



NanoRad 2024

5th International Workshop on Nano-Micro Thermal Radiation

17-19 July, 2024

Hokkaido Univ., Sapporo, Hokkaido, Japan

<https://nanorad2024.org/>

Program Book

Welcome Message

First of all, on behalf of the Organizing Committee, we would like to extend our warmest welcome to all of you to the 5th International Workshop on Nano-Micro Thermal Radiation (NanoRad2024), which will be held from July 17-19, 2024, in Sapporo, Japan. To promote scientific interactions among scientists and engineers working in the area of radiative heat transfer around the world, NanoRad was launched in 2012. Over the past decade, research in radiative heat transfer has been well established, and practical applications have also progressed to contribute to the goal of a carbon-neutral society. We would like to express our thanks to the members of the Executive Committee, International Scientific Committee, and Local Organizing Committee. Without their dedication and efforts, NanoRad would not have continued.

We hope that this NanoRad workshop will be a forum where you can exchange the newest ideas on radiative heat transfer research. More than 100 participants from 12 countries will attend the workshop. There will be 42 oral presentations, including 4 plenary and 15 invited talks, all in a single session. All attendees can share the NanoRad presentations to enhance the discussion on the research. An even more valuable aspect is the friendship among the participants. We hope all the participants in NanoRad2024 will make many friends through this opportunity.

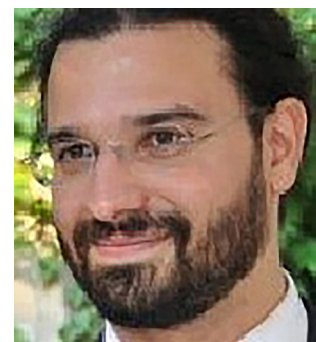
Finally, we hope you enjoy the nature in Hokkaido. The banquet is scheduled for the last day of the workshop on Friday. Hokkaido, the northernmost island of Japan, is renowned for its stunning natural beauty and diverse landscapes. Known for its expansive wilderness, Hokkaido offers a serene escape from the bustling cities. Hokkaido is famous for its breathtaking scenery, including vast forests, tranquil lakes, and towering mountains. The island is home to several national parks, such as Daisetsuzan National Park, which is the largest in Japan. Please take the opportunity to visit other areas in Hokkaido over the weekend.



Koji Miyazaki
Chair



Sheng Shen
Co-chair



Mauro Antezza
Co-chair

Committee Introduction

Conference Chairs

Chair	Conference Co-chairs	
Koji Miyazaki <i>Kyushu University, Japan</i>	Sheng Shen <i>Carnegie Mellon University, USA</i>	Mauro Antezza <i>University of Montpellier, France</i>

International Scientific Committees

Co-Chairs			
Zhuomin Zhang <i>Georgia Institute of Technology, USA</i>	M. Pinar Mengüç <i>Ozyegin University, Turkey</i>	Shigenao Maruyama <i>Tohoku University, Japan</i>	Yimin Xuan <i>Nanjing University of Aeronautics and Astronautics, China</i>
Members			
Philippe Ben-Abdallah <i>Institut d'Optique, France</i>	Svend-Age Biehs <i>Carl von Ossietzky University of Oldenburg, Germany</i>	Pierre-Olivier Chapuis <i>Université de Lyon, France</i>	Gang Chen <i>Massachusetts Institute of Technology, USA</i>
Yu-Bin Chen <i>National Tsing Hua University, Taiwan</i>	Ceji Fu <i>Peking University, China</i>	Mathieu Francoeur <i>McGill University, Canada</i>	Jean-Jacques Greffet <i>Institut d'Optique, France</i>
Katsunori Hanamura <i>Tokyo Institute of Technology, Japan</i>	Zubin Jacob <i>Purdue University, USA</i>	Karl Joulain <i>Université de Poitiers, France</i>	Achim Kittel <i>Carl von Ossietzky University of Oldenburg, Germany</i>
Bong-Jae Lee <i>Korea Advanced Institute of Science and Technology, South Korea</i>	Qiang Li <i>Nanjing University of Science and Technology, China</i>	Lin-Hua Liu <i>Shandong University, China</i>	Yungui Ma <i>Zhejiang University, China</i>
Arvind Narayanaswamy <i>Columbia University, USA</i>	Keunhan Park <i>University of Utah, USA</i>	Pramod Reddy <i>University of Michigan, USA</i>	Yong Shuai <i>Harbin Institute of Technology, China</i>
He-Ping Tan <i>Harbin Institute of Technology, China</i>	Guihua Tang <i>Xi'an Jiao Tong University, China</i>	Rodolphe Vaillon <i>University of Montpellier, France</i>	Liping Wang <i>Arizona State University, USA</i>
Xianfan Xu <i>Purdue University, USA</i>	Hong Ye <i>University of Science of Technology of China, China</i>	Xing Zhang <i>Tsinghua University, China</i>	Yi Zheng <i>Northeastern University, USA</i>
Huaichun Zhou <i>Northeast Electric Power University, China</i>	Qunzhi Zhu <i>Shanghai University of Electrical Power, China</i>	Jia Zhu <i>Nanjing University, China</i>	Chang-Ying Zhao <i>Shanghai Jiaotong University, China</i>

Local Organizing Committee

Chair

Tsuyoshi Totani
Hokkaido University, Japan

Technical Program Chair

Atsushi Sakurai
Niigata University, Japan

Secretary General

Hiroki Gonome
Yamagata University, Japan

Hiroyuki Fujii
Hokkaido University, Japan

Members

Kazuma Isobe
Okayama University, Japan

Makoto Kashiwagi
Waseda University, Japan

Masamichi Kohno
Kyushu University, Japan

Atsuki Komiya
Institute of Fluid Science, Tohoku University, Japan

Makoto Shimizu
Tohoku University, Japan

Yutaka Tabe
Hokkaido University, Japan

Yuhei Miyauchi
Kyoto University, Japan

Yoichi Murakami
Tokyo Institute of Technology, Japan

Takahiro Kono
Tokyo Metropolitan University, Japan

Plenary & Invited Speakers

Plenary Speakers



Prof. Gang Chen

Massachusetts Institute of Technology (MIT), USA

Title: **Photomolecular Effect and Universal Interfacial Absorption**



Prof. Philippe Ben-Abdallah

Institut d'Optique, France

Title: **Near-Field Heat Transfer Close to the Contact and in Many-Body Systems**



Prof. Masahiro Nomura

The University of Tokyo, Japan

Title: **Enhanced Thermal Conduction and Radiation by Surface Phonon Polaritons**



Prof. Shanhui Fan

Stanford University, USA

Title: **Near-Field Thermal Radiation with Time-Modulated Systems**

Invited Speakers



Prof. Mathieu Francoeur

McGill University, Canada

Title: **Enhanced Near-Field Radiative Heat Transfer Between Two Thin Membranes Enabled by Electromagnetic Corner and Edge Modes**



Prof. Achim Kittel

Carl von Ossietzky University of Oldenburg, Germany

Title: **Extreme Near Field Heat Transfer – Is It Heat Conduction?**



Prof. Xianfan Xu

Purdue University, USA

Title: **Greatly Enhanced Radiative Heat Transfer in Hyperbolic Materials**



Prof. Pramod Reddy

University of Michigan, USA

Title: **Energy Transfer and Conversion in Nanoscale Gaps**



Prof. Junichiro Shiomi

The University of Tokyo, Japan

Title: **Materials Informatics for Selective Thermal Radiation**



Prof. Bong Jae Lee

KAIST, Korea

Title: **Plasmonic Heat Transfer on a Thin Metal Film**



Prof. Svend-Age Biehs

Carl von Ossietzky University of Oldenburg, Germany

Title: **Near-Field Radiative Heat Transfer in Topological and Non-Reciprocal Systems**



Prof. Yi Zheng

Northeastern University, USA

Title: **Cost-Effective Functional Energy Materials for Thermal Radiative Applications**



Prof. Jian-Sheng Wang

National University of Singapore, Singapore

Title: **Photon Transport Out of Non-equilibrium Systems**



Prof. Junming Zhao

Harbin Institute of Technology, China

Title: **Field Effect Near Field Heat Flux Modulator: Fundamentals and Applications**



Prof. Joshua David Caldwell

Vanderbilt University, USA

Title: **Exploiting and Controlling Lattice Symmetry and Strong Coupling for Enhanced Thermal Transport**



Prof. Bo Zhao

University of Houston, USA

Title: **Exploiting Infrared Polaritons for Thermal Photonics**



Prof. Xiulin Ruan

Purdue University, USA

Title: **Far-Field and Near-Field Thermal Radiation Engineered by Four-Phonon Scattering**



Prof. Rodolphe Vaillon

LAAS-CNRS, Université de Toulouse, France

Title: **Current Limitations of Near-Field Thermophotovoltaic Devices and Some Solutions to Overcome Them**



Prof. Yong Shuai

Harbin Institute of Technology, China

Title: **Development of Circuit Model for Predicting Thermal Radiation in Nano/Microstructures**

Program at a Glance

Frontier Research in Applied Sciences Building Faculty of Engineering, Hokkaido University

	17th July	18th July	19th July
9:00	Welcome remark (8:50-9:00)		
	Plenary Lecture I (9:00-9:35) OS1-1	Plenary Lecture III (9:00-9:35) OS6-1	Plenary Lecture IV (9:00-9:35) OS11-1
10:00	Invited Lecture I (9:35-10:25) OS1-2, OS1-3	Invited Lecture IV (9:35-10:25) OS6-2, OS6-3	Invited Lecture VII (9:35-10:25) OS11-2, OS11-3
	Coffee Break (10:25-10:45)	Coffee Break (10:25-10:45)	Coffee Break (10:25-10:45)
11:00	Invited Lecture II (10:45-12:00) OS2-1~OS2-3	Invited Lecture V (10:45-12:00) OS7-1~OS7-3	Oral Session VII (10:45-12:00) OS12-1~OS12-5
12:00			
	Lunch Break (12:00-13:30)	Lunch Break (12:00-13:30)	Lunch Break (12:00-13:30)
13:00			
	Plenary Lecture II (13:30-14:05) OS3-1	Invited Lecture VI (13:30-14:20) OS8-1, OS8-2	Oral Session VIII (13:30-14:00) OS13-1, OS13-2
14:00	Invited Lecture III (14:05-14:30) OS3-2		
	Oral Session I (14:30-15:00) OS3-3, OS3-4	Oral Session IV (14:20-15:05) OS8-3~OS8-5	
15:00	Coffee Break (15:00-15:20)	Coffee Break (15:05-15:25)	Poster session (14:00-16:00) PS1~PS35
	Oral Session II (15:20-16:50) OS4-1~OS4-6	Oral Session V (15:25-16:40) OS9-1~OS9-5	
16:00			Open discussion on future directions (16:00-17:00)
	Break (16:50-17:00)	Break (16:40-16:50)	
17:00	Oral Session III (17:00-18:15) OS5-1~OS5-5	Oral Session VI (16:50-18:05) OS10-1~OS10-5	Group photo (17:00-17:10)
18:00			
			Banquet (18:00-21:00)

16th July

Welcome Cocktail (17:30-19:30)

17th July

Welcome Remark (8:50-9:00)

Chair:

Koji Miyazaki

Plenary Lecture I (9:00-9:35)

Chair:

Mauro Antezza

OS1-1 (9:00-9:35)

» **Near-Field Thermal Radiation with Time-Modulated Systems**

Shanhui Fan, Renwen Yu

Stanford University

Invited Lecture I (9:35-10:25)

Chair:

Mauro Antezza

OS1-2 (9:35-10:00)

» **Extreme Near Field Heat Transfer – Is It Heat Conduction?**

Achim Kittel, Fridolin Geesmann, David Hellmann, Konstantin Klopstech, Nils Koenne, Sophie Rodehutsors, Ludwig Worbes, Till Ziehm, Svend-Age Biehs

University of Oldenburg

OS1-3 (10:00-10:25)

» **Plasmonic Heat Transfer on a Thin Metal Film**

Dong-min Kim, Jeongmin Nam, Kukhyun Yun, Bong Jae Lee

Department of Mechanical Engineering, KAIST

Coffee Break (10:25-10:45)

Invited Lecture II (10:45-12:00)

Chair:

Achim Kittel

OS2-1 (10:45-11:10)

» **Near-Field Radiative Heat Transfer in Topological and Non-reciprocal Systems**

Svend-Age Biehs

Institute of Physics, Oldenburg University

OS2-2 (11:10-11:35)

» **Photon Transport Out of Non-equilibrium Systems**

Jian-Sheng Wang

National University of Singapore

OS2-3 (11:35-12:00)

» **Field Effect Near Field Heat Flux Modulator: Fundamentals and Applications**

Junming Zhao

Harbin Institute of Technology

Lunch Break (12:00-13:30)

Plenary Lecture II (13:30-14:05)

Chair:

Chang-Ying Zhao

OS3-1 (13:30-14:05)

» **Enhanced Thermal Conduction and Radiation by Surface Phonon Polaritons**

Masahiro Nomura

The University of Tokyo

Invited Lecture III (14:05-14:30)

Chair:

Chang-Ying Zhao

OS3-2 (14:05-14:30)

» **Current Limitations of Near-Field Thermophotovoltaic Devices and Some Solutions to Overcome Them**

Basile Roux¹, Oriol Teixido², Christophe Lucchesi³, Jean-Philippe Perez¹, Daniel Chemisana², Pierre-Olivier Chapuis³,
Rodolphe Vaillon⁴

1) IES, Univ Montpellier, CNRS, 2) Applied Physics Section of the Environmental Science Department, University of Lleida, 3) CNRS, INSA-Lyon, CETHIL, UMR 5008, 4) LAAS-CNRS, Université de Toulouse, CNRS

Oral Session I (14:30-15:00)

Chair:

Chang-Ying Zhao

OS3-3 (14:30-14:45)

» **Phonon Polaritons Thermal Radiation**

Sebastian Volz

LIMMS/CNRS-IIS(IRL2820) Institute of Industrial Science, The University of Tokyo

OS3-4 (14:45-15:00)

» **Power Generation Using Thermal Radiation and Cavity Antenna Coupling for Infrared Energy Harvesting**

Makoto Shimizu, Zhen Liu, Daisuke Matsuura, and Hiroo Yugami
Graduate School of Engineering, Tohoku University

Coffee Break (15:00-15:20)

Oral Session II (15:20-16:50)

Chair:

Bong-Jae Lee

OS4-1 (15:20-15:35)

» **Efficient Scaling and Industrial Potential of Solar Interfacial Desalination for Sustainable Freshwater Production**

Yushi Chen^{1,2}, Hua Bao^{1,2}

1) Global Institute of Future Technology, Shanghai Jiao Tong University, 2) University of Michigan-Shanghai Jiao Tong University Joint Institute, Shanghai Jiao Tong University

OS4-2 (15:35-15:50)

» **The Performance of Tungsten Carbide as a Solar Absorber**

Toshiharu Chono¹, Kazuma Nakamura², Koji Miyazaki³

1) Department of Mechanical and Control Engineering, Kyushu Institute of Technology, 2) Department of Basic Sciences, Kyushu Institute of Technology, 3) Department of Mechanical Engineering, Kyushu University

OS4-3 (15:50-16:05)

» **Multilayer Electricity-Generating Smart Glass with Double Core-Shell Doping Structure**

Shuni Chen¹, Yanming Guo¹, Yiquan Gong¹, Chao Shen², Yong Shuai¹

1) School of Energy Science and Engineering, Harbin Institute of Technology, 2) School of Architecture, Harbin Institute of Technology

OS4-4 (16:05-16:20)

» **Experimental Characterization of the Effect of Water Films and Droplets on Radiative Cooling Materials Spectral Emissivity**

Nicolas Lavielle, Elyes Nefzaoui, Armande Hervé, Georges Hamaoui, Tarik Bourouina
University Gustave Eiffel

OS4-5 (16:20-16:35)

» **Efficient, Hydrophobic, and Weather-Resistant Radiative Cooling Paints Based on MP-101 Binder**

Emily Clare Barber¹, Dudong Feng¹, Ziqi Fang¹, Daniel Carne¹, Orlando G Rivera Gonzalez¹, Wonjune Lee², Navdeep Vansal¹, Katherine Raykova¹, Jianguo Mei², Xiulin Ruan¹

1) Purdue University School of Mechanical Engineering, 2) Purdue University Department of Chemistry

OS4-6 (16:35-16:50)

» **Dynamic Colorful Radiative Cooling for Cooled Display**

Shenghao Jin¹, Ming Xiao², Fan Yi¹, Changying Zhao¹, BoXiang Wang^{3,4,5}

1) Institute of Engineering Thermophysics, School of Mechanical Engineering, Shanghai Jiao Tong University, 2) College of Polymer Science and Engineering, Sichuan University, 3) 2020 X-Lab, Shanghai Institute of Microsystem and Information Technology, Chinese Academy of Sciences, 4) State Key Laboratory of Transducer Technology, Shanghai Institute of Microsystem and Information Technology, Chinese Academy of Sciences, 5) School of Graduate Study, University of Chinese Academy of Sciences

Break (16:50-17:00)

Oral Session III (17:00-18:15)

Chair:

Svend-Age Biehs

OS5-1 (17:00-17:15)

» **Resonant-Mode Metasurface Thermal Super Mirror Assisted by Machine Learning**

Ken Araki¹, Richard Z Zhang²

1) School for Engineering of Matter, Transport and Energy, Arizona State University, 2) Department of Mechanical Engineering, University of North Texas

OS5-2 (17:15-17:30)

» **Metamaterial Thermophotovoltaic Cell by a Metal-Semiconductor-Metal Structure**

Katsunoti Hanamura¹, Shun Yoshioka¹, Zhou Xueyi¹, Merika Chanthanumataporn², Naphatsorn Vongsoasup²

1) Tokyo Institute of Technology, 2) Chulalongkorn University

OS5-3 (17:30-17:45)

» **Dual-Spectrum Stealth by Integrating Low-Emissivity Metafilms with Patterned Camouflage**

Yufei Gao, Linshuang Long, Yuchi Liu, Zhipeng Tang, Hong Ye

Department of Thermal Science and Energy Engineering, University of Science and Technology of China

OS5-4 (17:45-18:00)

» **Dynamic Control of Infrared Emissivity via Mechanical Strain**

Zhaoran Li, Zhipeng Tang, Xiaopeng Chen, Yuchi Liu, Linshuang Long, Hong Ye

Department of Thermal Science and Energy Engineering, University of Science and Technology of China

OS5-5 (18:00-18:15)

» **Data-Driven Design of Multilayer Hyperbolic Metamaterials for Near-Field Thermal Radiative Modulator with High Modulation Contrast**

Tuwei Liao, Shenghong Ju

Shanghai Jiao Tong University

18th July

Plenary Lecture III (9:00-9:35)

Chair:

Sheng Shen

OS6-1 (9:00-9:35)

» **Photomolecular Effect and Universal Interfacial Absorption**

Gang Chen

Massachusetts Institute of Technology

Invited Lecture IV (9:35-10:25)

Chair:

Sheng Shen

OS6-2 (9:35-10:00)

» **Exploiting and Controlling Lattice Symmetry and Strong Coupling for Enhanced Thermal Transport**

Joshua D. Caldwell

Vanderbilt University

OS6-3 (10:00-10:25)

» **Greatly Enhanced Radiative Heat Transfer in Hyperbolic Materials**

Y. Chen, M. Sergonia, H. Salihoglu, X. Xu

Purdue University

Coffee Break (10:25-10:45)

Invited Lecture V (10:45-12:00)

Chair:

Xianfan Xu

OS7-1 (10:45-11:10)

» **Energy Transfer and Conversion in Nanoscale Gaps**

Pramod Reddy

Department of Mechanical Engineering, University of Michigan

OS7-2 (11:10-11:35)

» **Materials Informatics for Selective Thermal Radiation**

Junichiro Shiomi^{1,2,3}

1) Institute of Engineering Innovation, The University of Tokyo, 2) Department of Mechanical Engineering, The University of Tokyo,

3) RIKEN Center for Advanced Intelligence Project

OS7-3 (11:35-12:00)

» **Enhanced Near-Field Radiative Heat Transfer between Two Thin Membranes Enabled by Electromagnetic Corner and Edge Modes**

Lei Tang¹, Livia M. Corrêa², Mathieu Francoeur^{2,3}, Chris Dames¹

1) Department of Mechanical Engineering, University of California at Berkeley, 2) Department of Mechanical Engineering, University of Utah,

3) Department of Mechanical Engineering, McGill University

Lunch Break (12:00-13:30)

Invited Lecture VI (13:30-14:20)

Chair:

Junming Zhao

OS8-1 (13:30-13:55)

» **Exploiting Infrared Polaritons for Thermal Photonics**

Bo Zhao

Department of Mechanical Engineering, University of Houston

OS8-2 (13:55-14:20)

» **Development of Circuit Model for Predicting Thermal Radiation in Nano/Microstructures**

Yanming Guo, Yong Shuai

School of Energy Science and Engineering, Harbin Institute of Technology

Oral Session IV (14:20-15:05)

Chair:

Junming Zhao

OS8-3 (14:20-14:35)

» **Enhancing Nonreciprocal Near-Field Radiative Heat Transfer Using Weyl Semimetals**

Wenbin Zhang, Changying Zhao

Institute of Engineering Thermophysics, Shanghai Jiao Tong University

OS8-4 (14:35-14:50)

» **Heat Transport between Nonreciprocal Media**

Nico Strauß

Institute of Physics, University of Kassel

OS8-5 (14:50-15:05)

» **Radiative Thermal Corbino Effect**

Ivan Latella¹, Philippe Ben-Abdallah²

1) Department of Condensed Matter Physics, University of Barcelona, 2) Laboratoire Charles Fabry, Institut d'Optique, CNRS

Coffee Break (15:05-15:25)

Oral Session V (15:25-16:40)

Chair:

Bo Zhao

OS9-1 (15:25-15:40)

» **Demonstration of Scalable Large-Area Near-Field Thermophotovoltaics**

Jennifer Selvidge¹, Yuting Li², Parth Solanki³, John Goldsmith¹, Ryan M France¹, Myles A Steiner¹, Eric J Tervo^{1,2,3}

1) National Renewable Energy Laboratory, 2) Department of Electrical & Computer Engineering, University of Wisconsin-Madison, 3) Department of Mechanical Engineering, University of Wisconsin-Madison

OS9-2 (15:40-15:55)

» **Perovskite-Based Thermal Photonics Power Generation**

Atsushi Sakurai¹, Shunsuke Ito², Kota Ono², Ryo Sugimoto², Koji Miyazaki³

1) Department of Mechanical and Production Engineering, Niigata University, 2) Graduate School of Science and Technology, Niigata University, 3) Department of Mechanical Engineering, Kyushu University

OS9-3 (15:55-16:10)

» **Operating Conditions and Thermodynamic Bounds of Dual Radiative Heat Engines**

Julien Legendre, P-Olivier Chapuis

CNRS - CETHIL

OS9-4 (16:10-16:25)

» **Near-Field Thermophotonic Refrigeration**

Thomas Châtelet, Julien Legendre, P-Olivier Chapuis, Olivier Merchiers

INSA Lyon - CETHIL

OS9-5 (16:25-16:40)

» **Temperature Dependence of Thermal Radiation and Electroluminescence in Near-Field Thermophotonic Components**

Wissal Sghaier¹, Kyriaki Kontou¹, Thomas Châtelet¹, Olivier Merchiers¹, Luc M van der Krabben², Natasha Gruginskij², John J Schermer², P-Olivier Chapuis¹

1) CNRS - CETHIL, 2) Radboud University Institute for Molecules and Materials, Applied Materials Science

Break (16:40-16:50)

Oral Session VI (16:50-18:05)

Chair:

Mathieu Francoeur

OS10-1 (16:50-17:05)

» **Control of Non-equilibrium Casimir Forces in Planar Bodies**

Hideo Iizuka¹, Shanhui Fan²

1) Toyota Central R&D Labs., Inc., 2) Department of Electrical Engineering, Ginzton Laboratory, Stanford University

OS10-2 (17:05-17:20)

» **Power-Density Distribution for Radiative Heat Exchange between a Substrate and a Solid Immersed in a Thermal Bath**

Florian Herz, Riccardo Messina, Philippe Ben-Abdallah

Laboratoire Charles Fabry, UMR 8501, Institut d'Optique, CNRS, Université Paris-Saclay

OS10-3 (17:20-17:35)

» **Fluctuational Electrodynamics Modelling of Radiative Heat Transfer Through Type I and Type II Hyperbolic Metamaterials**

Ross Yuk Ming Wong, Satoshi Ishii

Research Center for Materials Nanoarchitectonics, National Institute for Materials Science

OS10-4 (17:35-17:50)

» **Near-Field Radiative Heat Transfer between a Sphere and a Flat Surface in the Sub-100 nm Regime**

Mathieu Thomas, P-Olivier Chapuis

CNRS - CETHIL

OS10-5 (17:50-18:05)

» **Infrared Bolometers: Sensitivity, Near Field, and Thickness Optimization**

Olivier Merchiers¹, Aapo Varpula², Kirsi Tappura², P-Olivier Chapuis¹, Mika Prunnila²

1) INSA Lyon -CETHIL, 2) VTT Technical Centre of Finland

19th July

Plenary Lecture IV (9:00-9:35)

Chair:

Pramod Reddy

OS11-1 (9:00-9:35)

» **Near-Field Heat Transfer Close to the Contact and in Many-Body Systems**

Philippe Ben-Abdallah

Laboratoire Charles Fabry, UMR 8501, Institut d'Optique, CNRS, Université Paris-Saclay

Invited Lecture VII (9:35-10:25)

Chair:

Pramod Reddy

OS11-2 (9:35-10:00)

» **Cost-Effective Functional Energy Materials for Thermal Radiative Applications**

Yi Zheng

Northeastern University

OS11-3 (10:00-10:25)

» **Far-Field and Near-Field Thermal Radiation Engineered by Four-Phonon Scattering**

Xiulin Ruan

Purdue University

Coffee Break (10:25-10:45)

Oral Session VII (10:45-12:00)

Chair:

Rodolphe Vaillon

OS12-1 (10:45-11:00)

» **Exploration of Nonlinear Thermal Radiation for Thermal Transistor and Heat Pumping**

Yungui Ma

College of Optical Science and Engineering, Zhejiang University

OS12-2 (11:00-11:15)

» **Molecular Dynamics Study of the Nucleation Time and Energy Density Threshold of PNBs Induced by Different Duration Time Pulsed Light**

Qingchun Dong, Wei An, Yifan Zhang

Department of Mechanical and Energy Engineering, Tongji University

OS12-3 (11:15-11:30)

» **Dynamic and Directional Control of Thermal Radiation**

Tianji Liu, Longnan Li, Wei Li

GPL Photonics Laboratory, State Key Laboratory of Luminescence Science and Technology, Changchun Institute of Optics, Fine Mechanics and Physics, Chinese Academy of Sciences

OS12-4 (11:30-11:45)

» **Electromagnetic Radiation in The Presence of Topological Insulators**

Omar Jesus Franca Santiago, Stefan Yoshi Buhmann

Institute of Physics, University of Kassel

OS12-5 (11:45-12:00)

» **Space-Time Structure of Thermal and Vacuum Radiation**

Stefan Yoshi Buhmann¹, Frieder Lindel²

1) Institute of Physics, University of Kassel, 2) Institute of Physics, University of Freiburg

Lunch Break (12:00-13:30)

Oral Session VIII (13:30-14:00)

Chair:

Hiroki Gonome

OS13-1 (13:30-13:45)

» **Parylene as a Material for High-Resolution Heat Flow Sensors with Low Background Radiative Noise**

Kanishka Panda¹, Ayan Majumder¹, Rohith Mittapally², Audrey R. Gutierrez³, Edgar Meyhofer¹, Pramod Reddy¹

1) Department of Mechanical Engineering, University of Michigan - Ann Arbor, 2) Department of Mechanical Engineering, MIT, 3) Department of Electrical Engineering & Computer Science, University of Michigan - Ann Arbor

OS13-2 (13:45-14:00)

» **Exciton Thermal Radiation of Carbon Nanotube Thin Films**

Yuhei Miyauchi, Kaichi Teranishi, Akiteru Takahashi, Zhirui Liu, Taishi Nishihara

Institute of Advanced Energy, Kyoto University

Poster Session (14:00-16:00)

PS1

» **Wavelength-Selective, Directional Thermal Emission for Efficient Thermal Energy Harvesting**

Junyong Seo¹, Siwon Yoon¹, Bong Jae Lee²

1) Korea Institute of Energy Research, 2) Korea Advanced Institute of Science and Technology

PS2

» **Near-Field Thermal-Radiation Rectenna**

Yuji Oka^{1,2}, Zhen Liu¹, Makoto Shimizu¹, Hiroo Yugami¹, Olivier Merchiers², Pierre-Olivier Chapuis²

1) Graduate school of engineering, Tohoku University, 2) INSA-Lyon, CNRS, Univ. Lyon

PS3

» **Dual-Spectrum Stealth by Integrating Low-Emissivity Metafilms with Patterned Camouflage**

Yufei Gao, Linshuang Long, Yuchi Liu, Zhipeng Tang, Hong Ye

Department of Thermal Science and Energy Engineering, University of Science and Technology of China

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» **Dynamic Control of Infrared Emissivity via Mechanical Strain**

Zhaoran Li, Zhipeng Tang, Xiaopeng Chen, Yuchi Liu, Linshuang Long, Hong Ye

Department of Thermal Science and Energy Engineering, University of Science and Technology of China

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» **Experimental Demonstration of Near-Field Solar Thermophotovoltaic Energy Conversion**

Minwoo Choi¹, Xin Wang¹, Jaeman Song², Bong Jae Lee¹

1) Department of Mechanical Engineering, Korea Advanced Institute of Science and Technology, 2) Department of Mechanical Engineering, Kyung Hee University

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» **Numerical Investigation of Spectral Near-Field Heat Transfer between Nano-Pillar Array Structures**

Akshay Santosh Vidhate¹, Pradeep Kumar¹, Samar Agnihotri²

1) School of Mechanical and Materials Engineering, Indian Institute of Technology Mandi, 2) School of Computing and Electrical Engineering, Indian Institute of Technology Mandi

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» **Predicting Multi-Order Magnetic Polariton Resonances in Deep Grating by Distributed Circuit Model**

Hangjie Li¹, Junming Zhao¹, Linhua Liu²

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Jose Ordonez-Miranda^{1,2}, Roman Anufriev^{1,2}, Masahiro Nomura^{1,2}, Sebastian Volz^{1,2}

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» **Optimization Method for Autonomous Radiative Transfer Control Coating without Visual Changes**

Takumi Takahashi, Hiroki Tomori, Hiroki Gonome

Graduate School of Science and Engineering, Yamagata University

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» **General Analysis of Medium-Bridge TPV System**

Feng Gu^{1,2}, Cheng-Long Zhou^{1,2}, Xin-yu Jia^{1,2}, Hong-Liang Yi^{1,2}

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Shota Morishige, Kazuma Isobe, Yutaka Yamada, Akihiko Horibe

Graduate School of Environmental, Life, Natural Science and Technology, Okayama University

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» **Preparation of PCM@VO₂ Microcapsules Synthesized from Alkoxide Precursor**Kaketo Yamauchi, Kazuma Isobe, Yutaka Yamada, Akihiko Horibe*Graduate School of Environmental, Life, Natural Science and Technology, Okayama University*

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» **Nonreciprocal Thermal Radiation Using Magnetized Epsilon-Near-Zero Metamaterials**Mengqi Liu, Boxiang Wang, Changying Zhao*Shanghai Jiao Tong University*

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» **Effect of Crystal Orientation on Extreme Near-Field Heat Transport Across Nanogaps between Two Polar Dielectric Materials**Weizhe Yuan^{1,2}, Yangyu Guo^{1,2}, Hongliang Yi^{1,2}*1) School of Energy Science and Engineering, Harbin Institute of Technology, 2) Key Laboratory of Aerospace Thermophysics, Ministry of Industry and Information Technology*

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» **Nickel Nanowire Array-Based Selective Solar Absorbers Using Inductor-Capacitor Circuit Model**Sanjay Kumar Samudi¹, Erh-Ting Yeh¹, Yu-Bin Chen², Jui-Yung Chang¹*1) Department of Mechanical Engineering, National Yang Ming Chiao Tung University, 2) Department of Power Mechanical Engineering, National Tsing Hua University*

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» **Both Daylighting and Cooling: Scalable Biomimetic Energy-Saving Glass with Multispectral Regulation Property**Xinping Zhang, Fuqiang Wang*Harbin Institute of Technology*

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» **Experimental Evaluation of the Optical Absorption Performance of Pickering Emulsions with Plasmonic Nanoparticles**Yusuke Koizumi¹, Shun Hirashima², Taisei Kimura², Mizuho Ono³, Yoshimune Nonomura², Akito Masuhara², Hiroki Gonome¹*1) Department of Mechanical Systems Engineering, Yamagata University, 2) Department of Chemical Engineering, Yamagata University, 3) Department of Engineering, Tohoku University*

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» **Design of Optical Cavity for Thermophotovoltaic Systems Considering Thermal Behavior of Gasb Cells**Haolin Wang, Makoto Shimizu, Hiroo Yugami*Department of Mechanical Systems Engineering, Graduate School of Engineering, Tohoku University*

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» **Temperature Dependence of Electron-Phonon Coupling in Heterostructure Nanoparticles**Saeki Nakano¹, Yuta Ito¹, Mizuho Ono², Kakeru Fujiwara³, Tetsuro Katayama⁴, Takao Oto¹, Takayuki Chiba⁵, Hiroki Gonome¹*1) Graduate School of Science and Engineering, Yamagata University, 2) Institute of Fluid Science, Tohoku University, 3) Institute for Frontier Science Initiative, Kanazawa University, 4) Graduate School of Advanced Technology and Science, Tokushima University, 5) Graduate School of Organic Materials Science, Yamagata University*

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» Experimental Evaluation for Radiative Heat Transfer in Polydisperse Water Mist

Masato Jono¹, Takuma Kogawa², Kiyoto Kawai¹, Wenjing Xing¹, Shuichi Moriya³, Junnosuke Okajima³, Hiroki Gonome¹

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» Performance Evaluation of BaSO₄ Printed Films by Figure of Merit

Messie M. A. Ranjatoson, Renjiro Emoto, Katsuaki Hashikuni, Kosuke Watanabe, Koji Miyazaki

Department of Mechanical Engineering, Kyushu University

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» Long-range Thermal Transport and Relaxation of Particles under the Action of Coupled Surface Modes in Multiple Slabs

Yun Chao Hao^{1,2}, Hong Liang Yi^{1,2}, He Ping Tan^{1,2}, Yong Zhang^{1,2}

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» Design of Bifacial Near-Field Thermophotovoltaic Converters with Internal Cooling Channels in Silicon Layers

Gyu Heo¹, Minwoo Choi², Gunwoo Baik¹, Jaeman Song¹, Bong Jae Lee²

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» Demonstration of Direct Thermophotovoltaics Based on Magnesium Combustion

Daisuke Sato¹, Ayumu Hida², Kota Hayashi², Noboru Yamada²

1) Department of System Safety Engineering, Nagaoka University of Technology, 2) Department of Mechanical Engineering, Nagaoka University of Technology

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» Degradation of MIM Emitter at High Temperature and Thermal Resistance of IMIM Emitter

Tsuyoshi Totani¹, Satoru Odashima¹, Yoshio Kondo²

1) Faculty of Engineering, Hokkaido University, 2) NGK INSULATORS, LTD.

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» Harvesting Radiative Cooling and Solar Heating with Transparent Thermoelectric Device

Satoshi Ishii, Cédric Bourgès, Nicholaus Tanjaya, Takao Mori

National Institute for Materials Science

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» Radiative Scattering Properties of Dense Binary Colloidal Suspensions Using The Sticky Hard-Sphere Model

Hiroyuki Fujii, Hyeonwoo Na, Koyata Nishikawa, Kazumichi Kobayashi, Masao Watanabe

Hokkaido University

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» Numerical Study of The Particle Interaction Effects on The Light Scattering Properties In Simple Liquids

Hyeonwoo Na, Hiroyuki Fujii, Kazumichi Kobayashi, Masao Watanabe

Faculty of Engineering, Division of Mechanical and Space Engineering, Hokkaido University

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» **Light Scattering Properties for a Coagulation Process in Soy Milk**Koyata Nishikawa¹, Hiroyuki Fujii¹, Goro Nishimura², Kazumichi Kobayashi¹, Masao Watanabe¹*1) Division of Mechanical and Space Engineering, Faculty of Engineering, Hokkaido University, 2) Research Institute for Electronic Science, Hokkaido University*

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» **Challenges to Demonstrate Electroluminescent Cooling**Yoshitaka Hayakawa¹, Eisuke Ohashi², Masaaki Baba², Daisuke Sato², Noboru Yamada²*1) National Institute of Technology, Nagaoka College, 2) Nagaoka University of Technology*

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» **Prediction of Excitation of Magnetic Polaritons in Slit Arrays Using Transmission Line Models with Confirmable Constants**Yiquan Gong¹, Yanming Guo¹, Wenwen Zhang², Yong Shuai¹*1) Harbin Institute of Technology, 2) Heilongjiang University*

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» **Plasmonic Core-Shell Nanocatalyst Solar Thermal Reactor for Hydrogen Production**Yu-Ting Chuang¹, Ajay Kumar¹, Bong Jae Lee², Ming-Tsang Lee¹*1) Department of Power Mechanical Engineering, National Tsing Hua University, 2) Department of Mechanical Engineering, Korea Advanced Institute of Science and Technology*

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» **Nonreciprocal Thermophotonic System**Masato Suzuki, Hiroto Shibuya, Kazuki Yamaga, Atsushi Sakurai*Thermal Photonics Lab, Niigata University*

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» **Dynamic Multispectral Camouflage Based on Multilayered Graphene**Mikyung Lim, Hyeon-Don Kim, Hyung Cheoul Shim, Kwang-Seop Kim, and Jae-Hyun Kim*Department of Nano-devices and displays, Nano-convergence Manufacturing Research Division, Korea Institute of Machinery and Materials*

PS35

» **Resonant-Mode Grating Fabrication for Thermal Radiative Contrast**Joohyun Seo¹, Naqiyyah Nakimuli¹, John Beatty², Richard Z. Zhang¹*1) Department of Mechanical Engineering, University of North Texas, 2) Department of Chemistry & Biochemistry, Texas Woman's University***Open Discussion on Future Directions** (16:00-17:00)**Chair:**

M. Pinar Menguc

Group Photo (17:00-17:10)**Banquet** (18:00-21:00)

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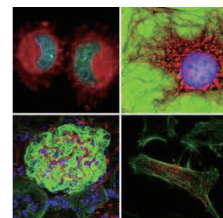
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