# RGD32 Program (Hybrid, Real-time; Version 2; 16 May 2022)

[1]**KST**, CEST, CDT

| Time[1] | Mon (July 4th) | | | | Time | Tue (July 5th) | | | | Wed (July 6th) | | | | Thu (July 7th) | | | | Time | Fri (July 8th) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **07:30 – 08:00**<br>00:30 – 01:00<br>17:30 – 18:00 | Registration | | | | **07:30 – 08:00**<br>00:30 – 01:00<br>17:30 – 18:00 | Registration | | | | Registration | | | | Registration | | | | **07:30 – 08:00**<br>00:30 – 01:00<br>17:30 – 18:00 | Registration | | | |
| **Halls** | **A** | **B** | **C** | **D** | **Halls** | **A** | **B** | **C** | **D** | **A** | **B** | **C** | **D** | **A** | **B** | **C** | **D** | **Halls** | **A** | **B** | **C** | **D** |
| **08:00 – 10:00**<br>01:00 – 03:00<br>18:00 – 20:00 | **T01 Boltzm I (K06)** | **T03 Numeric I** | **T05 DSMC I** | **T16 Shock** | **08:00 – 10:00**<br>01:00 – 03:00<br>18:00 – 20:00 | **S02 Rich Memorial I** | **T04 PDE II (K10)** | **T17 Gas-Surf I** | **T5,24 DSMC & HPC** | **T02 Kinetic III (K07)** | **S06 Porous Media** | **T12 Reacting I** | **T19,22 Jet Plume Vapor** | **T14 Hyper Veh I** | **S13 eProp I (K08)** | **T05 DSMC VI** | **S16 Hyper Flow I** | **08:00 – 10:00**<br>01:00 – 03:00<br>18:00 – 20:00 | **S09 BGK I** | **T15 Space Veh I** | **T06 MD I (K15)** | **T18 Vacuum I** |
| **10:00 – 10:20**<br>03:00 – 03:20<br>20:00 – 20:20 | Coffee Break | | | | **10:00 – 10:20**<br>03:00 – 03:20<br>20:00 – 20:20 | Coffee Break | | | | Coffee Break | | | | Coffee Break | | | | **10:00 – 10:20**<br>03:00 – 03:20<br>20:00 – 20:20 | Coffee Break | | | |
| **10:20 – 12:20**<br>03:20 – 05:20<br>20:20 – 22:20 | **T01 Boltzm II** | **T03 Numeric II** | **T05 DSMC II** | **T21 Plasma I** | **10:20 – 12:20**<br>03:20 – 05:20<br>20:20 – 22:20 | **S03 Rich Memorial II** | **S18 Entropy Closure (K05)** | **T17 Gas-Surf II** | **T5 DSMC IV** | **S12 Emerg-ent** | **T09,11 Multiph Shale** | **T07,08 Multisc, Micro, Nano I** | **S15 Dust Lunar** | **T14 Hyper Veh II** | **S14 eProp II (K02)** | **T05 DSMC VII** | **S17 Hyper Flow II** | **10:20 – 12:20**<br>03:20 – 05:20<br>20:20 – 22:20 | **S10 BGK II** | **T15 Space Veh II (K12)** | **T06 MD II** | **T1,2,3,18 Vacuum II** |
| **12:20 – 13:20**<br>05:20 – 06:20<br>22:20 – 23:20 | Lunch | | | | **12:20 – 13:20**<br>05:20 – 06:20<br>22:20 – 23:20 | Lunch & **Poster (On-site)** | | | | Lunch | | | | Lunch & **Poster (On-site)** | | | | **12:20 – 13:20**<br>05:20 – 06:20<br>22:20 – 23:20 | Lunch | | | |
| **13:20 – 14:40**<br>06:20 – 07:40<br>23:20 – 00:40 | **Opening and Welcome Remarks**<br>**Grad Lecture (Liu) (P1)** | | | | **13:20 – 15:20**<br>06:20 – 08:20<br>23:20 – 01:20 | **T02 Kinetic I** | **T13 Experi-ment (K03)** | **S07 Bulk Visco I** | **T5,12 Reacting & DSMC** | Excursion | | | | **T01 Boltz III (K11)** | **T03 Numeric III** | **S04 Nano I (K01)** | **T12 Reacting II** | **13:20 – 15:40**<br>06:20 – 08:40<br>23:20 – 01:40 | **S11 BGK III** | **T15 Space Veh III** | **T06 MD III (K13)** | **T10,11 Multiph Granul** |
| **14:40 – 15:00**<br>07:40 – 08:00<br>00:40 – 01:00 | Coffee Break | | | | **15:20 – 15:40**<br>08:20 – 08:40<br>01:20 – 01:40 | Coffee Break | | | | | | | | Coffee Break | | | | **15:40 – 17:40**<br>08:40 – 10:40<br>01:40 – 03:40 | **Farewell Party** | | | |
| **15:00 – 17:00**<br>08:00 – 10:00<br>01:00 – 03:00 | **S01 Reese Memorial** | **T04 PDE I** | **T05 DSMC III** | **T21 Plasma II (K04)** | **15:40 – 16:40**<br>08:40 – 09:40<br>01:40 – 02:40 | **Thomas Lecture (Ubachs) (P3)** | | | | | | | | **GNU-ERC Lecture (Eu) (P4)** | | | | | | | | |
| **17:00 – 17:10** | Break | | | | **16:40 – 16:50** | Break | | | | | | | | Break | | | | | | | | |
| **17:10 – 18:10**<br>10:10 – 11:10<br>03:10 – 04:10 | **Bird Lecture (Levin) (P2)** | | | | **16:50 – 18:50**<br>09:50 – 11:50<br>02:50 – 04:50 | **T02 Kinetic II** | **T14,16,23 Hyper Shock** | **S08 Bulk Visco II (K09)** | **T5 DSMC V** | | | | | **T01 Boltz IV** | **T03 Numeric IV (K14)** | **S05 Nano II** | **T07,08 Multisc, Micro, Nano II** | | | | | |
| **18:30 – 20:30**<br>11:30 – 13:30<br>04:30 – 06:30 | **Reception** | | | | **19:00 – 21:00**<br>12:00 – 14:00<br>05:00 – 07:00 | **IAC Meeting / NextGen** | | | | | | | | **Banquet** | | | | | | | | |

**Hybrid halls (A-Diamond, B-Vivace, C-Allegro, D-Andante)**
**On-site (In-person) & Virtual Poster**

| Time | Tue (July 5th) | Wed (July 6th) | Thu (July 7th) |
|---|---|---|---|
| **10:20 – 12:20** | **Virtual Poster Session T1** | | **Virtual Poster Session Th1** |
| **12:20 – 13:20** | Lunch & **Poster (On-site)** | Lunch | Lunch & **Poster (On-site)** |
| **13:20 – 15:30** | **Virtual Poster Session T2** | Excursion | **Virtual Poster Session Th2** |

| Keynote Lectures | | |
|---|---|---|
| **K01** | Murat Barisik | "Law of the Nano-wall" in Nano-channel Gas Flows |
| **K02** | Wonho Choe | Unique Physical Features of Cylindrical Hall Thruster Plasmas for Low Power Operation |
| **K03** | Stéphane Colin | Molecular Tagging – an Experimental Technique for Velocimetry and Thermometry in Internal Rarefied Gas Flows |
| **K04** | Zoltan Donko | Kinetic Effects in Charged Particle Transport, Gas Breakdown, and Electrical Discharges |
| **K05** | Clinton Groth | Development, Numerical Solution, and Application of Maximum-Entropy-Inspired Moment Closures for Non-Equilibrium Gaseous Flows with Shocks |
| **K06** | Yan Guo | Geometric Correction in Knudsen Layer Expansion |
| **K07** | Seung Yeal Ha | A Kinetic Approach for Collective Dynamics |
| **K08** | Kentaro Hara | Physics-based and Data-driven Models of Low-temperature Plasmas for Aerospace Applications |
| **K09** | Elena Kustova | New Challenges in Modeling Non-equilibrium Carbon Dioxide Flows |
| **K10** | Chang Liu | A Brief Review of the Direct Modeling Method: Multiscale Scheme, Unified Preserving Property, and Applications |
| **K11** | Duncan Lockerby | Simulating Low-speed Rarefied Flows around 3D Particulate and Droplets |
| **K12** | Jason Rabinovitch | A (very) Quick Overview of NASA Planetary Exploration Missions and the VATMOS-SR Mission Concept |
| **K13** | Takashi Tokumasu | Molecular Dynamics Simulations for Nanoscale Mass Transport Phenomena in Polymer Electrolyte Fuel Cells |
| **K14** | Lei Wu | Efficient and Accurate Deterministic Solver for the Boltzmann Equation: The Fast Spectral Method and General Iterative Scheme |
| **K15** | Yonghao Zhang | Effect of Confinement on Non-equilibrium Flow of Dense Gases |

| Plenary Lectures | | |
|---|---|---|
| **P01** | Tai-Ping Liu (Grad Lecture) | Solving Boltzmann equation, Green's function approach |
| **P02** | Wim Ubachs (Thomas Lecture) | Light extinction, Rayleigh-Brillouin scattering and absorption in the Earth's atmosphere, and in dilute and dense gases |
| **P03** | Deborah Levin (Bird Lecture) | Exploring the physics of multiscale flows at the molecular level |
| **P04** | Byung-Chan Eu (GNU-ERC Lecture) | Thermodynamically consistent generalized hydrodynamic theory of flows far removed from equilibrium |

| Special Sessions | | |
|---|---|---|
| **S01** | Yonghao Zhang | Memorial Session for Jason Reese |
| **S02, S03** | Igor Adamovich, Sergey Macheret, Deborah Levin | Memorial Session for Bill Rich I, II |
| **S04, S05** | BoHung Kim | Nanoscale Transport Phenomena at Interfaces I, II |
| **S06** | Alina Alexeenko, Irina Graur Martin | Rarefied Flows in Porous Media |
| **S07, S08** | Elena Kustova, Rakesh Kumar | Bulk Viscosity and Relaxation Processes I, II |
| **S09, S10, S11** | Seok-Bae Yun | Boltzmann Equation and BGK Models: Theory and Numerics I, II, III |
| **S12** | Doheon Kim, Seok-Bae Yun | Recent Advances on Emergent Behaviors and Collective Dynamics |
| **S13, S14** | Eunji Jun | Electric Propulsion I, II |
| **S15** | Jae Hyun Park, Kyun Ho Lee | Dust in Lunar Exploration |
| **S16, S17** | Gisu Park, Jaegang Kim | Hypersonic Flows I, II |
| **S18** | Clinton Groth, James McDonald | Entropy-Based Moment Closure Methods for Kinetic Equations |

| Topics | | | |
|---|---|---|---|
| **T01** | Boltzmann and Related Equations | **T15** | Space Vehicle Aerodynamics and Propulsion |
| **T02** | Kinetic Theory for Gases and Complex Systems | **T16** | Shock Waves in Rarefied Flows |
| **T03** | Numerical Methods for Kinetic Equations | **T17** | Gas-Surface Interactions (including Condensation) and Slip Flows |
| **T04** | PDE-based Computational Methods for Non-equilibrium Flows | **T18** | Vacuum Technology |
| **T05** | DSMC and Related Simulations | **T19** | Vapor Deposition Processes and Simulation |
| **T06** | Molecular Dynamics and Particle Methods | **T20** | Molecular Beams and Collisions |
| **T07** | Mesoscale and Multiscale Modeling | **T21** | Plasma Flows and Processes |
| **T08** | Micro- & Nano-scale Flows and Heat Transfer | **T22** | Jets, Plumes and Surface Interaction |
| **T09** | Shale Gases and Porous Media Flows | **T23** | Radiation and Astrophysics |
| **T10** | Granular Flows and Aerosols | **T24** | High-performance Computing in RGD |
| **T11** | Multiphase Flows and Kinetic Modeling | | |
| **T12** | Non-equilibrium Reacting Flows | | |
| **T13** | Experimental Techniques for Non-equilibrium Flows | | |
| **T14** | Hypersonic Vehicles, Facilities, and Diagnostics | | |

| Time | Mon (July 4th) | | | |
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| | **Room A** | **Room B** | **Room C** | **Room D** |
| **07:30 – 08:00 (KST)**<br>00:30 – 01:00 (CEST)<br>17:30 – 18:00 (CDT) | Registration | | | |
| | **Session M1A: Boltzmann and Related Equations I**<br>(Chair:) | **Session M1B: Numerical Methods for Kinetic Equations I**<br>(Chair:) | **Session M1C: DSMC I**<br>(Chair:) | **Session M1D: Shock Waves in Rarefied Flows**<br>(Chair:) |
| **08:00 – 08:20**<br>01:00 – 01:20<br>18:00 – 18:20 | Geometric Correction in Knudsen Layer Expansion<br>**Yan Guo***<br>*Brown University, USA* | Physics-Informed Neural Networks for the Vlasov Equation<br>**Hanquist**, Florio, Schiassi, Furfaro*<br>*University of Arizona, USA* | In-Situ, Conservative Particle Merging With Octree Sorting<br>**Huerta*,** Martin, Eckhardt<br>*Jacobs Engineering Group, USA* | Molecular Diffusivity Based Constitutive Relations for Rarefied Conditions<br>**Reddy***, Dadzie, Tomy<br>*Heriot-Watt University, UK* |
| **08:20 – 08:40**<br>01:20 – 01:40<br>18:20 – 18:40 | | Verification of a Discontinuous Galerkin Fast Spectral Solver for the Full Boltzmann Equation<br>**Adhikari***, Morton, Hu, Alexeenko<br>*Purdue University, USA* | A Computational Study on Thermally Induced Knudsen Forces for a Non-Contact Controlling Device<br>**Otic***, Ohara, Yonemura<br>*Tohoku University, Japan* | Low Reynolds Number Effect on Hypersonic Flow Over a Hemisphere with Counter-flow Jet<br>**Yoon***, Suzuki<br>*The University of Tokyo, Japan* |
| **08:40 – 09:00**<br>01:40 – 02:00<br>18:40 – 19:00 | Simulations of Flow Past a Blunt Body in an Inert Binary Gas Mixture in Rotational Non-Equilibrium Using DSMC and the Generalized Boltzmann Equation<br>**Agarwal***, Qian<br>*Washington University, USA* | Assessment of Kinetic Fokker-Planck Methods for Hypersonic Rarefied Flows<br>**Kim**, Jun*<br>*KAIST, Korea* | GSIS-LVDSMC for BGK Equation<br>**Luo**, Li, Wu*<br>*Southern University of Science and Technology, China* | On the Conditions of Clusters Penetration beyond the Limits of a Supersonic Jet<br>**Dubrovin***, Zarvin, Bondar, Yaskin, Kalyada, Dering<br>*Novosibirsk State University, Russia* |
| **09:00 – 09:20**<br>02:00 – 02:20<br>19:00 – 19:20 | Comparison of Numerical Solutions of Rarefied Hypersonic Gas Flows Using Boltzmann-based Zero-, First-, and Second-Order Constitutive Models<br>**Singh***, Battiato, Myong<br>*Nanyang Technological University, Singapore* | General Synthetic Iterative Scheme for Unsteady Phonon Boltzmann Equation with Dual Relaxation Times<br>**Liu,** Su, Wu*<br>*Southern University of Science and Technology, China* | Hydrodynamics, Normal-stress Differences and Heat Transport in Rarefied Pressure Driven Poiseuille Flow<br>**Ravichandir***, Alam<br>*Jawaharlal Nehru Centre for Advanced Scientific Research, India* | A Computational Investigation of High-Temperature Effect on the Type IV Shock Interaction<br>**Peng***, Hu, Z. Han, G. Han, Jiang<br>*University of Chinese Academy of Sciences, China* |
| **09:20 – 09:40**<br>02:20 – 02:40<br>19:20 – 19:40 | Comparative Study of Model Kinetic Equations and the Boltzmann Equation in the Shock Wave Structure Problem<br>**Poleshkin***, Kudryavtsev<br>*Khristianovich Institute of Theoretical and Applied Mechanics SB RAS, Russia* | Linearly Implicit Time Integration of Vibrational Master Equation Using Automatic Differentiation<br>**Petty,** Byrne*<br>*The University of New South Wales, Australia* | Relativistic DSMC Collisions in EMPIRE<br>**McDoniel***, Moore, Cartwright<br>*Sandia National Laboratories, USA* | Transition of The Regular to Mach Reflection of Shock Waves in Steady Rarefied Flows<br>**Shoev***, Timokhin<br>*Institute of Theoretical and Applied Mechanics SB RAS, Russia* |
| **09:40 – 10:00**<br>02:40 – 03:00<br>19:40 – 20:00 | A fast Fourier Spectral Method for the Non-cutoff Boltzmann Collision Operator<br>**Qi***, Hu<br>*City University of Hong Kong, Hong Kong PRC* | A GPU Accelerated Unified Gas-Kinetic Wave-Particle Algorithm for Rarefied Flows<br>**Yu**, Xie*, Tian, Ren, Li<br>*National University of Defense Technology, China* | Rarefied Atmospheric Gas Effects on The Aerodynamics of Super Low Altitude Satellites<br>**Yu,** Vignesh Ram, Yoon, Kim*<br>*Sejong University, Korea* | Application of the Mott-Smith Approximation to the Regular Shock-Wave Reflection Problem<br>**Timokhin***, Kudryavtsev, Bondar<br>*Institute of Theoretical and Applied Mechanics SB RAS, Russia* |
| **10:00 – 10:20**<br>03:00 – 03:20<br>20:00 – 20:20 | Coffee Break | | | |
| | **Session M2A: Boltzmann and Related Equations II**<br>(Chair: ) | **Session M2B: Numerical Methods for Kinetic Equations II**<br>(Chair: ) | **Session M2C: DSMC II**<br>(Chair:) | **Session M2D: Plasma Flows and Processes I**<br>(Chair:) |
| **10:20 – 10:40**<br>03:20 – 03:40<br>20:20 – 20:40 | Physics-informed Neural Network and Functional Interpolation for Rarefied-Gas Dynamics in the BGK Approximation<br>**De Florio**, Schiassi, Barichello, Ganapol, Furfaro*<br>*University of Arizona, USA* | A Conservative Multidimensional Vlasov Algorithm with Curvilinear Moving Phase-Space Grid<br>**Taitano***, Liu, Chacon<br>*Los Alamos National Laboratory, USA* | Trajectory Estimation Model of Space Debris with Gravitational and Drag Perturbations<br>**Preethi**, Appar, Kukilaya*, Kumar*<br>*Indian Institute of Technology Kanpur, India* | Real-Time State Estimation for Plasma Chemistry Applications<br>**Greve***, Hara<br>*Texas A&M University, USA* |
| **10:40 – 11:00**<br>03:40 – 04:00<br>20:40 – 21:00 | Source-sink-type Condition for Slightly Rarefied Gas Flow Driven by a Discontinuous Wall Temperature<br>**Taguchi***, Tsuji | New Fast Numerical Method for Rarefied Gas Simulation by Spherical Design and Traveling Finite Volume | A Hybrid DSMC-continuum Formulation for Jet Expansion into Rarefied Flows<br>**Tumuklu,** Bellan*, Hanquist | A Kinetic-continuum Method Combining the Direct Simulation Monte-Carlo with Collision-Radiation Model for Simulation of Laser-Induced |

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| | *Kyoto University, Japan* | **Sugimoto***, Morikawa<br>*Kyoto University, Japan* | *California Institute of Technology, USA* | Plasma Plumes<br>**Volkov***, Stokes, Lin<br>*University of Alabama, USA* |
| **11:00 – 11:20**<br>04:00 – 04:20<br>21:00 – 21:20 | Global In Time Existence of Solutions With L^1-Initial Data for The Revised Enskog Equation<br>**Polewczak***<br>*California State University, USA* | General Synthetic Iterative Scheme for Steady Solutions of Multi-Scale Polyatomic Gas Flows<br>**Zeng**, Wu*<br>*Southern University of Science and Technology, China* | Plume Analysis for VISORS Mission<br>**Karis***, Kazarin, Chinnappan, Alexeenko<br>*Purdue University, USA* | Two-Dimensional Axisymmetric Fluid Modeling of Low-Pressure Capacitively Coupled Plasma Using an Extended Temporal Multi-Scale Algorithm<br>**Wu***, Gu, Hu<br>*National Yang Ming Chiao Tung University, Taiwan ROC* |
| **11:20 – 11:40**<br>04:20 – 04:40<br>21:20 – 21:40 | An Attempt on the ES-Model-Based Construction of a Kinetic Equation for a Dense Gas<br>**Miyauchi***, Takata, Hattori<br>*Kyoto University, Japan* | On the Five-Moment Maximum Entropy System of One-Dimensional Boltzmann Equation<br>**Li**, Fan, Zheng*<br>*Peking University, China* | On The Convergence of the Symmetrized and Simplified Bernoulli Trial (SSBT) Collision Scheme in Shock Wave Problem<br>Javani, **Roohi***, Taheri<br>*Xi'an Jiaotong University, China* | On the Mechanism of Cluster Luminescence in the External Field of a Supersonic Flow<br>**Konstantinov**, Zarvin*, Dubrovin, Kalyada, Yaskin, Dering<br>*Novosibirsk State University, Russia* |
| **11:40 – 12:00**<br>04:40 – 05:00<br>21:40 – 22:00 | Model Two-Particle Kinetic Equation for Pairs of Quasiparticles<br>**Saveliev***<br>*Fesenkov Astrophysical Institute, Kazakhstan* | Data-Driven Nonlinear Compression and Denoising<br>**Martin***, Huerta, Wong, Eckhardt<br>*U.S. Army Research Office, USA* | Re-Entry Trajectory Estimation for Space Debris in Low Earth Orbit<br>**Park***, Nam, Kim, Kim<br>*Agency For Defense Development, Korea* | On the Role of Rotational Relaxation in Oxygen Discharges<br>**Huang***, Hu, Sun<br>*Chinese Academy of Sciences, China* |
| **12:00 – 12:20**<br>05:00 – 05:20<br>22:00 – 22:20 | Thermally Driven Flow of a Dense Gas in a Nanochannel<br>**Hattori***<br>*Kyoto University, Japan* | Kinetic Simulation of Pulsed Evaporation into Low-Pressure Gas: Model Kinetic Equation vs DSMC<br>**Titarev***, Morozov<br>*Federal Research Center, Russia* | Coupled Kinetic-Continuum Modeling of Re-Entry Vehicle Plasma Environment<br>**Shevyrin***, Bondar<br>*Khristianovich Institute of Theoretical and Applied Mechanics SB RAS, Russia* | Investigation of Hypersonic Plasma Sheath Effects on RF Degradation Using DSMC Method<br>Agarwal*, **Derubertis***<br>*Washington University, USA* |
| **12:20 – 13:20**<br>05:20 – 06:20<br>22:20 – 23:20 | Lunch | | | |
| **13:20 – 14:40**<br>06:20 – 07:40<br>23:20 – 00:40 | **Opening and Welcome Remarks**<br>**Grad Lecture**<br>(Solving Boltzmann Equation, Green's Function Approach, **Tai-Ping Liu***, *Academia Sinica and Stanford University*) | | | |
| **14:40 – 15:00**<br>07:40 – 08:00<br>00:40 – 01:00 | Coffee Break | | | |
| | **Session M3A: Memorial Session for Jason Reese**<br>(Chair:) | **Session M3B: PDE-based Computational Methods for Non-equilibrium Flows I**<br>(Chair: ) | **Session M3C: DSMC III**<br>(Chair:) | **Session M3D: Plasma Flows and Processes II**<br>(Chair:) |
| 15:00 – 15:20<br>08:00 – 08:20<br>01:00 – 01:20 | Flow Past a Square Cylinder in the Slip and Early Transition Regime: A Computational Study by Coupling Kinetic and Extended Thermodynamic Methods<br>**Gu***, Yang, Emerson, Zhang<br>*STFC Daresbury Laboratory, UK* | Numerical Analysis of Slow Uniform Flow past a Circular Disk with Sharp Edge<br>**Tomita**, Taguchi*, Tsuji<br>*Kyoto University, Japan* | Investigation of the Effect of Pseudo-Random Number Generating Algorithms on DSMC Simulation<br>**Sengupta**, Mankodi, Myong*<br>*Gyeongsang National University, Korea* | Kinetic Effects in Charged Particle Transport, Gas Breakdown, And Electrical Discharges<br>**Zoltan Donko***<br>*Wigner Research Centre for Physics, Hungary* |
| **15:20 – 15:40**<br>08:20 – 08:40<br>01:20 – 01:40 | | Reduced-order Modeling of a Collisional-Radiative, Euler Fluid System Through Low-Rank Tensor Decomposition<br>**Abrantes***, Taitano, Cambier<br>*Air Force Research Laboratory, USA* | A Kinetic Fokker-Planck Method for Modeling Diatomic Gas Mixtures<br>**Hepp***, Grabe, Hannemann<br>*German Aerospace Center (DLR), Germany* | |
| **15:40 – 16:00**<br>08:40 – 09:00<br>01:40 – 02:00 | Gas Rarefaction Effects in a Two-Dimensional Acoustic Micro-Resonator<br>**Manela***, Ben-Ami<br>*Technion - Israel Institute of Technology, Israel* | Entropy-based Ansatz for Galerkin Approximations of the Boltzmann Equation<br>**Abdelmalik***,Gamba, Kessler, Rjasanow<br>*Eindhoven University of Technology, Netherlands* | Thermophoretic Force on Micron-Sized Particles in Rarefied Gas Conditions<br>**Reinartz***, Staso, Shestakov, Kunnen, Toschi, Clercx<br>*Eindhoven University of Technology, Netherlands* | A New Class of Second-order Uniformly Asymptotic-preserving Imex Schemes for Kinetic and Hyperbolic Balance Laws with Stiff Relaxation<br>**Pichard***, Reboul, Massot<br>*Ecole polytechnique* |

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| **16:00 – 16:20**<br>09:00 – 09:20<br>02:00 – 02:20 | Drag on a Sphere over a Range of Knudsen Numbers and Speed Ratios<br>**White***, Cao, Agir, Vasiliadis<br>*University of Glasgow, UK* | On Moment Approximations of Boltzmann Equation: A Generic Moment System and Its FEM-Based Numerical Solution<br>**Christhuraj***, Torrilhon<br>*RWTH Aachen, Germany* | IXV Vehicle, Comparison of Aerothermodynamic DSMC Results and Flight Data in Rarefied Regime<br>**Schouler***, Prevereaud, Mieussens<br>*ONERA, France* | Energy and Momentum-Preserving Particle Scheme for the Magnetized Poisson-Vlasov-Fokker-Planck Equation<br>**Chung***, Fei, Gorji, Jenny<br>*Swiss Federal Institute of Technology, Switzerland* |
| **16:20 – 16:40**<br>09:20 – 09:40<br>04:20 – 02:40 | | Thermal Analysis of Mildly Rarefied Gaseous Flows through Isothermally Heated Circular Pipe<br>**Jha***, Agrawal<br>*Indian Institute of Technology Bombay, India* | Different Approaches for Simulation of Convective and Radiative Heat Fluxes in Planetary Entry Problems<br>**Istomin***, Kustova, Prutko<br>*Saint Petersburg State University, Russia* | Moment Models for Neutral Particles in the Plasma Edge<br>Cusicanqui, **Koellermeier***, Maes, Samaey<br>*University of Groningen, Netherlands* |
| **16:40 – 17:00**<br>09:40 – 10:00<br>02:40 – 03:00 | Multiscale Modelling and Computation of Hypersonic Gas Flows and Gas-Surface Interactions<br>**Zhang***, Deng, Tian, Feng, Fei<br>*Beihang University, P.R. China* | Domain Decomposed Hyper-reduction for Steady, Inviscid Hypersonic Flow<br>**Joshi***, Choi<br>*Virginia Polytechnic Institute and State University, USA.* | Validation of a Particle-In-Cell Code with Monte Carlo Collision Using the Finite Volume Method<br>**Kuhn***, Groll<br>*University of Bremen, Germany* | Fluid Simulations of Partially Magnetized Plasmas: Advanced Numerical Methods and Comparison to Kinetic Simulations<br>**Reboul***, Massot, Laguna, Anne Bourdon<br>*CNRS, France* |
| **17:00 – 17:10** | Break | | | |
| **17:10 – 18:10**<br>10:10 – 11:10<br>03:10 – 04:10 | **Bird Lecture**<br>(Exploring the Physics of Multiscale Flows at the Molecular Level, **Deborah Levin***, *University of Illinois at Urbana-Champaign*) | | | |
| **18:30 – 20:30**<br>11:30 – 13:30<br>04:30 – 06:30 | **Reception** | | | |

| Time | Tue (July 5th) | | | |
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| | **Room A** | **Room B** | **Room C** | **Room D** |
| **07:30 – 08:00 (KST)**<br>00:30 – 01:00 (CEST)<br>17:30 – 18:00 (CDT) | Registration | | | |
| | **Session T1A: Memorial Session for Bill Rich I**<br>(Chair: ) | **Session T1B: PDE-based Computational Methods for Non-equilibrium Flows II**<br>(Chair:) | **Session T1C: Gas-Surface Interactions (including Condensation) and Slip Flows I**<br>(Chair:) | **Session T1D: DSMC and HPC**<br>(Chair:) |
| **08:00 – 08:20**<br>01:00 – 01:20<br>18:00 – 18:20 | Detecting Order in Complexity of Molecular Collisions: Historical Perspective and Future Outlook<br>**Adamovich***, Rich<br>*Ohio State University, USA* | A Brief Review of the Direct Modeling Method: Multiscale Scheme, Unified Preserving Property, and Applications<br>**Chang Liu***<br>*Hong Kong University of Science and Technology, Hong Kong PRC* | Gas Scattering on Porous Surfaces and Its Impact on Rarefied Gas Transport in Shale<br>**Chen***, Jun, Li, Datta, Docherty, Gibelli, Borg<br>*University of Edinburgh, UK* | Impact Quantification of an Harmonic Oscillator Model for a Flow over a Sphere<br>**Civrais***, White, Steijl<br>*University of Glasgow, UK* |
| **08:20 – 08:40**<br>01:20 – 01:40<br>18:20 – 18:40 | | | The Influence of the Gas-Surface Interaction on the Drag and Thermophoresis on a Sphere in a Rarefied Gas<br>**Kalempa***, Sharipov<br>*University of Sao Paulo, Brazil* | On the Unsteady Behavior of a Hypersonic Flow over a Double Cone Using Kinetic Methods<br>**Karpuzcu***, Levin, Cerulus, Theofilis<br>*University of Illinois, Urbana-Champaign, USA* |
| **08:40 – 09:00**<br>01:40 – 02:00<br>18:40 – 19:00 | Development and Application of the Modified Marrone and Treanor Chemical Kinetics Model<br>Chaudhry*, **Boyd**, Candler<br>*University of Colorado Boulder, UK* | Application of a 10-Moment Fluid Model to Transition Neutral and Plasma Flows<br>**Kuldinow***, Hara<br>*Stanford University, USA* | Modeling Molecular Outgassing Transport and Deposition for Spacecraft Operating in Vacuum<br>**Anderson***, Alred, Hoey<br>*Jet Propulsion Laboratory, USA* | State of the SPARTA DSMC Code<br>**Moore***, Plimpton<br>*Sandia National Laboratories, USA* |
| **09:00 – 09:20**<br>02:00 – 02:20<br>19:00 – 19:20 | Vibrational Kinetics in 2D High Enthalpy Flows Using GPU's<br>**Colonna***, Bonelli, Ninni, Pascazio<br>*CNR-ISTP, Italy* | Investigation on the Validity of a Rarefied Gas Flow Model Based on the LBM as an Extended Navier-Stokes Equation Solver for Porous Media<br>**Tucny***, Vidal, Leclaire, Bertrand<br>*Research Center in Industrial Flow Processes (URPEI), Canada* | Stochastic Multiscale Simulation Method for Heterogeneous Catalysts: Concurrent Coupling of Kinetic Monte Carlo and Fluctuating Hydrodynamics<br>**Kim***, Nonaka, Bell, Garcia<br>*University of California, USA* | 3D-DSMC Method Applied to Coma Generation of Cometary Nuclei: Application to Comet 67P/Churyumov-Gerasimenko<br>**Pinzón-Rodríguez***, Gerig, Marschall, Herny, Thomas<br>*University of Bern, Switzerland* |
| **09:20 – 09:40**<br>02:20 – 02:40<br>19:20 – 19:40 | | Three-dimensional Generalized Finite Difference Method for Thermal Evolution and Rarefied Flows in Porous Small Planetary Bodies<br>**Zhang***, Hartzell<br>*University of Maryland, USA* | Measurements of Thermal and Tangential Momentum Accommodation Coefficients on a Solid Sample Surface in High Knudsen Number Flows<br>**Yamaguchi***, Osada, Endo<br>*Nagoya University, Japan* | On the Microscopic Characteristics of Hydrogen-oxygen Combustion Based on the DSMC Method<br>**Ma**, Yang*, Sun<br>*Chinese Academy of Sciences, China* |
| **09:40 – 10:00**<br>02:40 – 03:00<br>19:40 – 20:00 | Theoretical Models of Chemical Reactions in Vibrational-Translational Nonequilibrium<br>**Macheret***<br>*Purdue University, USA* | Modeling of High Speed Gas Flows Using In-house Computational Framework based on Direct Flux Reconstruction<br>**Suman**, Singh, Ujwal, Ramesh, Kumar*<br>*Indian Institute of Technology Kanpur, India* | Development of an Effective Finite-Rate Oxidation Model for Nusil-coated Charred Carbon Preform Ablators<br>**Swaminathan Gopalan***, Borner<br>*Analytical Mechanics Associates Inc. at NASA Ames Research Center, USA* | An Open Source USP Code within the Framework of SPARTA for the Simulation of Multiscale Gas Flows<br>**Feng**, Tian, Zhang*<br>*Beihang University, China* |
| **10:00 – 10:20**<br>03:00 – 03:20<br>20:00 – 20:20 | Coffee Break | | | |
| | **Session T2A: Memorial Session for Bill Rich II**<br>(Chair) | **Session T2B: Entropy-Based Moment Closure Methods for Kinetic Equations**<br>(Chair:) | **Session T2C: Gas-Surface Interactions (including Condensation) and Slip Flows II**<br>(Chair:) | **Session T2D: DSMC IV**<br>(Chair:) |
| **10:20 – 10:40**<br>03:20 – 03:40<br>20:20 – 20:40 | Validation of Vibrational Kinetics in Molecular Plasmas<br>**Guerra***, Silva, C. Dias, Fromentin, Baratte, Guaitella<br>*Instituto de Plasmas e Fusao Nuclear, Instituto* | Development, Numerical Solution, and Application of Maximum-Entropy-Inspired Moment Closures for Non-Equilibrium Gaseous Flows with Shocks<br>**Clinton Groth*** | Molecular Dynamics Study of Gas Surface Interactions on B-Cristobalite Surface<br>**Naspoori**, Kumar*, Kammara, Appar<br>*Indian Institute of Technology Kanpur, India* | Outflow of a Gaseous Mixture with a Large Species Mass Ratio into Vacuum<br>**Bykov***, Fedorov, Zakharov<br>*Russian Academy of Sciences, Russia* |

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| **10:40 – 11:00**<br>03:40 – 04:00<br>20:40 – 21:00 | *Superior Tecnico, Portugal* | *University of Toronto, Canada* | Heterogeneous Catalytic Reactions of Dissociated Air on the B-cristobalite Surface<br>**Pogosbekian***, Kroupnov<br>*Lomonosov Moscow State University, Russia* | Evaporation/Condensation and Nozzle Flow Modeling for FEMTA Microthruster<br>**Fowee Gasaway***, Pugia, Vorozhbit, Kazarin, Alexeenko<br>*Purdue University, USA* |
| **11:00 – 11:20**<br>04:00 – 04:20<br>21:00 – 21:20 | High Temperature Flow Simulations: Reduced Models and Data Validation<br>**Kustova***, Kunova, Kravchenko, Melnik<br>*Saint Petersburg State University, Russia* | Multi-Dimensional Approximate Maximum-Entropy Twenty-One-Moment Model with a Novel Approximation for Knudsen-Layer Wall Boundary Conditions<br>**Giroux***, McDonald<br>*University of Ottawa, Canada* | Condensation Induced by Rapidly Moving Liquid Film Surrounded by Vapor and Non-condensable Gas<br>**Ohashi***, Kobayashi, Fujii, Watanabe<br>*Hokkaido Univeristy, Japan* | Modeling of Lunar Dust Dispersion Using Two-Way Coupled Lagrangian-Lagrangian Framework<br>**Kumar***, Chinnappan, Bajpai, Bhavsar<br>*Indian Institute of Technology Kanpur, India* |
| **11:20 – 11:40**<br>04:20 – 04:40<br>21:20 – 21:40 | Modeling of Optical Diagnostics to Study Nonequilibrium Characteristics of High-Temperature Flows<br>Levin, Gimelshein, Wysong, **Karpuzcu***, Thirani<br>*University of Illinois, Urbana-Champaign, USA* | Investigation into New Moment-Closure-Based Quantum Hydrodynamics Models<br>**Morin***, McDonald<br>*University of Ottawa, Canada* | Gas Adsorption Modeling for Various Monoatomic Gases Considering Quantum Effects<br>**Basdanis***, Misdanitis, Valougeorgis, Sharipov<br>*University of Thessaly, Greece* | Coupling Carbon Oxidation and Surface Recession in Direct-Simulation Monte Carlo Code, SPARTA<br>**Arias***, Gopalan, Borner, Stephani, Plimpton<br>*University of Illinois at Urbana-Champaign, USA* |
| **11:40 – 12:00**<br>04:40 – 05:00<br>21:40 – 22:00 | | On the Application of Maximum-Entropy Inspired Multi-Gaussian Moment Closure for Multi-Dimensional Non-Equilibrium Gas Kinetics<br>**Brooks***, Groth, Laurent<br>*University of Toronto, Canada* | Simulation of Rarefied Gas Flow in a Channel Applying Artificial Neuron Network<br>Aksenova, **Khalidov***<br>*St.Petersburg Naval Polytechnic University, Russia* | Jet Expansion into the Vacuum Chamber: Kinetic-Continuum Computations and Validation Against Experiment<br>**Zaitsev***, Yarkov, Zarvin, Dubrovin, Bondar<br>*Khristianovich Institute of Theoretical and Applied Mechanics SB RAS, Russia* |
| **12:00 – 12:20**<br>05:00 – 05:20<br>22:00 – 22:20 | Determining Vibrational Distributions by Rotational Raman<br>**Miles***, Dogariu, Abbasszadehrad<br>*Texas A&M University, USA* | First-Order Hyperbolic-Relaxation Turbulence Modelling for Moment-Closures<br>**Yan***, McDonald<br>*University of Ottawa, Canada* | Simulation of Rarefied Gas Flow Near Rough Surface Applying the Solution of Inverse Problem<br>**Aksenova***, Khalidov<br>*St.Petersburg Naval Polytechnic University, Russia* | Kinetic Comparative Study of Rarefied-Transitional Flows<br>**Li***, Jiang, Geng, Chen, Wang<br>*China Aerodynamics Research and Development Center, China* |
| **12:20 – 13:20**<br>05:20 – 06:20<br>22:20 – 23:20 | Lunch & **Poster** | | | |
| | **Session T3A: Kinetic Theory for Gases and Complex Systems I**<br>(Chair:) | **Session T3B: Experimental Techniques for Non-equilibrium Flows**<br>(Chair:) | **Session T3C: Bulk Viscosity and Relaxation Processes I**<br>(Chair:) | **Session T3D: Non-equilibrium Reacting Flows and DSMC**<br>(Chair:) |
| **13:20 – 13:40**<br>06:20 – 06:40<br>23:20 – 23:40 | Discontinuous Galerkin Methods for Hyperbolic Moment Models of the Boltzmann-BGK Equation<br>**Van Heyningen***, Nguyen, Peraire<br>*Massachusetts Institute of Technology, USA* | Molecular Tagging – an Experimental Technique for Velocimetry and Thermometry in Internal Rarefied Gas Flows<br>**Stephane Colin***<br>*University of Toulouse, France* | Continuum Models for Bulk Viscosity and Relaxation in Polyatomic Gases<br>**Kustova***, Mekhonoshina, Bechina, Lagutin, Alekseev<br>*Saint Petersburg State University, Russia* | Implementation of Detailed Balance in DSMC Based on an Internal Energy Model Coupling Ro-vibrational and Electronic Energy<br>**Yang**, Sun, Hu*<br>*Chinese Academy of Sciences, China* |
| **13:40 – 14:00**<br>06:40 – 07:00<br>23:40 – 00:00 | Fast Evaluation of the Boltzmann Collision Operator Using Data Driven Reduced Order Models<br>**Alekseenko***, Martin, Wood<br>*California State University Northridge, USA* | | Understanding Role of Bulk Viscosity in Rarefied Polyatomic Gases Based on Rational Extended Thermodynamics<br>**Arima***<br>*National Institute of Technology Tomakomai College, Japan* | Relaxation Processes During Gas-jet Deposition of Diamond Structures from a Cloud of Microwave-activated Gas<br>**Yudin***, Plotnikov, Rebrov<br>*Kutateladze Institute of Thermophysics of SB RAS, Russia* |
| **14:00 – 14:20**<br>07:00 – 07:20<br>00:00 – 00:20 | A Rotational Relaxation Model for Nonlinear Coupled Constitutive Relations<br>**Yuan**, Jiang*, Zhao, Chen<br>*Zhejiang University, China* | Development and Validation of a Nitric Oxide Vibrational Temperature Diagnostic Using Ultraviolet Laser Absorption Spectroscopy<br>**Krish***, Streicher, Hanson<br>*Stanford University, USA* | | Capturing the COVID-19 Pandemic Characteristic with DSMC Method<br>**Guan**, Wang*<br>*University of Chinese Academy of Sciences, China* |
| **14:20 – 14:40**<br>07:20 – 07:40<br>00:20 – 00:40 | Application of the Moment System of Equations in the Second Approximation to Determine the Speed and Surface Temperature of the Aircraft<br>**Sakabekov**, Yergazina, Auzhani*<br>*Satbayev University, Kazakhstan* | Experimental Investigation on Electron Beam Fluorescence Application in Rare Gas Flow<br>**AiGuo***, YanGuang, Zhihui, Yin, Zhonghua, Jie<br>*China Aerodynamics Research and Development Center, China* | Vibrational Relaxation and Heat Capacity of CO2 under Non Thermodynamic Equilibrium<br>**Fernandez***, Alvarez, Tejeda, Montero<br>*Instituto de Estructura de la Materia, Spain* | A Comparison of Nonlinear Coupled Constitutive Relations and DSMC for Hypersonic Reverse Jet Flows<br>**Huang**, Zeng, Jiang*, Chen<br>*Zhejiang University, China* |

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| **14:40 – 15:00**<br>07:40 – 08:00<br>00:40 – 01:00 | Similarity Parameters in the Longitudinal Cylindrical Couette Problem: From the Continuous to Free Molecular<br>Abramov, Alexandrov, **Butkovskii***<br>*Central Aerohydrodynamic Institute, Russia* | Shock Tube Measurements of Atomic Nitrogen Collisional Excitation in Partially-ionized Nitrogen-Argon Mixtures<br>**Finch***, Granowitz, Streicher, Krish, Strand, Hanson<br>*Stanford University, USA* | | Influence of DSMC Collision Model Parameters on Hypersonic Chemically Reacting Flows<br>**Hu**, Zhao, Li, Geng, Yang*, Sun<br>*Chinese Academy of Sciences, China* |
| **15:00 – 15:20**<br>08:00 – 08:20<br>01:00 – 01:20 | Renormalized Expressions for Momentum and Energy Exchange Terms for a Disparate Gas Mixture<br>**Gorbachev***<br>*Novosibirsk State University, Russia* | Rotational Relaxation of CO2 in Supersonic Jets: A Gas Dynamic and Kinetic Study by Raman Spectroscopy<br>**Alvarez***, Fernandez, Tejeda, Montero<br>*Instituto de Estructura de la Materia, Spain* | Studying Rotational Relaxation in Gas Mixtures by Molecular Simulations of Rayleigh-Brillouin Scattering<br>**Ma**, Yang, Bruno, Zhang*<br>*Beihang University, China* | Low-variance Deviational Monte Carlo Simulation of Polyatomic Rarefied Gas Flow Using Reduction Method<br>**Shiraishi***, Imai, Yoshimoto, Takagi, Kinefuchi<br>*The University of Tokyo, Japan* |
| **15:20 – 15:40**<br>08:20 – 08:40<br>01:20 – 01:40 | Coffee Break | | | |
| **15:40 – 16:40**<br>08:40 – 09:40<br>01:40 – 02:40 | **Thomas Lecture**<br>(Light Extinction, Rayleigh-Brillouin Scattering and Absorption in the Earth's Atmosphere, and in Dilute and Dense Gases, **Wim Ubachs***, *Vrije University*) | | | |
| **16:40 – 16:50**<br>09:40 – 09:50<br>02:40 – 02:50 | Break | | | |
| | **Session T4A: Kinetic Theory for Gases and Complex Systems II**<br>(Chair:) | **Session T4B: Hypersonic Vehicles and Shock Waves**<br>(Chair:) | **Session T4C: Bulk Viscosity and Relaxation Processes II**<br>(Chair:) | **Session T4D: DSMC V**<br>(Chair:) |
| **16:50 – 17:10**<br>09:50 – 10:10<br>02:50 – 03:10 | Reynolds Analogy for the Rarefied Gas Flow Past a Flat Plate at Zero Incidence: Similarity Parameters<br>Abramov, **Butkovskii***<br>*Central Aerohydrodynamic Institute, Russia* | CFD/Radiation Analysis of the Chelyabinsk and St Valentine Meteoroids<br>**Reynier***, Lino Da Silva<br>*Ingénierie et Systèmes Avancés, France* | New Challenges in Modeling Non-Equilibrium Carbon Dioxide Flows<br>**Elena Kustova***<br>*Saint Petersburg State University, Russia* | DSMC Study of Taylor Couette Flow with Added Circulation<br>Garg, **Bhandarkar***, Puranik<br>*Indian Institute of Technology Bombay, India* |
| **17:10 – 17:30**<br>10:10 – 10:30<br>03:10 – 03:30 | Rarefied Cylindrical Couette Flow with Different Boundary Surface Temperatures<br>Abramov, **Alexandrov***, Butkovskii<br>*Central Aerohydrodynamic Institute, Russia* | Experimental Investigation on the Role of Boundary Layers Around a Supersonic Cylinder in Rarefied Flows<br>**Kovacs***, Passaggia, Mazellier, Lago<br>*CNRS, France* | | Computation of Hypersonic Flow around an Isolated Roughness Element Using Kinetic Theory<br>**Klothakis***, Dylewicz, Theofilis, Levin<br>*Technical University of Crete, Greece* |
| **17:30 – 17:50**<br>10:30 – 10:50<br>03:30 – 03:50 | A Kinetic Model for Rarefied Flows of Molecular Gases with Vibrational Modes<br>**Li**, Wu*<br>*Southern University of Science and Technology, China* | Simulation of Radiating Non-Equilibrium Flows around a Capsule Entering Titan's Atmosphere<br>**Beyer***, Pfeier, Nizenkov, Fasoulas<br>*University of Stuttgar, Germany* | Internal Energy Relaxation Processes and Bulk Viscosities<br>Bruno, **Giovangigli***<br>*Ecole Polytechnique, France* | Surface Chemistry Modelling with the Simulation Tool PICLas<br>**Lauterbach***, Pfeier, Fasoulas<br>*University of Stuttgart, Germany* |
| **17:50 – 18:10**<br>10:50 – 11:10<br>03:50 – 04:10 | Sound Wave Propagation in Rarefied Polyatomic Gases<br>**Li**, Su, Zhang*<br>*The University of Edinburgh, UK* | On Transitory Shock Interaction with Incipient Flow Separation<br>**Kang**, Lee*<br>*KAIST, Korea* | Bulk Viscosity of Dilute Gases Using MD Simulations<br>**Sharma**, Kumar*<br>*Indian Institute of Technology Kanpur, India* | Analysis of Non-Equilibrium Gas Flows with Evaporation from Porous Array Membranes<br>**Imai***, Yoshimoto, Takagi, Kinefuchi<br>*The University of Tokyo, Japan* |
| **18:10 – 18:30**<br>11:10 – 11:30<br>04:10 – 04:30 | Anomalous Transport in Flows near Simple Bodies<br>**Aristov***, Voronich, Zabelok<br>*Russian Academy of Sciences, Russia* | Numerical Analysis of Shock Wave Propagation in a Macrotube at Reduced Pressures<br>**Lokhande***, Deshpande<br>*Veermata Jijabai Technological Institute, India* | | Implementation of Machine Learning Methods for Non Equilibrium Gas Dynamic Problems<br>**Istomin***, Kustova, Lagutin, Shalamov<br>*Saint-Petersburg State University, Russia* |
| **18:30 – 18:50**<br>11:30 – 11:50<br>04:30 – 04:50 | Kinetic Study of Spatial Spread of COVID-19 Waves<br>**Aristov***, Aliev, Stroganov, Yastrebov<br>*Russian Academy of Sciences, Russia* | Experimental and Numerical Analysis of Rarefaction and Base Geometry Effects on Supersonic Flows<br>Toussaint*, **Noubel**, Baranger, Braeunig, Lago<br>*CEA-CESTA, France* | Quantum-classical Calculations of Transport Collision Integrals from Accurate Intermolecular Potentials<br>**Hong**, Coletti, Bartolomei, Sun*, Pirani<br>*Chinese Academy of Sciences, China* | Direct Simulation Monte Carlo Modeling of the Flip over Effect in Laser Produced Plasma Expansion Using SPARTA<br>**Emperado***, Dasallas, Garcia<br>*University of the Philippines Diliman, Philippines* |
| **19:00 – 21:00**<br>12:00 – 14:00<br>05:00 – 07:00 | **IAC Meeting / NextGen** | | | |

| Time | Wed (July 6th) | | | |
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| | **Room A** | **Room B** | **Room C** | **Room D** |
| **07:30 – 08:00 (KST)**<br>00:30 – 01:00 (CEST)<br>17:30 – 18:00 (CDT) | Registration | | | |
| | **Session W1A: Kinetic Theory for Gases and Complex Systems III**<br>(Chair:) | **Session W1B: Rarefied Flows in Porous Media**<br>(Chair:) | **Session W1C: Non-equilibrium Reacting Flows I**<br>(Chair:) | **Session W1D: Jet, Plumes and Vapor Deposition**<br>(Chair:) |
| **08:00 – 08:20**<br>01:00 – 01:20<br>18:00 – 18:20 | A Kinetic Approach for Collective Dynamics<br>**Seung Yeal Ha***<br>*Seoul National University, South Korea* | Heat Conduction of Rarefied Gas in Porous Media<br>**Su***, Zhang<br>*The University of Edinburgh, UK* | Shock-Tube and Laser Absorption Study of the N2 + O → NO + N Reaction Rate at High Temperatures<br>**Streicher***, Krish, Chang, Hanson<br>*Stanford University, USA* | Rarefied Supersonic Jet of Metal Vapor with a Light Carrier Gas: Cluster Formation Processes<br>**Bykov***, Fedorov, Safonov, Starinskiy, Bulgakov<br>*Saint Petersburg Polytechnic University, Russia* |
| **08:20 – 08:40**<br>01:20 – 01:40<br>18:20 – 18:40 | | Rarefied Porous Flow Effects in Lyophilization<br>**Wheeler***, Kazarin, Narsimhan, Alexeenko<br>*Purdue University, USA* | Thermal Conductivity of Molecular Nitrogen from ab initio Direct Molecular Simulations<br>**Valentini***, Grover, Bisek, Verhoff<br>*University of Dayton Research Institute, USA* | Moon Landing: Thrusters Cluster Plume Interactions Modelling<br>**Zitouni***, Kast, Peukert<br>*OHB, Germany* |
| **08:40 – 09:00**<br>01:40 – 02:00<br>18:40 – 19:00 | Study of the Chemical Composition of Pyrolysis Distillate<br>**Salokhiddinov***<br>*National University of Uzbekistan named after MirzoUlugbek, Uzbekistan* | Predicting Rarefied Gas Flow Through Surface Functionalized Channels<br>**Kunze***, Besser, Groll, Thöming<br>*University of Bremen, Germany* | Role of Translational Non-equilibrium Effects on Reactive Dynamics Controlling the Shock to Detonation Transition Using Molecular Dynamics<br>**Murugesan***, Radulescu<br>*University of Ottawa, Canada* | Continuum-based Simulation of the Plume and Dusty Surface Interaction in Lunar Landing Using OpenFOAM<br>**Ejtehadi***, Mankodi, Sohn, Myong<br>*Chungnam National University, Korea* |
| **09:00 – 09:20**<br>02:00 – 02:20<br>19:00 – 19:20 | Transport Coefficients for Dilute Relativistic Degenerate Gases in Arbitrary Dimensions<br>**Garcia-Perciante***, Mendez, Chacon-Acosta<br>*Universidad Autonoma Metropolitana, Mexico* | To be updated<br>**Kodama***<br>*Daiichi Sanyo Co., Ltd., Japan* | Quantum Mechanically Guided Simulations of Nonequilibrium Hypersonic Flow<br>**Grover***, Valentini, Verhoff, Bisek<br>*University of Dayton Research Institute, USA* | Calculation of Sputtered Atom Deposition via Non-Maxwellian View Factor Model and Particle VDF Compression<br>**Araki***, Martin<br>*Air Force Research Laboratory, USA* |
| **09:20 – 09:40**<br>02:20 – 02:40<br>19:20 – 19:40 | Locally-implicit Discontinuous Galerkin Schemes for the Kinetic Boltzmann-BGK System That Are Arbitrarily High-Order And Asymptotic-Preserving<br>**Rossmanith***, Sar<br>*Iowa State University, USA* | Macroscopic Model for Unsteady Slip Flow in Porous Media<br>**Lasseux***, Valdés-Parada, Bottaro<br>*CNRS, University of Bordeaux, France* | Bow Shock Stand-off Distance in CO2 at Re-entry Velocities: Theoretical Analysis and Numerical Simulation<br>**Bondar***, Shoev<br>*Khristianovich Institute of Theoretical and Applied Mechanics SB RAS, Russia* | A Parabolic Supersonic Nozzle for High Center-Line Density for Free Jets<br>**Patel***, Thomas, Joshi<br>*Institute for Plasma Research, India* |
| **09:40 – 10:00**<br>02:40 – 03:00<br>19:40 – 20:00 | Analytical Solution for the Development of Rarefied Shear Flow<br>**Mohan***, Sameen, Srinivasan, Girimaji<br>*Indian Institute of Technology Madras, India* | Temperature Gradient Driven Flows through a Microporous Medium<br>Johansson, Perrier, Topin, **Graur***<br>*Aix-Marseille University, France* | Evaluation of Velocity Gradient Term in Goulard Heat Transfer Theory<br>**Jeong**, Yang, Yoon, Kim*<br>*Sejong University, Korea* | Splitting of Laser-induced Plasma Plumes Due to the Snow-plow Effect: Kinetic-continuum Simulations<br>**Volkov***, Humphrey<br>*University of Alabama, USA* |
| **10:00 – 10:20**<br>03:00 – 03:20<br>20:00 – 20:20 | Coffee Break | | | |
| | **Session W2A: Recent Advances on Emergent Behaviors and Collective Dynamics**<br>(Chair:) | **Session W2B: Multiphase Flows and Kinetic Modeling**<br>(Chair:) | **Session W2C: Multiscale, Micro- & Nano-scale Flow and Heat Transfer I**<br>(Chair:) | **Session W2D: Dust in Lunar Exploration**<br>(Chair:) |
| **10:20 – 10:40**<br>03:20 – 03:40<br>20:20 – 20:40 | A Unified Framework for Distributed Optimization Algorithms over Time-varying Directed Graphs<br>**Kim***, Choi, Yun<br>*Hanyang University, Korea* | Particle Impact on the Surface of a High Mach Number Recirculating Double-Cone Flow<br>**Liu***, Marayikkottu, Karpuzcu, Levin<br>*University of Illinois Urbana Champaign, USA* | Thermal Transportation inside Oscillating Cavity over Various Flow Regimes<br>**Lim**, Xu*<br>*Hong Kong University of Science and Technology, Hong Kong PRC* | Kinetic Particle Simulations of Plasma Charging and Dust Transport near the Lunar Terminator<br>**Han***, Zhao, Lund<br>*Missouri University of Science and Technology, USA* |
| **10:40 – 11:00** | | Numerical Simulation of Instabilities Emerging in | Effect of Boundary in Nano-confinement | |

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| 03:40 – 04:00<br>20:40 – 21:00 | Asymptotic Behavior of a System for Coupled Schrodinger Equations<br>**Kim***, Park<br>*Sungshin Women's University, Korea* | Gravitational Fields Using Kinetic and Continuum Approaches<br>Kashkovsky, Kudryavtsev, **Shershnev***<br>*Khristianovich Institute of Theoretical and Applied Mechanics SB RAS, Russia* | **Hossain**, Kim*<br>*University of Ulsan, Korea* | Electrostatic Dust Motion on the Moon and Asteroids: A Review<br>**Hartzell***<br>*University of Maryland, USA* |
| **11:00 – 11:20**<br>04:00 – 04:20<br>21:00 – 21:20 | | A Multi-Continuum Model for Gas Flow in Heterogeneous and Hierarchical Porous Media of Shale Reservoirs<br>**Wu***, Wang, Wang<br>*Colorado School of Mines, USA* | Variational Multiscale Moment Methods for the Boltzmann Equations<br>**Baidoo***, Abdelmalik, Hughes, Gamba, Caarelli<br>*The University of Texas at Austin, USA* | |
| **11:20 – 11:40**<br>04:20 – 04:40<br>21:20 – 21:40 | Rigorous Derivation of the Euler-alignment Model with Singular Communication Weights from a Kinetic Fokker-Planck-alignment Model<br>**Choi**, Kim*<br>*Korea Institute for Advanced Study, Korea* | Numerical Analyzition of Nano-particle Following Features for Rayleigh Scattering Velocity Measurement Test in Low Density Wind Tunnel<br>**Zhonghua***, Zhihui, Aiguo, Junlin<br>*China Aerodynamics Research and Development Center, China* | Simplified Unified Wave-Particle Method and Direct Relaxation Process<br>**Liu***, Yang, Fang, Geng, Zhong*<br>*Northwestern Polytechnical University, China* | Spacecraft Engine Plumes in Near-Vacuum: Earth's Moon and Beyond<br>**Hoey***, Soares, Alred, Anderson, Martin, Shallcross, Wong<br>*California Institute of Technology, USA* |
| **11:40 – 12:00**<br>04:40 – 05:00<br>21:40 – 22:00 | | Unified Gas-Kinetic Wave-Particle Method for Gas-Particle Flow in All Regimes<br>**Yang**, Xu*<br>*Hong Kong University of Science and Technology, Hong Kong PRC* | Numerical Analysis of Unsteady Rarefied Gas Flows around a Sphere Induced by Impulsive Rotation<br>**Tsuji**, Taguchi*, Kotera<br>*Kyoto University, Japan* | |
| **12:00 – 12:20**<br>05:00 – 05:20<br>22:00 – 22:20 | Convergence Analysis of the Discrete Consensus-Based Optimization Algorithm with Random Batch Interactions and Heterogeneous Noises<br>**Ko**, Ha, Jin, Kim*<br>*Hanyang University, Korea* | Numerical Simulation of Decent Vehicle Entry in Dust Flow Conditions<br>**Polyanskiy***, Zaitsev<br>*Khristianovich Institute of Theoretical and Applied Mechanics SB RAS, Russia* | On the Application of the Regularized Lattice Boltzmann Method for Isothermal Flows with Non-Vanishing Knudsen Numbers<br>**Jonnalagadda***, Yadav, Sharma, Agrawal<br>*Indian Institute of Science, India* | Lunar Dust: Recent Observations and Experimental Studies<br>**Zhang***, Gan, Xie<br>*Macau University of Science and Technology, Macau* |
| **12:20 – 13:20**<br>05:20 – 06:20<br>22:20 – 23:20 | Lunch | | | |
| **13:20 – 21:00**<br>06:20 – 14:00<br>23:20 – 07:00 | Excursion | | | |

| Time | Thu (July 7th) | | | |
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| | Room A | Room B | Room C | Room D |
| **07:30 – 08:00 (KST)**<br>00:30 – 01:00 (CEST)<br>17:30 – 18:00 (CDT) | Registration | | | |
| | **Session Th1A: Hypersonic Vehicles, Facilities, and Diagnostics I**<br>(Chair:) | **Session Th1B: Electric Propulsion I**<br>(Chair:) | **Session Th1C: DSMC VI**<br>(Chair:) | **Session Th1D: Hypersonic Flows I**<br>(Chair:) |
| **08:00 – 08:20**<br>01:00 – 01:20<br>18:00 – 18:20 | Numerical Simulations of Rarefied Gas Flow over an Aero-spiked Hypersonic Blunt Body Using the Second-Order Boltzmann-Curtiss Constitutive Model<br>**Chourushi**, Singh, Vishnu, R. S. Myong*<br>*Gyeongsang National University, Korea* | Physics-based and Data-driven Models of Low-Temperature Plasmas for Aerospace Applications<br>**Hara***<br>*Stanford University, USA* | Noncontinuum Effects at the Smallest Scales of Turbulence<br>**Gallis***, McMullen, Krygier, Torczynski<br>*Sandia National Laboratories, USA* | Recent Progress of Impulse Facilities at KAIST<br>**Park***, Kim, Yang<br>*KAIST, Korea* |
| **08:20 – 08:40**<br>01:20 – 01:40<br>18:20 – 18:40 | Doppler-free Saturated Absorption Velocimetry for Low-density Hypersonic Flow Diagnostics<br>**Roy***, O'Byrne<br>*The University of New South Wales, Australia* | | Thermal Transpiration Flows Induced by Differences in Accommodation Coefficients<br>**Sugimoto***, Sugimoto<br>*Kyoto University, Japan* | |
| **08:40 – 09:00**<br>01:40 – 02:00<br>18:40 – 19:00 | Prediction of Aerodynamic Heating over Hypersonic Flow Using Rapid Aerothermodynamic Analysis Program<br>**Yeo**, Han, Kim, Seo, Kim*<br>*Seoul National University, Korea* | Ion Transport in the Magnetic Nozzle of Electrodeless Plasma Thrusters for Spacecraft<br>**Mazouffre***, Vinci, Inchingolo, Navarro-Cavalle, Fajardo<br>*CNRS, ICARE laboratory, France* | Direct Simulation Monte Carlo Simulations of 2D Rayleigh-Benard Convection<br>**Han**, Lo*, Mo<br>*National Defense University, Taiwan ROC* | Application of Modified Chemical-Kinetic Parameters to High-Enthalpy Flows<br>**Kim***<br>*Sejong University, Korea* |
| **09:00 – 09:20**<br>02:00 – 02:20<br>19:00 – 19:20 | Numerical Simulation of Aerodynamic Characteristics of a Sharp-edged Vehicle Using NNW-UGKS<br>**Dingwu** , Jin, Pei*, Meiliang, Haomin<br>*China Aerodynamics Research and Development Center, China* | | A Hybrid Unified Stochastic Particle Bhatnagar-Gross-Krook and DSMC Method for Polyatomic Gases<br>**Fei***, Hu*, Jenny<br>*Huazhong University of Science and Technology, Chinese Academy of Sciences, China* | Electronic-state-resolved Non-equilibrium Analysis of ICP Discharges<br>**Kumar***, Munafo, Panesi<br>*University of Illinois at Urbana-Champaign, USA* |
| **09:20 – 09:40**<br>02:20 – 02:40<br>19:20 – 19:40 | A Canonical Optimization Approach for Waverider Inverse Design<br>**Son**, Son, Yee*<br>*Seoul National University, Korea* | PIC Model of Air-breathing Hall thruster<br>**Taccogna***, Cichocki, Minelli<br>*CNR-ISTP, Italy* | The Chemically Reacting Hypersonic Flow over a Reentry Capsule with Hybrid Chemical Reaction<br>**Gokul**, Malaikannan*<br>*SRM Institute of Science and Technology, India* | A Numerical Model for Porous Ceramics Composites Oxidation Using Volume Averaging Theory<br>**Le Maout***, Konnik, Rzepka, Foster, Panerai, Stephani<br>*University of Illinois at Urbana-Champaign, USA* |
| **09:40 – 10:00**<br>02:40 – 03:00<br>19:40 – 20:00 | Numerical Simulation of Operating Characteristics of JF12 Shock Tunnel for Mars Entry Aerodynamic Tests<br>**Han***, Hu, Peng, Han, Jiang<br>*Chinese Academy of Sciences, China* | Part 1: Experimental Studies on Taylor Cone Formation with Annular/Linear Slit Configured Emitter for FEEP Thruster<br>Kwon, Kumar, Kwon, **Yoh***<br>*Seoul National University, Korea* | Recommended Direct Simulation Monte Carlo Collision Model Parameters for Reacting Methane Flows<br>**Gosma**, Gopalan, Stephani*<br>*University of Illinois at Urbana-Champaign, USA* | |
| **10:00 – 10:20**<br>03:00 – 03:20<br>20:00 – 20:20 | Coffee Break | | | |
| | **Session Th2A: Hypersonic Vehicles, Facilities, and Diagnostics II**<br>(Chair: ) | **Session Th2B: Electric Propulsion II**<br>(Chair:) | **Session Th2C: DSMC VII**<br>(Chair:) | **Session Th2D: Hypersonic Flows II**<br>(Chair:) |
| **10:20 – 10:40**<br>03:20 – 03:40<br>20:20 – 20:40 | Experimental Investigation of Waverider Aerodynamic Forces in Supersonic and Hypersonic Slip Regime<br>**Noubel***, Lago, Baranger<br>*CNRS, France* | Unique Physical Features of Cylindrical Hall Thruster Plasmas for Low Power Operation<br>**Choe***, Kim, Doh, Lim, Lee, Kim<br>*KAIST, Korea* | Effect of Rarefaction on Axial Vortex Using Direct Simulation Monte Carlo<br>**Dhurandhar***, Mohan, Sharma, Sameen<br>*Indian Institute of Technology Madras, India* | Self-consistent Modeling of ICP Discharges<br>**Munafo***, Kumar, Le Maout, Chiodi, Panesi<br>*University of Illinois at Urbana-Champaign, USA* |
| **10:40 – 11:00**<br>03:40 – 04:00<br>20:40 – 21:00 | Experimental Study of Sphere Drag Measurement in Hypersonic Low-Density Flow Using Accelerometer<br>**Lee**, Park*<br>*KAIST, Korea* | | Thermally Driven Rarefied Flows Induced by a Partially Heated Diamond in a Channel<br>Zhu, **Roohi***<br>*Xi'an Jiaotong University, China* | Bayesian Inference of Chemical-Kinetic |

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| **11:00 – 11:20**<br>04:00 – 04:20<br>21:00 – 21:20 | Validity of the Blowing Correction Correlation in Rarefied Flow Regimes<br>**Appar**, Sivakumar, Bajpai, Kumar*, Naspoori<br>*Indian Institute of Technology Kanpur, India* | Hybrid Kinetic-Fluid Simulations of Hall Thruster Plasma Dynamics<br>**Kawashima***, Komurasaki<br>*Shibaura Institute of Technology, Japan* | Flow-field and Performance Analysis of Plug Nozzle Under Continuum, Rarefied and Transitional Flow Regimes<br>**Jency**, Appar, Khan, Kumar*<br>*Indian Institute of Technology Kanpur, India* | Parameters of CN for Titan Entry<br>Jo, Rostkowski, **Panesi***<br>*University of Illinois at Urbana-Champaign, USA* |
| **11:20 – 11:40**<br>04:20 – 04:40<br>21:20 – 21:40 | A Pump-Probe Laser-Induced Fluorescence Diagnostic for Measuring Velocity Distributions in High-Enthalpy Wind Tunnels<br>**Cousens***, O'byrne<br>*University of New South Wales Canberra, Australia* | R&D Activities of Electric Propulsion at Korea Aerospace Research Institute (KARI)<br>**Kim***, Kim, Cho, Doh, Lee, Kim, Choe<br>*KAIST, Korea* | Hypersonic Turbulence Modeling from Rarefied to Continuum Regimes<br>**Tumuklu**, Hanquist*<br>*University of Arizona, USA* | Comparison of Thermochemical Nonequilibrium Models for Hypersonic Flow Analysis in OREX Vehicle<br>**Yang**, Kim*<br>*Sejong University, Korea* |
| **11:40 – 12:00**<br>04:40 – 05:00<br>21:40 – 22:00 | Aerodynamic Force Measurement Technique of Free-Flying Model in a Shock Tunnel<br>**Choi**, Park*<br>*KAIST, Korea* | | Monte Carlo Simulation of Thermal Creep Flow Around a Set of Plates with Different Surface Temperatures in a Pipe<br>**Matsumoto***, Kurita, Kato<br>*Yokohama National University, Japan* | |
| **12:00 – 12:20**<br>05:00 – 05:20<br>22:00 – 22:20 | Development of Detonation Driven Shock Tunnels and the Application in Hypersonic Vehicle Tests<br>**Hu***, Peng, Han, Han, Jiang<br>*Chinese Academy of Sciences, China* | Sensitivity Analysis of Mesh-to-Mesh Interpolation in 2D Fluid-Particle Simulation of Hall Thruster Plasma<br>**Jung**, Sung*<br>*Korea Aerospace University, Korea* | Multi-Zone Kinetic-continuum Simulation of An Orbit Correction Thruster Back Flow Around a Space Station<br>**Kashkovskya***, Bondar<br>*Khristianovich Institute of Theoretical and Applied Mechanics SB RAS, Russia* | Suitability of Tunable Diode Laser Absorption Spectroscopy Experiments for Low Density Flows<br>**Kelly***, Cousens, O'Byrne<br>*University of New South Wales, Australia* |
| **12:20 – 13:20**<br>05:20 – 06:20<br>22:20 – 23:20 | Lunch & **Poster** | | | |
| | **Session Th3A: Boltzmann and Related Equations III**<br>(Chair:) | **Session Th3B: Numerical Methods for Kinetic Equations III**<br>(Chair:) | **Session Th3C: Nanoscale Transport Phenomena at Interfaces I**<br>(Chair: ) | **Session Th3D: Non-equilibrium Reacting Flows II**<br>(Chair:) |
| **13:20 – 13:40**<br>06:20 – 06:40<br>23:20 – 23:40 | Simulating Low-speed Rarefied Flows around 3D Particulate and Droplets<br>**Duncan Lockerby***<br>*University of Warwick, UK* | Efficient Compressible Lattice Boltzmann Methods: Numerical Equilibria and Adaptive Mesh in Phase Space<br>**Coreixas***, Latt, Shan<br>*University of Geneva, Switzerland* | "Law of the Nano-wall" in Nano-channel Gas Flows<br>**Barisik***<br>*Izmir Institute of Technology, Turkey* | Theoretical Modeling of Effects of Microstructure on Surface Oxidation under Rarefied Nonequilibrium Conditions<br>**Zhang**, Wang*<br>*University of Chinese Academy of Sciences, China* |
| **13:40 – 14:00**<br>06:40 – 07:00<br>23:40 – 00:00 | | A symmetry Class Approach to 3D Discrete Collision Models via Computer Algebra<br>**Babovsky***, Grabmeier<br>*Technische Universität Ilmenau, Germany* | | Vibrational-Chemical Coupling in State-Dependent Reaction Models in CO2<br>Kustova, **Savelev***<br>*Saint Petersburg State University, Russia* |
| **14:00 – 14:20**<br>07:00 – 07:20<br>00:00 – 00:20 | Moment Equations for a Polytropic Gas Reproducing Adjustable Transport Coeffcients<br>**Djordjic***, Pavic-Colic, Torrilhon<br>*RWTH Aachen, Germany* | Solving Kinetic Equations Using Quadrature Based Moment Methods<br>**Van Cappellen***, Laboureur<br>*von Karman Institute for Fluid Dynamics, Belgium* | Nanofluidic Transport under Continuous and Discontinuous Graphitic Confinements<br>**Park***<br>*POSTECH, Korea* | Construction of a Boltzmann Model Equation Synchronously Involving Polyatomic Molecular Internal Energy, Dissociation and Recombination Effects for Multicomponent Gases<br>**Wu***, Li, Peng, Jiang<br>*China Aerodynamics Research and Development Center, China* |
| **14:20 – 14:40**<br>07:20 – 07:40<br>00:20 – 00:40 | Compactness Property for the Linearized Boltzmann Operator in the Polyatomic Case<br>**Brull***, Shahine, Thieullen<br>*Institut de mathematiques de Bordeaux, France* | Neural Network Assisted Modeling and Simulation of Kinetic Theory and Fluid Mechanics<br>**Xiao*** Schotthöfer, Frank<br>*Karlsruhe Institute of Technology, Germany* | | Slip Boundary Conditions for Gas Mixture Flows with State-to-state Vibrational-Chemical Kinetics<br>**Shakurova***, Kustova<br>*Saint Petersburg State University, Russia* |
| **14:40 – 15:00**<br>07:40 – 08:00<br>00:40 – 01:00 | Hilbert Expansion Based Fluid Models for Describing Rarefied Gases Interacting with a Plasma Background Medium<br>**Maes***, Dekeyser, Koellermeier, Baelmans, Samaey<br>*KU Leuven, Belgium* | Nonlinear Approximation of the Boltzmann Equation with an ES-BGK Collision Model Using the Method of Moments<br>**van der Woude*** Abdelmalik, van Brummelen<br>*Eindhoven University of Technology, Netherlands* | Exploring the Link Between the Interfacial and Bulk: Functionalized 2D Materials as a Key for Nanoscale Engineering<br>**Bakli***<br>*Indian Institute of Technology Kharagpur, India* | Computational Simulation of Reentry Flows over Hypersonic Vehicles Using Nonlinear Coupled Constitutive Relations<br>**Zeng***, Zhao, Jiang, Chen<br>*Zhejiang University, China* |

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| **15:00 – 15:20**<br>08:00 – 08:20<br>01:00 – 01:20 | Measure-valued Solution to the Inelastic Boltzmann Equation with Hard Potentials<br>**Qi***, Jang<br>*The Chinese University of Hong Kong, Hong Kong, PRC* | Simulation of Multi-species Non-equilibrium Gas Flows with the Particle-Based Ellipsoidal Statistical Bhatnagar-Gross-Krook Method<br>**Hild***, Pfeiffer<br>*University of Stuttgart, Germany* | Modeling Molecular Transport Phenomena in Nanochannels, Superlattices and Nanotubes<br>Masuduzzaman, Al Hossain, Karim, **Kim***<br>*University of Ulsan, Korea* | Study on Chemical Reaction Channels of CO2+O ↔ CO + O2 Based on ab initio Calculation<br>**Furudate***, Hagebaum-Reignier, Jeung<br>*Chungnam National University, Korea* |
| **15:20 – 15:40**<br>08:20 – 08:40<br>01:20 – 01:40 | Coffee Break | | | |
| **15:40 – 16:40**<br>08:40 – 09:40<br>01:40 – 02:40 | **GNU-ERC Lecture**<br>(Thermodynamically Consistent Generalized Hydrodynamic Theory of Flows Far Removed from Equilibrium, **Byung-Chan Eu***, *McGill University*) | | | |
| **16:40 – 16:50**<br>09:40 – 09:50<br>02:40 – 02:50 | Break | | | |
| | **Session Th4A: Boltzmann and Related Equations IV**<br>(Chair:) | **Session Th4B: Numerical Methods for Kinetic Equations IV**<br>(Chair:) | **Session Th4C: Nanoscale Transport Phenomena at Interfaces II**<br>(Chair:) | **Session Th4D: Multiscale, Micro- & Nano-scale Flow and Heat Transfer II**<br>(Chair:) |
| **16:50 – 17:10**<br>09:50 – 10:10<br>02:50 – 03:10 | Dissipation and Dispersion Properties of Discrete Velocity Boltzmann Model on Nine-velocity Lattice<br>**Ilyin***<br>*Russian Academy of Sciences, Russia* | Efficient and Accurate Deterministic Solver for the Boltzmann Equation: The Fast Spectral Method and General Iterative Scheme<br>**Lei Wu***<br>*Southern University of Science and Technology, China* | Microfluidic Platform for Rapid and Dynamic Transport Control of Nanoparticles<br>**Kim***, Ha, Seo<br>*UNIST, Korea* | Three-dimensional Unified Gas-Kinetic Wave-Particle Method for Diatomic Gases in Rotational and Vibrational Nonequilibrium<br>**Wei**, Zhu, Xu*<br>*The Hong Kong University of Science and Technology, Hong Kong PRC* |
| **17:10 – 17:30**<br>10:10 – 10:30<br>03:10 – 03:30 | Balanced States and Closure Relations: Kinetic Models in the Fluid Dynamic Limit<br>**Babovsky***<br>*Technische Universität Ilmenau, Germany* | | A Comparison of Spectral Current and Temperature Dependent Wavelength of Vibrational Carrier Modes in Carbon Nanotubes and Boron Nitride Nanotubes<br>**Anandakrishnan**, Sathian*<br>*Indian Institute of Technology Madras, India* | Diffusion-slip Boundary Conditions in Modelling Flows in Micro- and Nano-channels<br>**Tomy***, Dadzie*<br>*Heriot-Watt University, UK* |
| **17:30 – 17:50**<br>10:30 – 10:50<br>03:30 – 03:50 | About Macroscopic Boundary Conditions for Three Dimensional Nonlinear Nonstationary Boltzmann's Moment System of Equations<br>**Sakabekov***, Auzhani<br>*Satbayev University, Kazakhstan* | Limits of the Kinetic Interpretation of Lattice Boltzmann Schemes: A Cure via a Macroscopic Standpoint with Finite Difference Schemes on the Conserved Moments<br>**Bellotti***, Graille, Massot<br>*Institut Polytechnique de Paris, France* | | Approximation of State-Resolved Diffusion Coeffcients Using Artificial Neural Networks<br>**Bechina**, Kustova, Avrutskiy, Chikitkin*<br>*Moscow Institute of Physics and Technology, Russia* |
| **17:50 – 18:10**<br>10:50 – 11:10<br>03:50 – 04:10 | Kinetic Theory of Confined Systems<br>**Maynar***, Garcıa de Soria, Brey<br>*Universidad de Sevilla, Spain* | Exponential BGK Integrator for Multiscale Flow Simulation<br>**Garmirian***, Gorji, Pfeiffer<br>*University of Stuttgart, Germany* | Coherent Phonon Scattering in the Coated Grain Nanocomposites and Their Thermoelectric Performance<br>**Kim***<br>*Yonsei University, Korea* | A data-driven Approach to DSMC-CFD Coupling for Multiscale Gas Flows<br>**Tatsios***, Chinnappan, Kamal, Vasileiadis, Gibelli, Docherty, White, Borg, Kermode, Lockerby<br>*University of Edinburgh, UK* |
| **18:10 – 18:30**<br>11:10 – 11:30<br>04:10 – 04:30 | Understanding an Instability in Vibrated Granular Monolayers<br>**Soria***, Maynar, Brey<br>*Universidad de Sevilla, Spain* | Advances in the Development of the Fokker-Planck Method for Simulation of Rarefied Gases<br>**Basov***, Grabe<br>*German Aerospace Center, Germany* | | Asymptotic Modelling of the Flow of a Thermal Binary Gas Mixture in a Microchannel with Variable Width<br>**Croizet***, Gatignol<br>*Sorbonne University, France* |
| **18:30 – 18:50**<br>11:30 – 11:50<br>04:30 – 04:50 | Consistent Models of Vibrational Kinetics in CO2 Flows<br>**Kosareva***, Kustova, Hannemman, Hannemman<br>*Saint-Petersburg State University, Russia* | SMARTA: a Code Based on the View-Factor Method for Collisionless Flows<br>**Parodi***, Alsalihi, Magin<br>*von Karman Institute for Fluid Dynamics, Belgium* | On the Mechanism of the Thermally Induced Tangential Knudsen Force<br>**Yonemura***, Otic<br>*Chubu University, Japan* | Computational Analysis of Pressure-Driven Gas Flows through a Periodical System of Short Channels in Wide Range of Rarefaction<br>**Voronich***, Titarev<br>*The Russian Academy of Sciences, Russia* |
| **19:00 – 21:00**<br>12:00 – 14:00<br>05:00 – 07:00 | **Banquet** | | | |

| Time | Fri (July 8th) | | | |
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| | **Room A** | **Room B** | **Room C** | **Room D** |
| **07:30 – 08:00 (KST)**<br>00:30 – 01:00 (CEST)<br>17:30 – 18:00 (CDT) | Registration | | | |
| | **Session F1A: Boltzmann Equation and BGK Models: Theory and Numerics I**<br>(Chair:) | **Session F1B: Space Vehicle Aerodynamics and Propulsion I**<br>(Chair:) | **Session F1C: Molecular Dynamics and Particle Methods I**<br>(Chair:) | **Session F1D: Vacuum Technology I**<br>(Chair: ) |
| **08:00 – 08:20**<br>01:00 – 01:20<br>18:00 – 18:20 | Ellipsoidal BGK Model of the Boltzmann Equation with the Correct Prandtl Number<br>**Yun***<br>*Sungkyunkwan University, Korea* | The VATMOS-SR Mission Concept: DSMC Studies of the Gas Sampling<br>**Borner***, Rabinovitch, Gallis, Parai, Petkov, Avice, Sotin<br>*AMA Inc. at NASA Ames Research Center, USA* | Effect of Confinement on Non-equilibrium Flow of Dense Gases<br>**Yonghao Zhang***<br>*The University of Edinburgh, UK* | Estimation of Gas Surface Interaction Coefficients in VKI's Dual Chamber Vacuum Facility<br>**Jorge***, Hubin, Magin<br>*von Karman Institute for Fluid Dynamics, Belgium* |
| **08:20 – 08:40**<br>01:20 – 01:40<br>18:20 – 18:40 | Non-Uniqueness of Stationary Solutions to the Radiative Transfer Equation<br>**Jang***, Velázquez<br>*Pohang University of Science and Technology, Korea* | Performance Comparison of Xenon and Krypton Mixture Discharges in 500 W-class Cylindrical Hall Thruster<br>**Kim**, Park, Doh, Lee, Choe*<br>*KAIST, Korea* | | Modeling Contaminant Outgassing and Free Molecular Transport Processes for the Cryogenic SPHEREx Observatory<br>**Alred***, Moore, Susca, Ricchiuti, Rocca, Soares<br>*California Institute of Technology, USA* |
| **08:40 – 09:00**<br>01:40 – 02:00<br>18:40 – 19:00 | | Reentry Aerothermodynamics of a Deorbiting CubeSat with DragSail<br>**Adhikari***, Black, Cofer, Alexeenko<br>*Purdue University, USA* | Knudsen Minimum Disappearance in Molecular-Confined Flows<br>**Corral-Casas***, Li, Borg, Gibelli<br>*The University of Edinburgh, UK* | Evaluation of a Space-borne MLI Performance by Using and Experimental Estimation<br>**Kim**, Chang, Kim, Huh*<br>*Chungnam National University, Korea* |
| **09:00 – 09:20**<br>02:00 – 02:20<br>19:00 – 19:20 | Holder Regularity of the Boltzmann Equation Past an Obstacle<br>Kim, **Lee***<br>*Pohang University of Science and Technology, Korea* | Investigation of Gurney Flap on Aerodynamic Characteristics of NACA4412 Airfoil<br>**Wang**, Li, Jiang*, Mao, Li<br>*China Aerodynamics Research and Development Center, China* | Comparison of Two Approaches in Molecular Dynamics Simulation of Gas-Surface Interaction<br>**Tao**, Wang*<br>*University of Chinese Academy of Sciences, China* | Topological Impact of a Simple Self-Replication Geometric Structure with Great Application Potential in Vacuum Pumping and Photovoltaic Industry<br>**Luo***, Day<br>*Karlsruhe Institute of Technology, Germany* |
| **09:20 – 09:40**<br>02:20 – 02:40<br>19:20 – 19:40 | | Plume Simulation of Atmosphere-Breathing-Electric-Propulsion System<br>**Moon**, Jun*<br>*KAIST, Korea* | Characterization of Second-order Non-Navier-Fourier Constitutive Laws in Planar and Cylindrical Couette Flow Using Molecular Dynamics Simulations<br>**Kammara**, Sharma, Myong*<br>*Gyeongsang National University, Korea* | Rarefied Gas Dynamic Applications in Spacecraft Contamination Control Engineering at NASA JPL<br>**Hoey***, Soares, Alred, Anderson, Martin, Shallcross, Wong<br>*California Institute of Technology, USA* |
| **09:40 – 10:00**<br>02:40 – 03:00<br>19:40 – 20:00 | ES-BGK Model for Diatomic Gases with Translational- Rotational and Translational-Vibrational Energy Exchanges<br>Dauvois, Mathiaud, **Mieussens***, Pfeiffer<br>*Univ. Bordeaux, France* | Similarity Study on The Aeroheating of the Hypersonic Strong Shear-Compression Flow<br>**Gao**, Wang*<br>*University of the Chinese Academy of Sciences, China* | Multiscale Modeling of Electrospray Thrusters with Particle-in-Cell and Molecular Dynamics<br>**Nuwal***, Azevedo, Klosterman, Levin, Rovey<br>*University of Illinois Urbana Champaign, USA* | A Direct Simulation Monte Carlo Framework for the Simulation of Mercury Driven Diffusion Pumps for Fusion Reactor Exhaust Pumping<br>**Teichmann***, Giegerich, Day<br>*Karlsruhe Institute of Technology, Germany* |
| **10:00 – 10:20**<br>03:00 – 03:20<br>20:00 – 20:20 | Coffee Break | | | |
| | **Session F2A: Boltzmann Equation and BGK Models: Theory and Numerics II**<br>(Chair:) | **Session F2B: Space Vehicle Aerodynamics and Propulsion II**<br>(Chair:) | **Session F2C: Molecular Dynamics and Particle Methods II**<br>(Chair: ) | **Session F2D: Vacuum Technology II**<br>(Chair:) |
| **10:20 – 10:40**<br>03:20 – 03:40<br>20:20 – 20:40 | To be updated<br>**Kim***<br>*University of Wisconsin Madison, USA* | A (very) Quick Overview of NASA Planetary Exploration Missions and the VATMOS-SR Mission Concept<br>**Jason Rabinovitch***<br>*Stevens Institute of Technology, USA* | Multiscale Simulation of Gas Flow in a Micro Thruster Based on the Unified Stochastic Particle BGK method<br>**Sun**, Hu*, Fei*, Sun<br>Chinese Academy of Sciences, Huazhong *University of Science and Technology, China* | Accurate Modeling and Simulation of NVBCS Based on the Test Particle Monte Carlo Method<br>**Sun***, Li, Wang, Wang, Deng, Zhang<br>*Anhui University of Science and Technology, China* |
| **10:40 – 11:00**<br>03:40 – 04:00 | | | Bulk Viscosity of Dilute Gases and Their Mixtures Using Equilibrium Molecular Dynamics | Numerical Cooling Power Predictions for a Dilution Refrigerator via Kinetic Modeling |

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| 20:40 – 21:00 | Small Solutions of the Einstein-Boltzmann System Coupled with a Non-Linear Scalar Field with Bianchi Symmetries<br>**Lee***<br>*Kyung Hee University*, *Korea* | | Approach<br>**Sharma**, Kumar*, Pareek, Singh<br>*Indian Institute of Technology Kanpur*, *India* | **Tantos***, Zilz, Day, Adam, Wernsdorfer<br>*Karlsruhe Institute of Technology -Campus Nord*, *Germany* |
| **11:00 – 11:20**<br>04:00 – 04:20<br>21:00 – 21:20 | | DSMC Calculation and Analysis of Aerodynamic Drag of VLEO Satellite<br>**Jiang**, Zhang*<br>*Beihang University*, *China* | Molecular Dynamics Simulations on Scattering of High-Speed Ar Molecules on Pt(100) Surface<br>**Ye**, Hu, Sun*<br>*University of Chinese Academy of Sciences*, *China* | State-to-State Simulations of Plane Shock Waves Using Physics-Informed Neural Networks<br>**Campoli***, Gorikhovskii, Kunova, Kustova, Melnik<br>*Saint Petersburg State University, Russia* |
| **11:20 – 11:40**<br>04:20 – 04:40<br>21:20 – 21:40 | Local Velocity Grid Conservative Semi-Lagrangian Schemes for the BGK Model<br>**Cho***, Boscarino, Russo<br>*Gyeongsang National University*, *Korea* | Axial-Azimuthal Numerical Modeling of Hall Thruster Plasmas to Investigate Electron Anomalous Transport<br>**Park**, Kim, Doh, Lee, Choe*<br>*KAIST*, *Korea* | The Effect of Boundary in Nanoscale Phenomena on the Atomic-level Interface<br>**Masuduzzaman**, Kim*<br>*University of Ulsan*, *Korea* | Recent Advances in the Theory of Kinetic Equations of Collision Dynamics<br>**Gapyak***, Gerasimenko<br>*Taras Shevchenko National University of Kyiv, Ukraine* |
| **11:40 – 12:00**<br>04:40 – 05:00<br>21:40 – 22:00 | | Effect of Thermochemical Nonequilibrium on Supersonic Combustion<br>**Liu**, Yao*, Sun*<br>*University of Chinese Academy of Science*, *China* | Desorption Kinetics for Carbon Surfaces with Defects<br>**Chaithanya Kondur**, Stephani*<br>*University of Illinois at Urbana-Champaign*, *USA* | A Meshfree Arbitrary Lagrangian-Eulerian (ALE) Method for the BGK Model of the Boltzmann Equation with Moving Boundaries<br>**Tiwari***, Klar, Russo<br>*TU Kaiserslautern, Germany* |
| **12:00 – 12:20**<br>05:00 – 05:20<br>22:00 – 22:20 | Well-Posedness and Singularity Formation for Vlasov-Riesz System<br>**Choi***<br>*Yonsei University*, *Korea* | Mixed Flow Charged Aerodynamics for Small Satellite Orbital Predictions<br>**Watson***, Glowacki, Parashar, Capon<br>*Victoria University of Wellington*, *New Zealand* | Collision Integrals of Interacting Atoms and Ions - Analysis of Used Approximations and Best Practices<br>**Buchowiecki***<br>*University of Szczecin*, *Poland* | Comparison of Different Time-Stepping Methods Based on the Simulation of an Electron Gun<br>**Ott***, Pfeiffer<br>*University of Stuttgart, Germany* |
| **12:20 – 13:20**<br>05:20 – 06:20<br>22:20 – 23:20 | Lunch | | | |
| | **Session F3A: Boltzmann Equation and BGK Models: Theory and Numerics III**<br>(Chair:) | **Session F3B: Space Vehicle Aerodynamics and Propulsion III**<br>(Chair:) | **Session F3C: Molecular Dynamics and Particle Methods III**<br>(Chair:) | **Session F3D: Multiphase Flows and Granular Flows**<br>(Chair:) |
| **13:20 – 13:40**<br>06:20 – 06:40<br>23:20 – 23:40 | Conservative Semi-Lagrangian Methods for Kinetic Equations<br>**Russo***<br>*University of Catania*, *Italy* | Three Dimensional Plasma Discharge in Annular Hall Thruster Channel with Multiple Collision Models in OpenFOAM<br>**Anflo**, Lee*<br>*Seoul National University*, *Korea* | Molecular Dynamics Simulations for Nanoscale Mass Transport Phenomena in Polymer Electrolyte Fuel Cells<br>**Takashi Tokumasu***<br>*Tohoku University*, *Japan* | Non-monotonic Heat Flux Trends in a Rarefied Granular Gas<br>**Hong***, Morris<br>*Purdue University, USA* |
| **13:40 – 14:00**<br>06:40 – 07:00<br>23:40 – 00:00 | | Performance Study of Intake Device for Atmosphere-Breathing Electric Propulsion<br>**Jun***<br>*KAIST*, *Korea* | | Role of Viscosity in Macroscopic Description of Cluster Formation in Granular Flow<br>**Suzuki***<br>*The University of Tokyo, Japan* |
| **14:00 – 14:20**<br>07:00 – 07:20<br>00:00 – 00:20 | A Mixed Boltzmann-BGK Model for Gas Mixtures<br>**Bisi***<br>*University of Parma*, *Italy* | Analysis of DSMC Flow Profiles Generated in Microgap Plasma Thrusters Using Different Electrode Plate Configurations<br>**Guevara Jelid***, White, Kontis<br>*University of Glasgow*, *UK* | Determination of Shear and Bulk Viscosity of Dilute Gases and Their Mixtures Using Accurate Inter-molecular Potentials<br>**Sivakumar**, Sharma, Kumar*<br>*Indian Institute of Technology Kanpur, India* | Surface Polishing Using Particle-laden Gas Flows<br>**Garg**, Agarwal*<br>*Indian Institute of Technology Bombay, India* |
| **14:20 – 14:40**<br>07:20 – 07:40<br>00:20 – 00:40 | Derivation Of BGK Models for Complex Gases from Entropy Minimization<br>**Brull***<br>*Institut de math´ematiques de Bordeaux*, *France* | Design of a Low-Reynolds-Number Airfoil for Mars Exploration Airplane Using a Transition Model<br>**Jung**, Yee, Jeong*<br>*Seoul National University*, *Korea* | Air Outflow into Vacuum Periodically Interrupted by Bodies Moving Towards the Jet<br>**Yakunchikov***<br>*Lomonosov Moscow State University*, *Russia* | Symmetric Simulations of Droplets with a Particle based Vlasov-Enskog-Solver<br>**Tietz***, Pfeiffer, Fasoulas<br>*University of Stuttgart, Germany* |
| **14:40 – 15:00**<br>07:40 – 08:00<br>00:40 – 01:00 | On Multi-Species Kinetic Modeling of Plasma<br>**Klingenberg***, Marlies Pirner | Time-stepping Global Stability Analysis of Hypersonic Flows<br>**Dylewicz***, Klothakis, Theofilis, Levin<br>*University of Liverpool*, *UK* | A Weighted Particle Scheme for Solving the Enskog-Vlasov Equation in Spherical Geometry<br>**Busuioc***, Gibelli<br>*West University of Timi¸soara Bd. Vasile P˙arvan*, *Romania* | Interaction of Shock Waves in Dilute Rapid Granular Gas<br>**Khan**, Jaiswal, Patel, Kumar, Kumar*<br>*Indian Institute of Technology Kanpur, India* |

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| **15:00 – 15:20**<br>08:00 – 08:20<br>01:00 – 01:20 | *University of W¨urzburg*, *Germany* | Part 2: Numerical Studies on Taylor Cone Formation and Its Inherent Characteristics for FEEP Thruster<br>Kumar, Kwon, Kwon, **Yoh*** <br>*Seoul National University, Korea* | Assessment of Molecular Mean Free Paths and Its Application in Micro/Nanochannel Gas Flows<br>**Xie*** <br>*University of Derby*, *UK* | A Kinetic Derivation of Cahn-Hilliard Fluid Equations<br>**Giovangigli*** <br>*Ecole Polytechnique, France* |
| **15:20 – 15:40**<br>08:20 – 08:40<br>01:20 – 01:40 | Relativistic BGK Model for Inert Gas Mixtures<br>**Hwang**, Lee, Yun* <br>*Sungkyunkwan University*, *Korea* | Investigation on the Mode Transition Process in a Three-Dimensional Scramjet Combustor Equipped with a Strut<br>**Yan***, Liao, Meng, Huang <br>*National University of Defense Technology, China* | Stefan-Maxwell Diffusitivies of Gas Mixtures, and Onsager's Regression Hypothesis<br>**Zyskin***, Monroe* <br>*University of Oxford, UK* | Uniform Shear Flow in a Granular Gas of Inelastic and Rough Maxwell Particles<br>**Santos***, Kremer <br>*Universidad de Extremadura, Spain* |
| **15:40 – 16:00**<br>08:40 – 09:00<br>01:40 – 02:00 | BGK Model for Multi-Component Gases Near a Global Maxwellian<br>**Bae**, Klingenberg, Pirner, Yun* <br>*Sungkyunkwan University*, *Korea* | | Performance Evaluation of CLL-Kernel Using Accommodation Coefficients Obtained by the Classical and the Correlation Method<br>**Nejad***, Nedea, Frijns <br>*Eindhoven University of Technology*, *Netherlands* | Kinetic-based Two-phase Flow Model: A Reduced-order Model of Polydisperse Oscillating Droplets with Geometrical Variables<br>**Loison***, Pichard, Kokh, Massot <br>*Ecole Polytechnique, France* |
| **16:00 – 18:00**<br>09:00 – 11:00<br>02:00 – 04:00 | **Farewell Party** | | | |

## Poster Presentations (49, Virtual)

[1]**KST**, CEST, CDT

| Time[1] | Tue (July 5th) | Wed (July 6th) | Thu (July 7th) |
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| | **Virtual Poster Session T1** | | **Virtual Poster Session Th1** |
| **10:20 – 10:30**<br>03:20 – 03:30<br>20:20 – 20:30 | The First DSMC Model Created on COMSOL Multiphysics®<br>**Denpoh***<br>*Tokyo Electron Technology Solutions Ltd, Japan* | | Design Exploration on the Mixing Augmentation Mechanism Induced by the Cantilevered Ramp Injector in the Shock-induced Combustion Ramjet Engine<br>Du, **Huang***, Yan<br>*National University of Defense Technology, China* |
| **10:30 – 10:40**<br>03:30 – 03:40<br>20:30 – 20:40 | Accurate Modeling and Simulation of a Rotor-stator Row Based on the Test Particle Monte Carlo Method<br>**Sun***, Zhang, Han, Zhao, Zhang, Han<br>*Northeastern University, China* | | Effect of High-Altitude Atmosphere on Resonant Rossiter Frequencies of Cavity Flow<br>**Uthpala**, Lee, Myong, Lee*<br>*Gyeongsang National University, Korea* |
| **10:40 – 10:50**<br>03:40 – 03:50<br>20:40 – 20:50 | On the Role of Finite Size of Vehicles and Multilane Highways in the Traffic Flow Fundamental Diagram<br>**Méndez***, Marques Jr, Velasco<br>*Universidad Aut´onoma Metropolitana- Cuajimalpa, Mexico* | | Calculation of Newtonian Aerodynamic Coefficients with Mesh Refinements Using Kernel Interpolation<br>**Jo**, Furudate*<br>*Chungnam National University, Korea* |
| **10:50 – 11:00**<br>03:50 – 04:00<br>20:50 – 21:00 | Minimum of the Normal Momentum Flux Transferred to the Inner Cylinder in the Rarefied Couette Flow with a Fixed Outer Cylinder<br>Abramov, Alexandrov, Buzykin, **Butkovskii***<br>*Central Aerohydrodynamic Institute, Russia* | | Reflected Shock Data Interpretation with the DSMC Method<br>**Wysong***, Streicher, Krish, Hanson, Gimelshein<br>*Air Force Research Laboratory, USA* |
| **11:00 – 11:10**<br>04:00 – 04:10<br>21:00 – 21:10 | Rarefied Gas Flow Past a Flat Plate<br>Abramov, **Butkovskii***, Buzykin<br>*Central Aerohydrodynamic Institute, Russia* | | Numerical Investigation of Pyrolysis Gas Interaction with Hypersonic Reentry Flow-Field<br>**Appar**, Bajpai, Naspoori, Kumar*<br>*Indian Institute of Technology Kanpur, India* |
| **11:10 – 11:20**<br>04:10 – 04:20<br>21:10 – 21:20 | 3D Density Field of Shock Tube by Background Oriented Schlieren Technique and Physics Informed Neural Networks<br>**Hur**, Lee*<br>*Seoul National University, Korea* | | A Second Order Velocity Slip and Temperature Jump Boundary Condition for Thermodynamic Non Equilibrium Flows<br>**Liu***, Wu<br>*Southern University of Science and Technology, China* |
| **11:20 – 11:30**<br>04:20 – 04:30<br>21:20 – 21:30 | A Multi-Prediction Implicit Scheme for Gas Flow in All Flow Regimes<br>**Yuan***, Wu, Liu, Zhong<br>*Southern University of Science and Technology, China* | | Design and Optimization of Hypervelocity and High-Enthalpy Nozzles<br>**Wang***, Jiang<br>*Chinese Academy of Sciences, China* |
| **11:30 – 11:40**<br>04:30 – 04:40<br>21:30 – 21:40 | Unsteady-state Method for Calculating Steady Subsonic and Transonic External Rarefied Gas Flows<br>Abramov, **Butkovskii***, Buzykin<br>*Central Aerohydrodynamic Institute, Russia* | | Effect of Speed Ratio Increase on Pressure Measurement for Hypersonic Rarefied Gas Flows<br>**Ozawa***, Suzuki, Fujita<br>*Japan Aerospace Exploration Agency, Japan* |
| **11:40 – 11:50**<br>04:40 – 04:50<br>21:40 – 21:50 | Axisymmetric Simulation of Interaction of Rocket Exhaust with Lunar Surfaces<br>**Shaik***, Gavasane, Mankodi, Bhandarkar<br>*Indian Institute of Technology Bombay, India* | | Surface Defect and Al2O3-Nanoparticle Bombardment on Graphite Surface<br>**Jeon**, Kwon, Lee, Park*<br>*Gyeongsang National University, Korea* |
| **11:50 – 12:00**<br>04:50 – 05:00<br>21:50 – 22:00 | The Knudsen Number Effect of Hypersonic Flow over a Re-Entry Capsule<br>**Gokul,** Malaikannan*<br>*SRM Institute of Science and Technology, India* | | Extending Low-rank Radiation Transport Methods and Exploring Partial Frequency Re-distribution Applications<br>**Cambier***, Taitano, Abrantes<br>*Air Force Research Laboratory, USA* |
| **12:00 – 12:10**<br>05:00 – 05:10<br>22:00 – 22:10 | Numerical Investigation of Thermal Creep like Flow in Micro-Channels with Different Temperature Quadrilaterals<br>**Han***, Wang, Zhang, Zhang<br>*Northeastern University, China* | | Runtime based Weighted N-way Partitioning Scheme for Direct Simulation Monte Carlo Codes<br>**Mankodi***<br>*Indian Institute of Technology Guwahati, India* |
| **12:10 – 12:20**<br>05:10 – 05:20<br>22:10 – 22:20 | Non-equilibrium Shock Wave Structure in Supersonic Granular and Molecular Gas<br>**Bajpai**, Appar, Khan, Kumar, Kumar*<br>*Indian Institute of Technology Kanpur, India* | | Energy Redistribution in DSMC Using Modified Quantum-Kinetic Model<br>**Chou***, Pan<br>*National Taiwan University, Taiwan* |

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| **12:20 – 13:20**<br>05:20 – 06:20<br>22:20 – 23:20 | Lunch & **Poster (On-site)** | Lunch | Lunch & **Poster (On-site)** |
| | **Virtual Poster Session T2** | | **Virtual Poster Session Th2** |
| **13:20 – 13:30**<br>06:20 – 06:30<br>23:20 – 23:30 | Numerical Analysis of Flow Field according to Nozzle Shape in LPCVD Furnace<br>**Ji**, Sohn, Ko*<br>*Sungkyunkwan University, Korea* | | Effect of Velocity Slip and Temperature Jump at the Fluid-Solid Interface in a Coupled Chemically Reacting Flow<br>**Appar**, Sivakumar, Kumar*<br>*Indian Institute of Technology Kanpur, India* |
| **13:30 – 13:40**<br>06:30 – 06:40<br>23:30 – 23:40 | Simulating the Effect of Background Gas in Stoichiometry of Film Produced by Pulsed Laser Deposition<br>**Mata***, Dasallas, Garcia<br>*University of the Philippines Diliman, Philippines* | | Hypersonic Nonequilibrium Prandtl-Meyer Expansion<br>**Khraibut***, Gai<br>*University of New South Wales, Australia* |
| **13:40 – 13:50**<br>06:40 – 06:50<br>23:40 – 23:50 | G13-Based Moment Gas Kinetic Solver for Steady and Unsteady Rarefied flows: Discrete and Explicit Form<br>**Liu***, Shu<br>*National University of Singapore, Singapore* | | Analysis of Continuum Breakdown of Jet Interaction with Rarefied Flow<br>**Yang**, Song, Wang, Sun*<br>*Chinese Academy of Sciences, China* |
| **13:50 – 14:00**<br>06:50 – 07:00<br>23:50 – 00:00 | Numerical Simulation for OLED Manufacturing Process in High Vacuum System<br>**Park***, Seo, Lee, Seo, Shon<br>*Metariver Technology Co., Korea* | | Supersonic Gas Flow into a Vacuum through a Forward and Backward Facing Step in a Wide Range of Rarefaction<br>**Sazhin***<br>*Ural Federal University, Russia* |
| **14:00 – 14:10**<br>07:00 – 07:10<br>00:00 – 00:10 | Lagrangian-Lagrangian Simulation of Dusty Gas Flow Past a Cylinder<br>**Bajpai**, Bhavsar, Appar, Bhateja, Kumar*<br>*Indian Institute of Technology Kanpur, India* | | DSMC Simulations of High-Speed Flow Instabilities<br>**Kashkovsky***, Kudryavtsev, Shershnev<br>*Khristianovich Institute of Theoretical and Applied Mechanics SB RAS, Russia* |
| **14:10 – 14:20**<br>07:10 – 07:20<br>00:10 – 00:20 | Implementation of Test Particle Monte-Carlo Codes in the Development of a Metal Foil Pump<br>**Kathage***, Luo, Day<br>*Karlsruhe Institute of Technology, Germany* | | Non-stationary Rarefied Gas Flow in a Channel with Oscillating Barriers in a Wide Range of Knudsen Numbers<br>**Kosyanchuk***<br>*Lomonosov Moscow State University, Russia* |
| **14:20 – 14:30**<br>07:20 – 07:30<br>00:20 – 00:30 | On Some Recent Advances in the Kinetic Theory of Collisional Dynamics<br>**Gapyak***, Gerasimenko<br>*Taras Shevchenko National University of Kyiv, Ukraine* | | Local Nonequilibrium Molecular Distribution Function Reconstruction from the Continuum Models<br>**Timokhin***, Rukhmakov, Bondar<br>*Lomonosov Moscow State University, Russia* |
| **14:30 – 14:40**<br>07:30 – 07:40<br>00:30 – 00:40 | Variational Approach to Thermal Creep Flow in Microchannels on the Basis of the Linearized Boltzmann Equation for Hard-Sphere Molecules and General Boundary Conditions<br>**Nguyen***, Lorenzani<br>*FPT University, HCM, Vietnam* | | The Effect of Source Pressure on a Coating Process Using the Aerosol Deposition Method<br>**Agir***, Cao, White, Kontis<br>*University of Glasgow, UK* |
| **14:40 – 14:50**<br>07:40 – 07:50<br>00:40 – 00:50 | Lattice Boltzmann Solver for One-dimensional Computational Hemodynamics: Applications to Modeling of Pressure Losses in Arterial Networks<br>**Ilyin***, Kochergin, Stroganov<br>*Federal Research Center "Computer Science and Control" of the Russian Academy of Sciences, Russia* | | Hypersonic Boundary Layer Flow with an Obstacle in the Near Continuum Regime<br>**Chen**, Stemmer*<br>*Technical University of Munich, Germany* |
| **14:50 – 15:00**<br>07:50 – 08:00<br>00:50 – 01:00 | A Fick's Law Recovering Relaxation BGK Operator for General Mixtures of Gases<br>Brull, **Guillon***, Thieullen<br>*Institut de Mathématiques de Bordeaux, France* | | Accommodative Dependence of the Photophoresis of a Fine Aerosol Particle<br>Chernyak, **Sograbi***<br>*Ural Federal University, Russia* |
| **15:00 – 15:10**<br>08:00 – 08:10<br>01:00 – 01:10 | Homogenenous States of Granular Gases of Inelastic Hard Spheres under Nonlinear Drag<br>Megıas, **Santos***<br>*Universidad de Extremadura, Spain* | | GPU Code Implementation for Numerical Solving of Multidimensional Kinetic Equations<br>**Malkov***, Kudryavtsev<br>*Khristianovich Institute of Theoretical and Applied Mechanics SB RAS, Russia* |

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| **15:10 – 15:20**<br>08:10 – 08:20<br>01:10 – 01:20 | Deep Learning Methods for CH4 And CO2 Detection in Near and Shortwave Infrared Spectral Ranges<br>**Jang**, Kim*<br>*Inha University, Korea* | | Comparative Analysis of Numerical Schemes for the Vlasov Kinetic Equation<br>**Malkov***, Kudryavtsev<br>*Khristianovich Institute of Theoretical and Applied Mechanics SB RAS, Russia* |
| **15:20 – 15:30**<br>08:20 – 08:30<br>01:20 – 01:30 | | | Granular Flow past an Elliptical Obstacle<br>**Bhavsar**, Bajpai, Khan, Kumar*<br>*Indian Institute of Technology Kanpur, India* |