Nanoscale Heat Transport—From Fundamentals to Devices
April 18 - April 21, 2017

Symposium Organizers
Pierre-Olivier Chapuis, Center for Energy and Thermal Sciences, CNRS - INSA Lyon
Aleksandr Chernatynsky, Missouri University of Science and Technology
Kedar Hippalgaonkar, Nanyang Technological University
Austin Minnich, California Institute of Technology

Proceedings Statement
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* Invited Paper

TUTORIAL
Understanding Nanoscale Heat Transport—Interplay between Experiment and Theory
Monday Afternoon, April 17, 2017
1:30 PM – 5:00 PM
PCC West, 100 Level, Room 101 BC

The tutorial will provide an overview of experimental and theoretical techniques for understanding and manipulating thermal transport in nanoscale materials. Particular attention will be devoted to the techniques aimed at understanding the quasi-ballistic transport regime where the characteristic length scales are smaller than the mean-free paths of heat carriers. The importance of combining theory and experiment in making significant progress on this subject will be illustrated throughout the tutorial.

1:30 PM - 3:00 PM
Part I: Keivan Esfarjani
The first part of the tutorial will outline the limitations of Fourier law at length scales on the order of 10 to 100 nm, where a big portion of heat is carried ballistically since phonon mean-free paths, typically in silicon, span a wide range from nm to tens or hundreds of microns. Consequently, new theoretical methodologies need to be developed to describe propagation of heat in nanostructured samples. The tutorial will describe the latest theoretical methodologies that have been developed in order to model heat transport in various types of materials, from bulk to superlattices to amorphous materials, and discuss their success and limitations when compared to experimental data.

3:00 PM BREAK

3:30 PM - 5:00 PM
Part II: Richard Wilson
The second part of the tutorial will provide an overview of recent advances in experimental techniques for studying nanoscale thermal transport and discuss how they can be used to rigorously test transport theories. Topics will include how advances in optical techniques, such as time domain thermoreflectance, and steady-state techniques based on micro fabricated test structures are enabling transport theories to be experimentally tested across a diverse array of physical systems, e.g. solid-solid interfaces, superlattices and multilayers, anisotropic 2D materials, and nanoscale metal multilayers. Special emphasis will be placed on recent experimental advances in characterizing the thermal response of insulating and semiconducting materials in the quasi-ballistic limit, which enable tests of state-of-the-art density-functional theory predictions for phonon mean-free paths.

SESSION NM2.1: Thermal Transport in 2D Materials I
Session Chair: John Bischof
Tuesday Morning, April 18, 2017
PCC West, 100 Level, Room 101 BC

10:30 AM *NM2.1.01

11:00 AM NM2.1.02
Nanoscale Characterization of the Thermal Conductivity of Supported Graphite Nanoplates, Graphene and Few-Layer Graphene Mauro Tortello; Politecnico di Torino, Italy.

11:15 AM NM2.1.03
Understanding and Tuning Heat Conduction in MoS$_2$—Cross-Plane Diffusive-Ballistic Transport and Dynamic Electrochemical Tuning of Thermal Conductivity by Li Intercalation Aditya Sood; Stanford University, United States.

11:30 AM *NM2.1.04
Thermal Transport in Two-Dimensional Materials and Devices Eric Pop; Stanford University, United States.

SESSION NM2.2: Multiphase Thermal Transport
Session Chair: Olle Hellman
Tuesday Afternoon, April 18, 2017
PCC West, 100 Level, Room 101 BC

1:30 PM *NM2.2.01
Evaporative Processes and Mass Accommodation Coefficient via Molecular Dynamics Pawel Keblishki; Rensselaer Polytechnic Institute, United States.

2:00 PM *NM2.2.02
Nanoparticle Heating to Improve Therapeutics, Diagnostics and Regenerative Medicine John Bischof; University of Minnesota, United States.

2:30 PM NM2.2.03
Probing Nanoscale Heat Transport in Liquid Environments—Contact and Non-Contact Immersion Scanning Thermal Microscopy (iSThM) Olek Kolow; Lancaster University, United Kingdom.

2:45 PM NM2.2.04
Boiling at the Nanoscale—Nanobubbles around Hot Nanoparticles and Heat Phase Change of Nanofluids Merabia Sammy; Universite de Lyon, CNRS, UCBL, ILM, France.

3:00 PM BREAK

SESSION NM2.3: Phonon Properties
Session Chair: Pawel Keblishki
Tuesday Afternoon, April 18, 2017
PCC West, 100 Level, Room 101 BC

3:30 PM *NM2.3.01
Strongly Anharmonic Materials from First Principles with the Temperature Dependent Effective Potential Method Olle Hellman; California Institute of Technology, United States; Linkoping University, Sweden.

4:00 PM NM2.3.02
Phonon Properties and Slow Organic-to-Inorganic Sub-Lattice Thermalization in Hybrid Perovskites Xi Nuo; Argonne National Laboratory, United States.
SESSION NM2.4: Poster Session I: Heat Transport at the Nanoscale
Tuesday Afternoon, April 18, 2017
8:00 PM - 10:00 PM
Sheraton, Third Level, Phoenix Ballroom

NM2.4.01
Size Dictated Thermal Conductivity of GaN Thomas Beechem; Sandia National Labs, United States.

NM2.4.02
Heat Conduction Tuning Based on the Wave Nature of Phonons Masahiro Nomura1, 2, 3, 4; 1Institute of Industrial Science, the University of Tokyo, Japan; 2Institute for Nano Quantum Information Electronics, the University of Tokyo, Japan; 3PRESTO, JSTA, Japan.

NM2.4.03
Ballistic Phonon Transport in Si Nanowires Roman Anufriev; University of Tokyo, Japan.

NM2.4.04
Microelectronics Thin Films and Boundaries Characterized by Scanning Thermal Microscopy Axel Pie; 1, 2, 3STMicroelectronics, France; 4CNRS - INSA Lyon, France.

NM2.4.05
Effects of Grain Boundaries and Defects on Anisotropic Magnon Transport in Textured Sr1−xCuxO3+δ Xi Chen; University of Texas at Austin, United States.

NM2.4.06
Kapitza Resistance and the Thermal Conductivity of Amorphous Superlattices Ashutosh Giri; University of Virginia, United States.

NM2.4.07
Scattering of Longitudinal Acoustic Phonons in Thin Silicon Membranes Dravy Geldzha; University of Illinois at Urbana-Champaign, United States.

NM2.4.08
Sub-Amorphous Thermal Conductivity in Amorphous Heterogeneous Nanocomposites Jaeyun Moon; California Institute of Technology, United States.

NM2.4.09
Revisiting the Theory of Disordered Alloy Thermal Conductivity Hamideza Seyf; Georgia Institute of Technology, United States.

NM2.4.10
Synthesis and Characterization of Boron Arsenide Crystals Fei Tian; University of Houston, United States.

NM2.4.11
Calibrated Sub-Micron Temperature Measurement of an Operating Plasmonic HAMR Device by Thermoreflectance Imaging Gregory Hohensee; Western Digital Corporation, United States.

NM2.4.12
Pump-Probe Measurements of Thermal Conductance of Amorphous and Metallic Interfaces for Nanoscale Thermal Management in Heat-Assisted Magnetic Recording Gregory Hohensee; Western Digital Corporation, United States.

NM2.4.13

NM2.4.14
Ray Tracing Simulations of Incoherent Phonon Boundary Scattering in Silicon Nanomeshes Geoffrey Wehmeyer; University of California, Berkeley, United States.

NM2.4.15
Spin Mediated Thermal Transport in p-Si Paul C. Lou; University of California, Riverside, United States.

NM2.4.16
Magneto-Thermal Transport Behavior in Ferromagnetic and Semiconductor Thin Films Paul C. Lou; University of California, Riverside, United States.

NM2.4.17
Broadening of Thermal Surface Wave Spectrum on SiOx Thin Film from Near-Infrared to Far-Infrared due to Zenneck Modes Sergei Gluchko; Paris-Saclay University, France.

NM2.4.18
Hydrogen-Induced Thermal Conductivity Change across Metal-Insulator Transition in Amorphous WO3 Film Ayano Nakamura2, 3, 4; 1Nagoya University, Japan; 2Nagoya University, Japan.

NM2.4.19
The Enhancement of Thermal Conductivity of Polyvinyl Alcohol Nanofiber Membrane Meng An1, 2, 3; 1Huazhong University of Science and Technology, China; 2Huazhong University of Science and Technology, China.

NM2.4.20
The Adjustable Thermal Resistor By Reversibly Folding a Graphene Sheet Meng An1, 2; 1Huazhong University of Science and Technology, China; 2Huazhong University of Science and Technology, China.

NM2.4.21
Solution-Phase Processing Routes to Metal Chalcogenide Thermoelectric Thin Films Robert Y . Wang; Arizona State University, United States.

NM2.4.22
Sound Attenuation in Amorphous Silica at Frequencies near the Boson Peak Zhi Liang; California State University, Fresno, United States.

NM2.4.23
Coherent Control of Thermal Conductance in Hole- and Pillar-Based Phononic Crystals Roman Anufriev; The University of Tokyo, Japan.

NM2.4.24
Thermal Phonon MFP Spectrum Probing Using Phononic Crystals Masahiro Nomura2, 4; 1University of Tokyo, Japan; 2Japan Science and Technology Agency, Japan.

NM2.4.25
Interlayer Thermal Conductance within Phosphorene and Graphene Bilayer Yang Hong; University of Nebraska Lincoln, United States.

NM2.4.26
Non-Contact Measurement of In-Plane Thermal Anisotropy in Polymer Films Using Transient Grating Spectroscopy Andrew Robbins; California Institute of Technology, United States.

NM2.4.27
Near Field Thermal Properties of Meso and Nanoporous Systems Paul Esquivel-Sirvent; Universidad Nacional Autonoma de Mexico, Mexico.

NM2.4.28
Thermal Conduction in Homologous In2O3(ZnO)x Films Junjun Jia; Aoyama Gakuin University, Japan.

NM2.4.29
External Electric Field Driving Ultra-Low Thermal Conductivity of Silicene Guangzhao Qin; RWTH Aachen University, Germany.
Session Chair: Emigdio Chavez-Angel
Wednesday Morning, April 19, 2017
PCC West, 100 Level, Room 101 BC

9:00 AM NM2.5.01
Thermal Switching with Collapsible Graphene Membranes Michelle Chen; Stanford University, United States.

9:15 AM NM2.5.02
Thermal Transport Measurement of Sub-10 nm Single- and Bi-Layer Graphene Nanomesh Structures by Block Copolymer Lithography Jinwoo Oh1,2; Korea Institute of Science and Technology, Korea (the Republic of); Seoul National University, Korea (the Republic of).

9:30 AM NM2.5.03
Ballistic Phonon Conduction in Silicon Nanobeam Labyrinths Woosung Park; Stanford University, United States.

9:45 AM BREAK

10:15 AM NM2.6.01
Thermal Transport in Si Phononic Crystals Emigdio Chavez-Angel1,2; 1Catalan Institute of Nanoscience and Nanotechnology ICN2, Spain; 2JG University of Mainz, Germany.

10:45 AM NM2.6.02
Heat Focusing by Phononic Nanostructures Roman Anufriev; The University of Tokyo, Japan.

11:00 AM NM2.6.03
Coherent Modification of Thermal Properties Using Phononic Crystals Hari Massila; University of Jyvaskyla, Finland.

11:30 AM NM2.6.04
Experimental Investigation of Phonon Coherence and Backscattering Using Silicon Nanostructures Jaeho Lee1,2; 1University of California, Irvine, United States; 2Lawrence Berkeley National Laboratory, United States.

11:45 AM NM2.6.05
Understanding and Manipulating Coherent and Incoherent Phonon Transport in Multilayered Structures Yan Wang; University of Nevada, Reno, United States.
SESSION NM2.7: Phonons in Materials
  Session Chair: Woochul Kim
  Wednesday Afternoon, April 19, 2017
  PCC West, 100 Level, Room 101 BC

1:30 PM *NM2.7.01
Thermal Conduction in van der Waals Materials Junjiwo Wu; University of California, Berkeley, United States.

2:00 PM NM2.7.02
Periodicity Dependent Heat Dissipation Efficiency in 2D Confined Nanoscale Heat Source Arrays Nico Hernandez Charpak; University of Colorado at Boulder, United States.

2:15 PM NM2.7.03
Ballistic Effects on Thermal Conductivity in 1D and 2D Configurations from Single and Multiple Localized Sub Mean Free Path Heat Sources—A Numerical Investigation Elyes Nefzaoui; 
  1; *ESIEE Paris, France; 2Laboratoire ESYSOM (EA2552), France.

2:30 PM BREAK

SESSION NM2.8: Thermoelectrics and Compounds
  Session Chair: Ilari Maasilta
  Wednesday Afternoon, April 19, 2017
  PCC West, 100 Level, Room 101 BC

3:30 PM *NM2.8.01
Structural Variations in Thermoelectric Device Geometry for Low S/W and Wearable System Woochul Kim; Yonsei University, Korea (the Republic of).

4:00 PM NM2.8.02
Modulation of Thermoelectric Properties of Carbon Nanomaterials Masato Ohnishi; The University of Tokyo, Japan.

4:15 PM NM2.8.03
Acoustic Phonons Lifetime and Thermal Conductivity in Complex Thermoelectric Crystal Structure Stephane Pailhes; ILM, University Lyon, CNRS, France.

4:30 PM NM2.8.04
Effect of the High-Pressure Spin Transition in Mg-Fe-O System on Thermal Conductivity Aleksandr V. Chernatynskiy; Missouri University of Science and Technology, United States.

4:45 PM NM2.8.05
Magnetic Martensitic Transformation and Thermal Transport in Mn$_{1−x}$MGe (M = Co, Ni) Grive Zheng; University of Illinois at Urbana-Champaign, United States.

SESSION NM2.9: Poster Session II: Heat Transport at the Nanoscale
  Wednesday Afternoon, April 19, 2017
  8:00 PM - 10:00 PM
  Sheraton, Third Level, Phoenix Ballroom

NM2.9.01
Interfacial Thermal Transport across Graphene and Organic Semiconductor Xinyu Wang; The University of Hong Kong, Hong Kong.

NM2.9.02
Monitoring Heat Dissipation from Gold Nanorods to the Ambient Water through Conjugated Ligands with Atomic Resolution Yuexiang Yan; National University of Singapore, Singapore.

NM2.9.03
A Novel Phonon Monte Carlo Simulator for Calculating Thermal Conductivities Abdul R. Shaik; Arizona State University, United States.

NM2.9.04
Intrinsic Localized Mode and Low Thermal Conductivity of PbSe Nina Shulumba; California Institute of Technology, United States.

NM2.9.05
Phonon Heat Conduction under Large Thermal Gradient in Optically Heated Nanoline Arrays Xiawen Chen; California Institute of Technology, United States.

NM2.9.06
Thermal Measurements of Nanoporous In$_{x}$Ga$_{3−x}$N Thin Films Directly Grown by Metalorganic Chemical Vapor Deposition Dongchao Xu; University of Arizona, Arizona.

NM2.9.07
Thermal Conductivities of Epitaxial Al-Doped and ZnO Thin Films Deposited by Magnetron Sputtering Junjun Jia; Aoyama Gakuin Univ, Japan.

NM2.9.08
Influence of a nm-Sized Metallic Interlayer on Metal-Dielectric Thermal Boundary Conductance Maite Blank; EPFL, Switzerland.

NM2.9.09
Four-Phonon Scattering Phase Space in Anharmonic Semiconductor Crystals Navaneetha Krishnan Ravichandran; Boston College, United States.

NM2.9.10
Spherical and Cylindrical Pores with Amorphous Shells, Impact on the Thermal Transport Konstantinos Termentzidis; CNRS, France.

NM2.9.11
An Ultrathin Heat Pipe Based on Hierarchical Micro/Nanostructures for Electronic Cooling Ramesh Shrestha; Carnegie Mellon University, United States.

NM2.9.12
Size Dependent Thermal Conductivity of Single-Wall Carbon Nanotubes from Molecular Dynamics Simulations William T. Yorgason; Utah State University, United States.

NM2.9.13
Improvement of Thermoelectric Properties through Reduction of Thermal Conductivity by Nanoparticle Addition and Stoichiometric Change to Mg$_{2}$Si William T. Yorgason; Utah State University, United States.

NM2.9.14
Assessment of Convective Heat Transfer Behavior of Water Flow in Graphene Nanochannels Drew Marable; University of Tennessee, United States.

NM2.9.15
Role of Structural and Compositional Disorder in Alloys and Glasses on Thermal Conductivity Jihui Nie; Rensselaer Polytechnic Institute, United States.

NM2.9.16
Unprecedented Increase of the Lattice Thermal Conductivity of Auxetic Carbon Crystals under Tensile Strain Ming Hu; RWTH Aachen University, Germany.

NM2.9.17
Trends in Thermal Conductivity for High Aspect Ratio Nanostructures Using Molecular Modeling Greg Walker; Vanderbilt University, United States.

NM2.9.18
Study of Heat Transport in Metal-Coated Carbon Nanotubes Using Molecular Dynamics Atomistic Simulations Iman Salehinia; Northern Illinois University, United States.

NM2.9.19
Particle-Based Device Simulator for Modeling of Self-Heating Effects in P-Type MOSFET Transistors Dotrica Vasileske; Arizona State University, United States.

NM2.9.20
Metal-Insulator Metal Metamaterial Thermal Emitter with the Suppression of the Parasitic Modes Kota Ito; Toyota Central R&D Labs Inc, Japan.
NM2.9.21
Degree-of-Freedom Resolved Thermal Transport in the C_{60} Molecular Crystal Sushant Kumar; Carnegie Mellon University, United States.

NM2.9.22
Nanoscale Thermal Transport in the Kinetic Collective Model F. Xavier Alvarez; Universitat Autonoma de Barcelona, Spain.

NM2.9.23
Enhancement of the Thermophysical Properties of Suspended Silica Thin Films Supporting the Propagation of Surface Phonon-Polaritons Laurent Tranchant; Kyushu Institute of Technology, Japan.

NM2.9.24
Wavevector Dependent Transmission Coefficient at Si/Ge Interfaces and across Vacuum Gaps from First Principles Lattice Dynamics Calculations Moradia Samy; Universite de Lyon, CNRS, UCBL, ILM, UMR5306, France.

SESSION NM2.10: Radiative Heat Transport
Session Chair: Giulia Galli
Thursday Morning, April 20, 2017
PCC West, 100 Level, Room 101 BC

8:00 AM *NM2.10.01 Radiative Heat Transfer at the Nanoscale Pramod Sangi Reddy; University of Michigan, United States.

8:30 AM NM2.10.02 Near-Field Thermal Radiation and Gas Conduction in a Nanostructured Gap Measured by Frequency Domain Thermoreflectance (FDTR) Minyoung Jeong; Carnegie Mellon University, United States.

8:45 AM NM2.10.03 Radiation at the Nanoscale—A Heat Transfer Measurement between Parallel Plates Anthony Fiorino; University of Michigan, United States.

9:00 AM NM2.10.04 Perfect Thermal Emission by Nanoscale Transmission Line Resonators Sheng Shen; Carnegie Mellon University, United States.

9:15 AM *NM2.10.05 Near-Field Radiative Heat Transfer—Multiscale Modeling and Measurement between Macroscale Planar Surfaces Mathieu Francoeur; Department of Mechanical Engineering, University of Utah, United States.

9:45 AM BREAK

SESSION NM2.11: Computational Methods
Thursday Morning, April 20, 2017
PCC West, 100 Level, Room 101 BC

10:15 AM *NM2.11.01 First Principles Calculations of Thermal Conductivity with out of Equilibrium Molecular Dynamics Simulations Giulia Galli; University of Chicago, United States.

10:45 AM *NM2.11.02 Modeling Thermal Transport from First-Principles—Nanostructures, Defective Materials, Novel Compounds and Beyond Natalio Mingo; CEA, France.

11:15 AM NM2.11.03 Theory of Substrate-Directed Cross-Plane Heat Dissipation from Two-Dimensional Crystals Zhuan-Yong Ong; Institute of High Performance Computing, Singapore.

11:30 AM NM2.11.04 Molecular Dynamics Study of the Influence of Individual Dislocation and Density of Dislocations on the Thermal Conductivity Konstantinos Termentzidis; CNRS, France.

11:45 AM NM2.11.05 Lattice Thermal Conductivity of PbTe-Based Materials Driven Near Ferroelectric Phase Transition Ivana Savic; Tyndall National Institute, Ireland.

SESSION NM2.12: Junctions and Couplings
Session Chair: Jonathan Malen
Thursday Afternoon, April 20, 2017
PCC West, 100 Level, Room 101 BC

1:30 PM *NM2.12.01 Heat Transport through Atomic Contacts Bernd Gotsmann; IBM Research - Zurich, Switzerland.

2:00 PM NM2.12.02 Investigation of a Topography-Free Composite Sample Using a Combined Scanning Thermal Microscopy/Scanning Electron Microscopy Instrument Severine Gomes; CETHIL, UMR 5008, CNRS - INS A Lyon - Université Claude Bernard Lyon 1, France.

2:15 PM NM2.12.03 Heat Transport in Isotopically Engineered Nanowires Samik Mukherjee; Ecole Polytechnique-Montreal, Canada.

2:30 PM NM2.12.04 Correlation of Heat Transport and Shear Forces in Nanoscale Junctions Benjamin Robinson; Lancaster University, United Kingdom.

2:45 PM NM2.12.05 Probing the Mean-Free-Paths of Phonons in Semiconductors and Dielectrics by Fourier-Transform Time-Domain Thermoreflectance (FT-TDTR) Yee Kan Koh; National University of Singapore, Singapore.

3:00 PM BREAK

SESSION NM2.13: Thermal Transport in Organic Materials
Thursday Afternoon, April 20, 2017
PCC West, 100 Level, Room 101 BC

3:30 PM *NM2.13.01 Dynamic Disorder Controls Thermal Transport in Superatomic Crystals and Organic-Inorganic Perovskites Jonathan A. Malen; Carnegie Mellon University, United States.

4:00 PM NM2.13.02 C_{60} Based Molecular Self-Assemblies with On-Demand Thermal and Mechanical Properties Abduljabar Alsadawy; University of Arizona, United States.

4:15 PM NM2.13.03 Thermal Conductivity of Template Fabricated Polymer Nanofibers Matthew Smith; Georgia Institute of Technology, United States.

4:30 PM NM2.13.04 An Integrated Optothermal Sensor for the Measurement of Thermophysical Properties of Bio-Tissues Xu Xie; University of Illinois at Urbana-Champaign, United States.

4:45 PM NM2.13.05 Tuning Thermal Conductivity of Metal-Organic–Frameworks Alex Greaney; University of California, Riverside, United States.
SESSION NM2.14: Poster Session III: Heat Transport at the Nanoscale  
Thursday Afternoon, April 20, 2017  
8:00 PM - 10:00 PM  
Sheraton, Third Level, Phoenix Ballroom

NM2.14.01 Local Thermal Calibration for Quantitative Measurement Using Thermoresistive Micro and Nanoprobes  
Eloise Green; CETHIL-UMR5008, CNRS, INSA Lyon, France.

NM2.14.02 Monte Carlo Simulation of Phononic like Silicon Nanostructures—Comparison to Experiments and Models  
Maxime Verdier; University of Lorraine, LEMTA, France.

NM2.14.03 Ultrafast Interferometric Measurement of Plasmonic Field in a Hot Spot by Thermoreflectance  
Stefan Dilhac; University of Bordeaux, France.

NM2.14.04 Real Time Thermal Conductivity Measurement during Growth of Ultrathin Layers  
Aitor F. Lopeandia; Universitat Autònoma Barcelona, Spain.

NM2.14.05 Probing In-Plane Phonon Mean Free Paths of MoS  
Bo Sun; California Institute of Technology, United States.

NM2.14.06 Radiative Heat Transfer between Plasmonic Nanospheres  
David Becker; Universidad Nacional Autonoma de Mexico, Mexico.

NM2.14.07 2D Ballistic Phonon Heat Conduction from Single Metallic Line Investigated with Electrical Means  
Wassim Jaberi; CETHIL, France.

NM2.14.08 Surface Nanoscale Engineering to Tune Phonon Dispersion and Lifetimes in Low-Dimensional Semiconductors  
Sanhamitra Neogi; University of Colorado Boulder, United States.

NM2.14.09 Comparison of Monte Carlo Methods for Phonon-Boundary Scattering in Nanoporous Silicon Films  
Kevin D. Parrish; Carnegie Mellon University, United States.

NM2.14.10 Effect of Anharmonicity on Thermal Conductance at Solid/Solid Interfaces with an Intermediate Layer  
Kourzbeg Rastgarkafshgarkolaei; University of Virginia, United States.

NM2.14.11 Grain Size Dependent Thermal Conductivity of Twisted Bilayer Graphene by Raman Spectroscopy  
Tej B. Lamby 1,2,3; University of Puerto Rico, United States; 3Institute for Functional Nanomaterials, United States.

NM2.14.12 Understanding the Origins of Large Negative Thermal Expansion in Ferroelectric Perovskites from First Principles  
Ethan T. Ritz; Cornell University, United States.

Oleg Kolosov 1,2; Lancaster University, United Kingdom; 2Lancaster Materials Analysis Ltd, United Kingdom.

NM2.14.14 Roles of Interface and Substrate Properties on Through-Plane Heat Dissipation in 2D-Material-Based Devices  
Poya Yassea; University of Illinois at Chicago, United States.

NM2.14.15 Quantifying the Propagon Contribution to Thermal Conductivity in Free-Standing Hydrogenated Amorphous Silicon  
Runjiang Guo; California Institute of Technology, United States.

NM2.14.16 Validity of the Isotropic Thermal Conductivity Assumption in Supercell Lattice Dynamics  
Ruivuan Ma; University of Pennsylvania, United States.

NM2.14.17 Viability of HfN Transducers for High Temperature Thermal Measurements Using Time Domain Thermoreflectance  
Christina Rost; University of Virginia, United States.

NM2.14.18 Understanding Thermal Properties in Entropy-Stabilized Oxides  
Jeffrey Braun; University of Virginia, United States.

NM2.14.19 Breaking Network Connectivity Leads to Ultralow Thermal Conductivities in Fully Dense Amorphous Solid  
Jeffrey Braun; University of Virginia, United States.

NM2.14.20 Non-Equilibrium Molecular Dynamics Simulations of Thermal Boundary Conductance in Stacked Two-Dimensional Materials  
Klas Karis; University of Illinois at Chicago, United States.

NM2.14.21 Characterizing and Controlling the Anisotropic Nanoscale Heat Transfer in 2D van der Waals Materials  
Yongjie Hu; University of California, Los Angeles (UCLA), United States.

NM2.14.22 Deterministic Simulation of Frequency Dependent Phonon Transport in Nuclear Materials  
Jackson Harter; Oregon State University, United States.

NM2.14.23 Light-Induced Temperature Control in Solid-State Nanopores  
Meni Wanunu; Northeastern University, United States.

NM2.14.24 Synthesis and Thermal Analysis of Vertically Aligned CNs Grown on Copper Substrates  
Qisheng Zhang; University of Dayton, United States.

NM2.14.25 Novel Scanning Thermal Microprobe for Co-Registered Seebeck Coefficient and Thermal Conductivity  
Nicholas Kempf; Boise State University, United States.

NM2.14.26 Epitaxial Metal-Semiconductor Interfacial Thermal Conductance  
Ning Ye; University of Delaware, United States.

NM2.14.27 Characterization of Thermal Transport in Amorphous Germanium  
Freddy DeAngelis; Georgia Institute of Technology, United States.

NM2.14.28 Temperature Dependent Thermal Conductivity of Aluminum Rich AlGaN Alloys  
Christopher B. Saltonstall; Sandia National Laboratories, United States.

NM2.14.29 Heat Conduction Analysis Involving the Effect Arising from Phonon Coherence  
Takuma Shiga; The University of Tokyo, Japan.

NM2.14.30 How are Phonons Scattered at the Interface between Inorganic Nanoparticles and Polymers?  
Christian Huebner; University of Duisburg-Essen, Germany.

NM2.14.31 Controlling Thermal Transport in Porous Nanocomposite for Thermoelectric Applications  
Yue Wu; Iowa State University, United States.

NM2.14.32 A Detailed Wave-Packet Study of Phonon Scattering at Surfaces—Effect of Roughness and Morphology  
Cheng Shao; Shanghai Jiao Tong University, China.

NM2.14.33 Anharmonic Lattice Dynamics Prediction of Thermal Conductivity of 2D Materials—A Discussion on the Accuracy  
Hua Bao; Shanghai Jiao Tong University, China.
Heat Pulse Propagation in Silicon Phononic Crystals

Chauhan
Non-Diffusive Thermal Transport in Silicon at Low Temperatures
University of Michigan, United States.

Parallel Measurement of Conductive and Convective Thermal Transport of Micro/Nanowires Based on Raman Mapping
Yanan Yue; Wuhan University, China.

Molecular Dynamics Study on Thermal Transport at Carbon Nanotube Interface Junctions—Effects of Mechanical Force and Chemical Functionalization
Yanan Yue; Wuhan University, China.

Carbonized Electrospun Nanofiber Sheets for Thermophones
Ali Aliev; University of Texas at Dallas, United States.

Interatomic Potentials for Mechanical Properties via Machine Learning
Andrew D. Rohskopf; Georgia Institute of Technology, United States.

Study of Radiative Heat Transfer in Ångström and Nanometer Sized Gaps
Longji Cui; University of Michigan, United States.

Analysis of the Temperature Dependence of the Thermal Conductivity in Single Crystal Oxides
Eric Langenberg; Centro de Investigación en Química Biológica e Materiales Moleculares (Universidade de Santiago de Compostela), Spain.

Impedance Matching for Phonons at Solid-Solid Interfaces
Jingjie Zhang; University of Virginia, United States.

Synthesis of $\text{Fe}_x\text{Co}_y\text{S}_z$ Nanoparticles Using Hot-Injection Method for Use in Thermoelctric Applications
Rick Eyi; University of Arkansas, United States.

Thermal Conductivity of Oxide-Based Thin Films Measured by Frequency Domain Thermoreflectance (FDTR)
Alexandros Sarantopoulos; Universidad de Santiago de Compostela, Spain.

Magnetic Polariton Enhanced Localized Heating for Heat Assisted Magnetic Recording Applications
Xiaoyan Ying; Arizona State University, United States.

Thin Silica Micro-Grating Coating for Enhancing Radiative Cooling of Solar Cells
Linshuang Long; 1, 2 Arizona State University, United States; 3University of Science and Technology of China, China.

Plasmonic Light Trapping for Enhanced Infrared Photon Absorption in Ultrathin Wide-Bandgap Semiconductors
Qing Ni; University of Science and Technology of China, China; 1Arizona State University, United States.

Non-Diffusive Thermal Transport in Silicon at Low Temperatures
Vinay S. Chauhan; The Ohio State University, United States.

Heat Pulse Propagation in Silicon Phononic Crystals
Weixuan Li; University of Florida, United States.

Dynamical Thermal Conductivity in Single-Crystalline Graphene Ribbons
Arnab K. Majee; University of Massachusetts Amherst, United States.

Phonon Transport Dynamics in SiGe Alloy Nanowires and Nanocomposites
Meenakshi Upadhyaya; University of Massachusetts Amherst, United States.

Enhanced Thermal Conductivity and Low Permittivity of Resin Based Composites Modified by Mesoporous-$\text{SiO}_2$ and Mesoporous-$\text{SiO}_2@\text{Al}_2\text{O}_3$ Microspheres
Jun Zhou; Xi’an Jiaotong University, China.

Heat Transfer in Porous Crystals Containing Adsorbed Gases
Hasan Babaei; 1, 2University of Pittsburgh, United States; 3Carnegie Mellon University, United States.

SESSION NM2.15: Thermal Measurement Techniques
Session Chair: Ravi Prasher
Friday Morning, April 21, 2017
PCC West, 100 Level, Room 101 BC

8:00 AM *NM2.15.01
Mode-Resolved Phonon Scattering Rates across the Brillouin Zone with Neutron and X-Ray Scattering
Olivier Delaire; 1, 2 Duke University, United States; 3Oak Ridge National Laboratory, United States.

8:30 AM NM2.15.02
Individual Upconverting Nanoparticles as Nanoscale Heaters and Thermometers
Andrea Pickel; University of California, Berkeley, United States.

8:45 AM NM2.15.03
Scanning Thermal InfraRed Microscopy (STIRM) a New Method for Measuring Thermal Conductivity and Chemical Composition at the Nanoscale
Andrea Centrone; National Institute of Standard and Technology, United States.

9:00 AM NM2.15.04
Calibrated Scanning Thermal Microscopy for Nanolayered and Micropatterned Samples
Pierre-Olivier Chapuis; CNRS - INSA Lyon, France.

9:15 AM NM2.15.05
Full-Field Thermal Imaging of Submicron Heat Transport in InGaAs and Silicon
Amir K. Ziabari; Duke University, United States.

9:30 AM NM2.15.06
Developing Superior Alloy Contacts Optimized for Electrical and Thermal Transport at Metal-Graphene Interfaces
Dipanjan Saha; Carnegie Mellon University, United States.

9:45 AM BREAK

SESSION NM2.16: Interfacial Thermal Transport
Session Chair: Olivier Delaire
Friday Morning, April 21, 2017
PCC West, 100 Level, Room 101 BC

10:15 AM *NM2.16.01
Manipulating Interfacial Thermal Transport Using Surface Chemistry
Ravi Prasher; Lawrence Berkeley National Laboratory, United States.

10:45 AM NM2.16.02
Cooperative Molecular Behavior Enhances the Thermal Conductance of Binary Self-Assembled Monolayer Junctions
Alan McGaughey; Carnegie Mellon University, United States.
11:00 AM NM2.16.03
Thermal Phonon Diffraction from Atomically Rough Surfaces Navaneetha Krishnan Ravichandran1, 2; 1Boston College, United States; 2California Institute of Technology, United States.

11:15 AM NM2.16.04
Thermal Boundary Resistance-Limited Performance of High-Frequency Photodiodes—Towards In Situ Thermoreflectance Measurements without Metal Transducers Patrick E. Hopkins; University of Virginia, United States.

11:30 AM NM2.16.05
A Numerical Test of the Diffuse Mismatch Model—Wavevector-Resolved Modeling of Phonon Transmission across Rough Interfaces Rohit R. Kakodkar; University of Delaware, United States.

11:45 AM NM2.16.06
Fabrication and Characterization of Copper Nanowire Arrays as Thermal Interface Materials Wei Gong; Carnegie Mellon University, United States.

SESSION NM2.17: Radiative Thermal Devices and Key Parameters
Session Chair: Alan McGaughey
Friday Afternoon, April 21, 2017
PCC West, 100 Level, Room 101 BC

1:30 PM *NM2.17.01
Contactless Thermotronics with Photons Philippe Ben-Abdallah2, 3; 2Laboratoire Charles Fabry CNRS/ Institut d’Optique, France; 3Université de Sherbrooke, Canada.

2:00 PM NM2.17.02
Multi-Length Scale Coupled Phonon-Electron Monte Carlo Simulations of Three-Dimensional GaN Transistors Hongbo Zhao; University of Arizona, United States.

2:15 PM NM2.17.03
Toward Radiative Thermal Information Processing—Multilevel Memory and Near-Field Effect Kota Ito; Toyota Central R&D Labs Inc, Japan.

2:30 PM NM2.17.04
Near-Field Thermophotovoltaic Energy Conversion by Excitation of Magnetic Polaritons inside Nanometer Vacuum Gaps with Nanostructured Drude Emitters Payam Sabbaghi; Arizona State University, United States.

2:45 PM NM2.17.05
A Full Drift-Diffusion Model for Near-Field Radiation Mediated Thermophotovoltaic Devices Rodolphe Vaillon1, 2; 1Univ Lyon, CNRS, INSA-Lyon, Université Claude Bernard Lyon 1, CETHIL UMR5008, France; 2University of Utah, United States.

3:00 PM NM2.17.06
Characterizing Electron Phonon Coupling in Elemental Metals with Picosecond Electrical Pulses Richard B. Wilson; University of California, Riverside, United States.