendee preferring credit-card payment has to pay the registration fee via Conference website. If the Bank transfer is the only way for you, contact to info@htffm-iv.org right now.

Welcome Reception

On Sunday evening, September 4, 2011, all attendees are invited to the Welcome Reception, which will be held at 17:30 to 19:30 at the NAVIS ballroom on the first floor of Hilton Fukuoka Sea Hawk.

Lunch and Banquet

Monday, September 5 through Thursday, September 8, a buffet style Conference lunch will be served on the same floor of the technical session. The Conference banquet will be on the 5th floor at 18:00 to 20:00 on Thursday, September 8, 2011. Dinner will be served as a buffet, with seating provided. All the registered attendees are invited to the Conference banquet and lunch. Tickets for accompanying persons are available on the registration desk.

Oral Presentation and Audio-Visual Aids

All the presentations except the Keynote Lectures are allocated for 20 minutes including discussion. Session room will have a full-color liquid crystal projector equipped with a connection cable with D-sub mini 15-pin male connector for RGB-video input from your laptop computers. Also a Windows PC with MS Power Point and Adobe Acrobat Reader will be available for your presentation by pre-installing your presentation via USB flash memory or CD-ROM. Speakers are strongly recommended to check your laptop and/or software compatibility before your session.

Poster Presentation

Each poster will be assigned a booth equipped with 90 cm width x 180cm height board with thumb tacks. It is recommended that posters be printed on a single sheets (e.g. A0-size with the shorter side at the top), but the final decision regarding the poster size is left to the authors. Each poster station

will have an identification number of your paper. Because the poster session will be held in the same room as the lunch, mount your poster during the coffee-break in the morning of September 6. It is the author's responsibility to remove all the posters and clean the area before the end of the poster-session day.

Best Poster Award is planned to be given to a few distinguished posters and the winner will be announced in the Conference Banquet.

Organizing Committee

Conference Chair:

Yasuyuki Takata, Kyushu University, Japan

Conference Co-Chairs:

Kenneth S. Breuer, Brown University, USA

Gian Piero Celata, ENEA Casaccia, Italy

Nobuhide Kasagi, The University of Tokyo, Japan

Masahiro Kawaji, The City College of New York, USA

John R. Thome, École Polytechnique Fédérale de Lausanne (EPFL), Switzerland

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Tassos G. Karayiannis, Brunel University, UK

Moohwan Kim, Pohang University of Science and Technology, Korea

Joon Sik Lee, Seoul National University, Korea

Kaichiro Mishima, INSS Inc., Japan

Gian Luca Morini, University of Bologna, Italy

Björn Palm, Royal Institute of Technology, Sweden

Deborah Pence, Oregon State University, USA

Khellil Sefiane, University of Edinburgh, UK

Naoki Shikazono, The University of Tokyo, Japan

Peter Stephan, Darmstadt University of Technology, Germany

Yoshio Utaka, Yokohama National University, Japan

Xing Zhang, Tsinghua University, China

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Koji Miyazaki, Kyushu Institute of Technology, Japan

Yoshinori Hamamoto, Kyushu University, Japan

Naoya Sakoda, Kyushu University, Japan

Technical Program

Monday, September 5, 2011

Opening Remarks

9:00-9:20, Monday, September 5

Conference Chair: *Yasuyuki Takaka* (Kyushu University, Japan)

President of Heat Transfer Society of Japan & Conference Co-Chair: *Nobuhide Kasagi* (The University of Tokyo, Japan)

Keynote Session 1

Chair: **Peter Stephan**

9:20-10:10, Monday, September 5

HTFFM-IV-KN1

Opportunities and challenges associated with the use of nanofluids
Khellil Sefiane (University of Edinburgh, UK)

Session 1-1 Boiling and Evaporation -1

Chair: **Peter Stephan**

10:10-10:50, Monday, September 5

HTFFM-IV-013

Effects of micro/nano-scale surface characteristics on the Leidenfrost point temperature of water

Hyungdae Kim (Kyung Hee University, Republic of Korea), *Bao Truong, Jacopo Buongiorno, Lin-Wen Hu* (Massachusetts Institute of Technology, USA)

HTFFM-IV-087

Transient growth process of precursor film at early stage of droplet spreading
Shota Hashimoto, Ichiro Ueno (Tokyo University of Science, Japan)

Session 1-2 Measurement Technique

Chair: **Kenneth S. Breuer**

11:10-12:30, Monday, September 5

HTFFM-IV-073

The flow characteristics of an evaporating ethanol water mixture droplet on a glass substrate

Yoshinori Hamamoto (Kyushu University, Japan), *John R.E. Christy, Khellil Sefiane* (The University of Edinburgh, United Kingdom)

HTFFM-IV-144

Experimental study on heat transfer to boiling bubble from superheated liquid layer

Tomohide Yabuki, Takuya Hamaguchi, Takayuki Kobayashi, Osamu Nakabeppu (Meiji University, Japan)

HTFFM-IV-145

Development of an infrared-based visualization technique to study phase dynamics on boiling surfaces

Hyungdae Kim (Kyung Hee University, Republic of Korea), *Jacopo Buongiorno* (Massachusetts Institute of Technology, USA)

HTFFM-IV-058

Temperature imaging of aqueous solution in microchannel using near-infrared absorbance characteristics of water

Naoto Kakuta, Yuko Fukuhara (Kyushu University, Japan), *Katsuya Kondo* (Tottori University, Japan), *Hidenobu Arimoto* (AIST, Japan), *Yukio Yamada* (The University of Electro-Communications, Japan)

Keynote Session 2

Chair: Khellil Sefiane

14:00-14:50, Monday, September 5

HTFFM-IV-KN2

Visualization and numerical simulation on subcooled pool boiling

Tomoaki Kunugi, Yasuo Ose, Zensaku Kawara (Kyoto University, Japan)

Session 1-3 Boiling and Evaporation -2

Chair: Khellil Sefiane

14:50-15:30, Monday, September 5

HTFFM-IV-150

Study on boiling heat transfer of mini-heat transfer surfaces

Yasuo Koizumi, Yoshiki Morita (Shinshu University, Japan)

HTFFM-IV-035

Application of butanol aqueous solution to boiling with impinging flow in mini channel

Koichi Obara, Tomohiro Ueno, Yasuhiro Nomura, Naoki Ono (Shibaura Institute of Technology, Japan)

Session 1-4 Numerical Simulation -1

Chair: Mohammad Hassan Rahimian

15:50-17:10, Monday, September 5

HTFFM-IV-086

Hybrid numerical approaches for modeling drop ejection, impact and coffee ring formation

Moussa Tembely (CNRS, France), *Anne-Gaëlle Mercier, Christine Nayoze* (LCPem, France), *Arthur Soucemarianadin* (CNRS, France)

HTFFM-IV-027

Entropy generation analysis of the channel sizing effect on the X-shaped micro-channels

Shu-Min Tu, Shuichi Torii (Kumamoto University, Japan), *Yang-Cheng Shih* (National Taipei University of Technology, Taiwan)

HTFFM-IV-043

Pore-scale numerical simulation of two phase flow of Newtonian and viscoelastic fluids

Johana Pinilla, Charles-Henri Bruneau (IMB Université Bordeaux 1 and INRIA MC² Team, France)

HTFFM-IV-020

Mixed convective slip flows in a vertical parallel plate microchannel

Hamid Niazmand, Behnam Rahimi (Ferdowsi University of Mashhad, Iran)

Tuesday, September 6, 2011

Keynote Session 3

Chair: Gian Luca Morini

9:00-9:50, Tuesday, September 6

HTFFM-IV-KN3

Characteristics of evaporative heat transfer in the vicinity of a 3-phase contact line

Peter Stephan (Darmstadt University of Technology, Germany)

Session 2-1 Single Phase Flow - 1

Chair: Gian Luca Morini

9:50-10:50, Tuesday, September 6

HTFFM-IV -066

Numerical and experimental investigations of the hydraulic and thermal performance of rough micro channels

Katharina Jasch, Stephan Scholl (Technische Universität Braunschweig, Germany)

HTFFM-IV -037

A new prediction method based on one-dimensional theory for compressible fluid flow in micro-tubes

Shintaro Murakami (Maizuru National College of Technology, Japan), *Yutaka Asako* (Tokyo Metropolitan University, Japan)

HTFFM-IV -097

Diffusion and mixing phenomena in micro-channel analyzed by the luminol chemiluminescence

Kaoru Yoshida, Ryosuke Matsumoto (Kansai University, Japan)

Session 2-2 Fuel Cell and Combustion

Chair: Masahiro Kawaji

11:10-12:30, Tuesday, September 6

HTFFM-IV -071

Breakthrough pressure in gas diffusion layer w/wo microporous layer using X-ray tomography

Jongrok Kim, Junho Je, Seungwoo Doh (Pohang University of Science and Technology, Korea), *TaeJoo Kim* (The Korea Atomic Energy Research Institute, Korea), *Massoud Kaviani* (University of Michigan, USA), *Sang Young Son* (University of Cincinnati, USA), *Moo Hwan Kim* (Pohang University of Science and Technology, Korea)

HTFFM-IV -131

Solid oxide fuel cells with an anode including proton conductors

Kohei Masuda, Manabu Ihara, Katsunori Hanamura (Tokyo Institute of Technology, Japan)

HTFFM-IV -111

Influence of wall temperature on surface reaction in ultra-micro combustor using hydrogen-air premixed mixture

Naoki Hayashi, Toshiki Imai, Hiroshi Yamashita (Nagoya University, Japan)

HTFFM-IV -113

Fluid simulation of diesel exhaust gas with particle deposition

Kazuhiro Yamamoto, Shinya Ohori (Nagoya University, Japan)

Poster Session

Chair: Yasunobu Fujita and Tohru Fukano

14:00-15:30, Tuesday, September 6

HTFFM-IV -018

On cooling effectiveness of Al₂O₃/water nanofluid in a minichannel heat sink

C.J. Ho, W.C. Chen (National Cheng Kung University, Taiwan)

HTFFM-IV -024

Interphase heat transfer during bulk condensation at flow of vapor-gas mixtures
N.M. Kortsenshteyn (Krzhizhanovsky Power Engineering Institute, Russia), *A.K. Yastrebov* (Moscow Power Engineering Institute, Russia)

HTFFM-IV -052

Experimental study on micropump using rotational motion of magnetic material balls
Hiroshige Kumamaru, Fuma Sakata, Yoshio Nomura, Kazuhiro Itoh, Yuji Shimogonya (University of Hyogo, Japan)

HTFFM-IV -055

Experimental study on measurement of energy accommodation coefficient by low-pressure method
H. Yamaguchi, K. Kanazawa, Y. Matsuda, T. Niimi (Nagoya University, Japan)

HTFFM-IV -057

Non-invasive velocity measurement of microchannel flow by Raman scattering imaging
Motoyuki Takahashi, Takahiro Takamatsu, Yohei Sato (Keio University, Japan)

HTFFM-IV -063

Study on dynamics of liquid slug and instability of a liquid film in a microchannel
Yuichi Shibata, Taiga Takamine, Osamu Okamoto (Ibaraki National College of Technology, Japan), *Masahiro Kawaji* (City College of City University of New York, USA)

HTFFM-IV -064

Characteristics of a thin liquid layer formed by a confined vapor bubble in a mini-gap between two parallel plates
Yaohua Zhang, Yoshio Utaka (Yokohama National University, Japan)

HTFFM-IV -105

Quantum molecular dynamics study on energy transfer to an emitted electron in surface collision process of a particle
Masahiko Shibahara, Takeaki Yokoi (Osaka University, Japan), *Shin-ichi Satake, Jun Taniguchi* (Tokyo University of Science, Japan)

HTFFM-IV -108

Accommodation coefficient investigation in all flow regimes: from hydrodynamic to near free molecular regimes
Mustafa Hadj-Nacer, Irina Graur, Pierre Perrier (Université de Provence- Ecole Polytechnique Universitaire de Marseille, France)

HTFFM-IV -117

Momentum and heat transport in nanoscale lubrication of alkane thin film sheared by self-assembled monolayer surfaces
Gota Kikugawa, Naofumi Yamamoto, Taku Ohara (Tohoku University, Japan)

HTFFM-IV -118

Effect of non-condensable gases on interface resistance in microscopic dropwise condensation
Atsushi Tokunaga (Ube National College of Technology, Japan), *Shota Yamawaki, Gyoko Nagayama, Takaharu Tsuruta* (Kyushu Institute of Technology, Japan)

HTFFM-IV -124

Phenomenological analysis of the friction coefficient in microtubes
Laurie Karim, Laurent Royon, Gerard Guiffant (Denis Diderot University, France)

HTFFM-IV -125

SPH simulation of binary collision between liquid droplets with different physical properties
Yuta Hashimoto, Yasutaka Yamaguchi (Osaka University, Japan), *Koji Kuroda, Tadashi Nakajima, Hideo Fujimura* (Dai Nippon Printing Co., Ltd., Japan)

HTFFM-IV -127

Flow visualization and numerical simulation of T-junction mixing of high-temperature high-pressure water to estimate natural convection

Yoshio Masuda, Osamu Sato, Takafumi Aizawa, Masayuki Shirai, Akira Suzuki (AIST, Japan)

HTFFM-IV -128

Filterless air cleaning with moisture thermal control method

Nagisa Onoda, Shota Ishiguchi, Osamu Nakabeppu (Meiji University, Japan)

HTFFM-IV -146

Experimental and computational analysis of heat conduction of carbon nanotube pellet

Yutaka Yamada, Takashi Nishiyama, Takahiro Yasuhara, Koji Takahashi (Kyushu University, Japan)

HTFFM-IV -147

Molecular dynamics simulation of phonon transport in suspended and supported graphene nanoribbons

Masanari Kimura, Takafumi Matsuzaki, Koji Takahashi (Kyushu University, Japan)

HTFFM-IV -148

Optimization of heat exchanger dimensions of a Joule-Thomson microcooler by simulation of performance

Adhika Widyaparaga, Masashi Kuwamoto, Naoya Sakoda, Hiromi Kubota, Masamichi Kohno, Yasuyuki Takata (Kyushu University, Japan)

HTFFM-IV -149

A micro-beam MEMS sensor for measurement of thermal conductivity of fluids at a steady state

Yuki Tanaka, Toshiyuki Tanaka, Satoru Uchida, Takanobu Fukunaga, Kosaku Kurata, Koji Takahashi, Hiroshi Takamatsu (Kyushu University, Japan)

HTFFM-IV -152

The measurement of hydrogen gas viscosity with a curved vibrating wire method

Elin Yusibani, Peter P. L. Woodfield, Yosuke Nagahama, Kosuke Yoshimura, Kanei Shinzato, Masamichi Kohno, Yasuyuki Takata (Kyushu University, Japan)

HTFFM-IV -153

Effect of roughness on the behavior of small droplet impinging onto a hot surface

Yuki Fukatani, Sinya Fukusa, Sumitomo Hidaka, Makoto Arita, Masamichi Kohno, Yasuyuki Takata (Kyushu University, Japan)

Session 2-3 Numerical Simulation - 2

Chair: Bing-Yang Cao

15:50-17:30, Tuesday, September 6

HTFFM-IV -031

Numerical simulation of the drying of inkjet-printed droplets

D.P. Siregar, J.G.M. Kuerten (Eindhoven University of Technology, Netherlands)

HTFFM-IV -061

Red blood cell deformation in a capillary with a permeable wall simulated by immersed boundary lattice Boltzmann method

Zai-Yi Shen, Ying He (University of Science and Technology of China, China)

HTFFM-IV -137

Numerical simulation of non-Newtonian pseudoplastic fluid in a micro scale channel using lattice Boltzmann method

Hossein Hamedei, Mohammad Hassan Rahimian (University of Tehran, Iran)

HTFFM-IV -091

CFD analysis of two-phase flow through microchannel using homogeneous equilibrium model (HEM)

Ashutosh Kumar (Fluidyn Software and Consultancy Private Limited, India), *Meryll Levet, Claude Souprayen* (FLUIDYN France, France), *Anil Kumar* (Fluidyn Software and Consultancy Private Limited, India), *Liam Worth, Robert Pearce* (ITER Organization, France)

HTFFM-IV -074

The effects of variable properties on momentum and heat transfer of a spherical aerosol particle in slip flow regime

Behzad Mohajer, Vahid Aliakbar, Mehrzad Shams (K.N.Toosi University of Tech., Iran)

Wednesday, September 7, 2011

Keynote Session 4

Chair: Peng Zhang

9:00-9:50, Wednesday, September 7

HTFFM-IV-KN4

Liquid film in micro tube two phase flow systems

Naoki Shikazono (The University of Tokyo, Japan)

Session 3-1 Two Phase Flow

Chair: Peng Zhang

9:50-10:50, Wednesday, September 7

HTFFM-IV -094

Flow patterns and pressure drop of adiabatic gas-liquid two-phase flow in a horizontal flat rectangular microchannel

Hideo Ide, Kentaro Satonaka (Kagoshima University, Japan), *Tohru Fukano* (Kyushu University, Japan)

HTFFM-IV -101

Theoretical study for high heat flux cooling by using phase change heat transfer in a microchannel

Junnosuke Okajima, Atsuki Komiya, Shigenao Maruyama (Tohoku University, Japan)

HTFFM-IV -103

Experimental and numerical investigation of viscous oil-water flow in a microchannel

Hooman Foroughi (University of Toronto, Canada), *M. Hossein Azadfar* (City College of City University of New York, USA), *Masahiro Kawaji*

Session 3-2 Molecular Dynamics

Chair: Masahiko Shibahara

11:10-12:30, Wednesday, September 7

HTFFM-IV -133

Molecular simulation of water adsorbed on mesoporous silica thin films

Kyohei Yamashita, Hirofumi Daiguji (The University of Tokyo, Japan)

HTFFM-IV -033

Molecular understanding of fast water flow through carbon nanotube membranes

Laurent Joly, Kerstin Falk, Lydéric Bocquet (UMR 5586 Université Lyon 1 et CNRS, France)

HTFFM-IV -129

Molecular dynamics analysis on the microscopic properties of single water and water-alcohol droplets at solid-liquid interface

Donatas Surblys, Yasutaka Yamaguchi (Osaka University, Japan), *Koji Kuroda, Tadashi Nakajima, Hideo Fujimura* (Dai Nippon Printing Co., Ltd., Japan)

HTFFM-IV -112

Thermal transport in single walled carbon nanotubes

Wang Xiao-ming, Lu Shu-shen (Sun Yat-sen University, China)

Thursday, September 8, 2011

Keynote Session 5

Chair: Osamu Nakabeppu

9:00-9:50, Thursday, September 8

HTFFM-IV-KN5

Study on the thermal, electrical and thermoelectric properties of nanofilms

Xing Zhang, Weigang Ma (Tsinghua University, China)

Session 4-1 Micro/Nano Devices

Chair: Osamu Nakabeppu

9:50-10:50, Thursday, September 8

HTFFM-IV -132

Estimation of heat dissipation in power MOSFET by electro-thermal analysis

Tomoyuki Hatakeyama, Masaru Ishizuka, Shinji Nakagawa (Toyama Prefectural University, Japan), *Katsuhiko Koizumi* (Cosel. Co., LTD., Japan), *Kazuyoshi Fushinobu* (Tokyo Institute of Technology, Japan)

HTFFM-IV -102

Efficiency of a thermoelectric micro-generator

Akihiro Yamamoto, Jun-ichiro Kurosaki, Yoshihiro Hashimoto, Koji Miyazaki (Kyushu Institute of Technology, Japan)

HTFFM-IV -095

Heat conduction through throat of graphene thermal nozzle studied by molecular dynamics simulation

Bing-Yang Cao, Yuan-Wei Li (Tsinghua University, China)

Keynote Session 6

Chair: Juergen J. Brandner

11:10-12:00, Thursday, September 8

HTFFM-IV-KN6

Contact line dynamics at the nanoscale with and without evaporation

Kenneth S. Breuer (Brown University, USA)

Session 4-2 Micro/Nano Fluidics - 1

Chair: Juergen J. Brandner

12:00-12:40, Thursday, September 8

HTFFM-IV -076

Analysis of a thermal transpiration rarefied gas flow: a circular cross section micro-tube submitted to a temperature gradient along its axis

Marcos Rojas Cardenas, Irina Graur, Pierre Perrier, J. Gilbert Meolans (Université de Provence 'Polytech' Marseille, France)

HTFFM-IV -134

Enhanced energy accommodation of gas molecules on surfaces covered with single-walled carbon nanotubes: molecular beam experiment and Monte Carlo simulation

Ikuya Kinefuchi, Jumpei Kawasaki, Junichiro Shiomi, Shu Takagi, Shigeo Maruyama, Yoichiro Matsumoto (The University of Tokyo, Japan)

I²CNER Lecture

Chair: Yasuyuki Takata

14:00-14:50, Thursday, September 8

Fundamental of carbon nanotubes and their application to fuel cell catalyst

Naotoshi Nakashima (Kyushu University, Japan)

Session 4-3 Heat Transfer Devices

Chair: Ching Jenq Ho

15:10-16:50, Thursday, September 8

HTFFM-IV -008

A new microstructure device for efficient evaporation of liquids

Juergen J. Brandner, Stefan Maikowske, Alice Vittoriosi (Karlsruhe Institute of Technology, Germany)

HTFFM-IV -121

Evaluation of flow characteristics in micro heat pipe manufactured in 3D integration semiconductor chip by high-speed imaging technique

Jun Nakatsuka (The University of Tokyo, Japan), *Mitsuhsa Ichiyanagi* (Sophia University, Japan), *Ikuya Kinefuchi, Hideki Kitada, Youguk Kim* (The University of Tokyo, Japan), *Ryoichi Ohigashi* (Dai Nippon Printing Co., Ltd., Japan), *Takayuki Ohba, Yoichiro Matsumoto* (The University of Tokyo, Japan)

HTFFM-IV -019

Heat transfer performance of a cryogenic heat pipe using nitrogen as working fluid

P. Zhang, Z. Q. Long, R. Z. Wang (Shanghai Jiao Tong University, China)

HTFFM-IV -015

Orientation effect on the convective boiling performance of a microchannel heat sink

Chi-Chuan Wang (National Chiao Tung University, Taiwan), *Wen-Jeng Chang, Chia-Hsing Dai* (Feng Chia University, Taiwan), *Kai-Shing Yang* (Industrial Technology Research Institute, Taiwan)

HTFFM-IV -151

Heat pipe mediated chemical processing in microstructured reactors

Holger Löwe, Raoul D. Axinte, Nadin Ehm (Johannes Gutenberg University, Germany)

Friday, September 9, 2011

Keynote Session 7

Chair: Irina Graur

9:00-9:50, Friday, September 9

HTFFM-IV-KN7

Experimental techniques for the analysis of gaseous microflows

Stephane Colin (University of Toulouse, France)

Session 5-1 Micro/Nano Fluidics - 2

Chair: Irina Graur

9:50-10:50, Friday, September 9

HTFFM-IV -054

Experimental study of near wall electrokinetic transport of particles in microfluidics

Qian Liang, Chun Yang, Jianmin Miao (Nanyang Technological University, Singapore)

HTFFM-IV -088

Particle accumulation by ac electroosmosis in microfluidic device with co-planar electrodes

Akihiko Ishida, Hikaru Toki, Masahiro Motosuke, Shinji Honami (Tokyo University of Science, Japan)

HTFFM-IV -069

Experimental investigations of turbulent gas flow through a micro-tube

Shinichi Matsushita, Chungpyo Hong (Tokyo University of Science, Japan), *Yutaka Asako* (Tokyo Metropolitan University, Japan), *Ichiro Ueno* (Tokyo University of Science, Japan)

Session 5-2 Single Phase Flow - 2

Chair: Stéphane Colin

11:10-12:10, Friday, September 9

HTFFM-IV -023

Compressible gas flow through heated commercial microtubes

Yahui Yang (DIENCA Alma Mater Studiorum Università di Bologna, Italy), *Tom Schakenbos* (Eindhoven University of Technology, Netherlands), *Habib Chalabi, Marco Lorenzini, Gian Luca Morini* (DIENCA Alma Mater Studiorum Università di Bologna, Italy)

HTFFM-IV -068

Heat transfer characteristics of gas flow in micro-tubes with constant wall temperature

Kyohei Isobe, Chungpyo Hong (Tokyo University of Science, Japan), *Yutaka Asako* (Tokyo Metropolitan University, Japan), *Ichiro Ueno* (Tokyo University of Science, Japan)

HTFFM-IV -078

Enhancement of one-side actuating piezoelectric micro-pump using a frequency modulator

H. K. Ma, H. C. Su, J. Y. Wu (National Taiwan University, Taiwan)

Closing Remarks

12:10-12:30, Friday, September 9