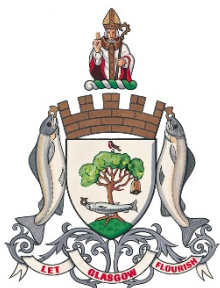
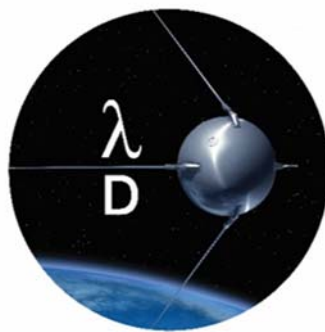




31st International Symposium on Rarefied Gas Dynamics

Glasgow, UK

July 23-27, 2018



James Weir Foundation



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General information

RGD31 Secretariat

Address: Level 8, James Weir Building, 75 Montrose Street, Glasgow, G1 1XJ

Email: RGD31@strath.ac.uk

Conference Venue

Technology & Innovation Centre, University of Strathclyde

99 George Street

Glasgow

G1 1RD

Banquet Venue

The Trades Hall of Glasgow, 85 Glassford Street, Glasgow, G1 1BQ, UK

Travel

Glasgow has a well-developed transport system featuring two airports, numerous bus services and an extensive urban rail network.

Bus

[Buchanan Bus Station](#) is 0.6 miles away, with frequent services to [Glasgow International Airport](#). A direct bus ([500 Airport Express](#)) connection to Glasgow International Airport is also available from [North Hanover Street](#), [outside Queen Street Station](#), every 15 minutes. This is a 10-minute walk and the single fare is approximately £8. Depending on traffic, the journey time is around 20-30 minutes.

Car

Discounted parking is available nearby - validate your ticket at Reception in the Technology and Innovation Centre or at Security Control in the Livingstone Tower (22 Richmond Street).

24hour [City Parking Duke Street](#), G4 0UW (0.3 miles) - capped at £5.40 per day; 24hour [NCP Montrose Street](#), G1 1RS (0.2 miles) - capped at £6.30 for 12 hours and £12.30 for 24 hours

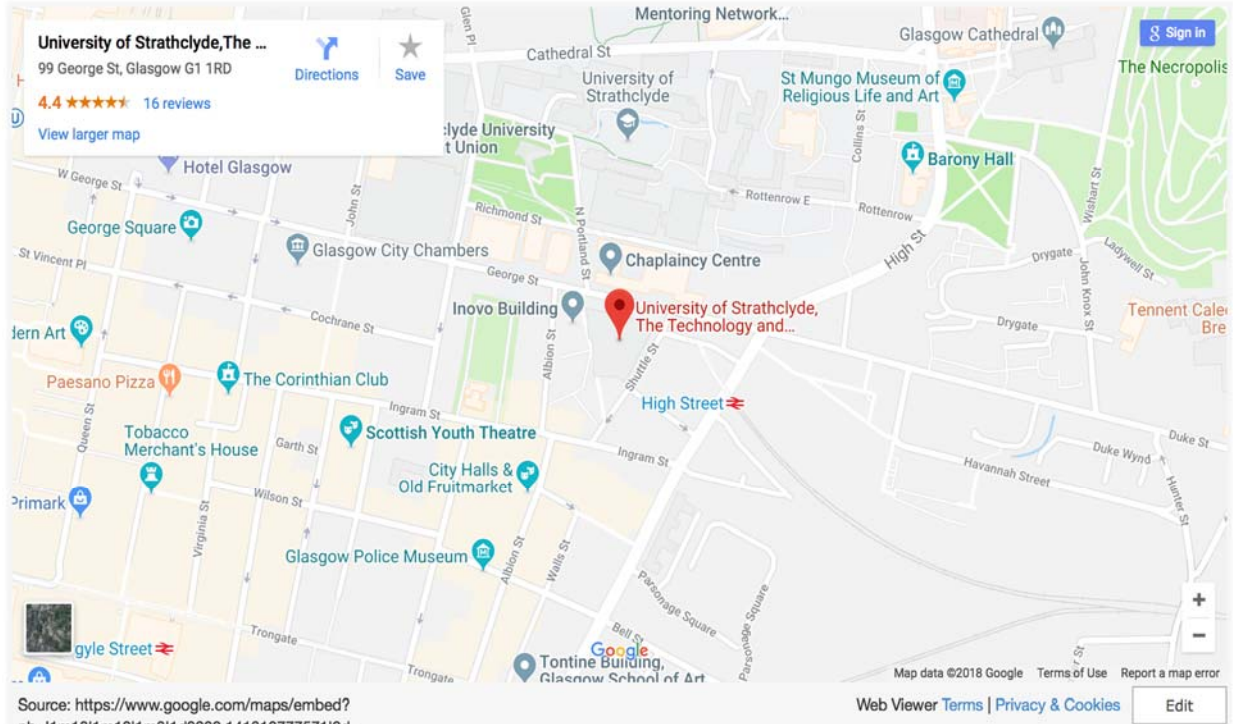
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The closest [railway stations](#) are:

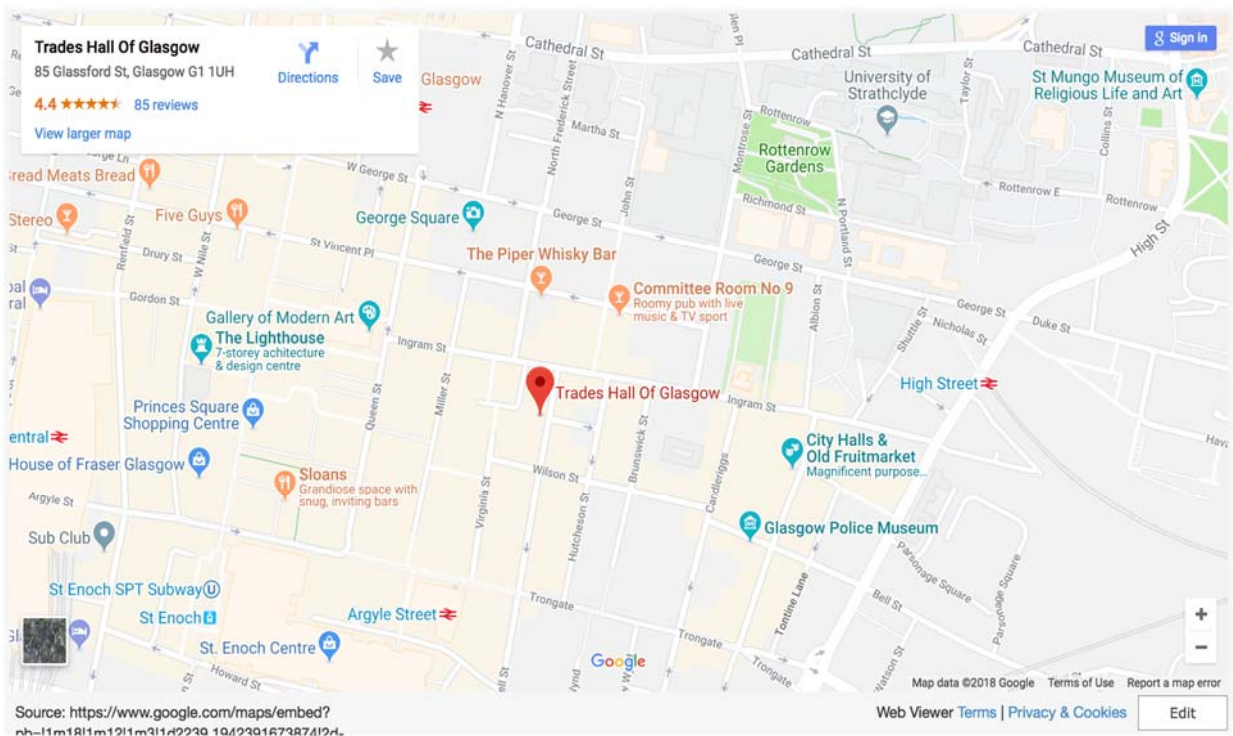
- High Street (0.1 miles)
- Queen Street (0.4 miles)
- Argyle Street (0.6 miles)
- Glasgow Central (0.9 miles)
- Buchanan Street Underground is less than 10 minutes' walk

Maps

- Conference Venue



- Banquet Venue



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You can use your university login details to connect to “eduroam” if you are from other eduroam network equipped [universities and colleges around the world](#)

Otherwise, you can use the WiFiGuest network:

- 1) Select 'WiFiGuest' from the list of available networks on your laptop or mobile device
- 2) Launch your preferred browser and click 'Get Online'
- 3) Select the 'Free Wi-Fi Cloud' option
- 4) WiFiGuest uses the public access Wi-Fi network known as _The Cloud. If you've used _The Cloud elsewhere before you can use the same user details to log in. If not, select 'Create Account' and enter all mandatory information requested
- 5) Select 'Continue' to connect to WiFiGuest

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You can find some useful information for tours in Glasgow from the following websites:

<https://peoplemakeglasgow.com/things-to-do/tours>

<https://discoverscotlandtours.com/>

<https://www.scottishtours.co.uk/tourpage.asp?id=177>

<https://www.visitscotland.com/destinations-maps/glasgow/see-do/day-trips-from-glasgow/>

Programme of 31 st International Symposium on Rarefied Gas Dynamics															
	Monday (July 23)			Tuesday (July 24)			Wednesday (July 25)			Thursday (July 26)			Friday (July 27)		
8:00 8:30	Registration														
8:30 9:15				Special session	Session 2b	Session 2c	Session 5a	Session 5b	Session 5c	Session 7a	Session 7b	Session 7c	Session 10a	Session 10b	Session 10c
9:15 9:35	Welcome & Opening Remarks														
9:35 10:30	Graeme Bird Lecture Memorial Sessions for Graeme Bird & Phillip Muntz			Coffee/Tea Breaks											
10:30 10:50				Special session	Session 3b	Session 3c	Session 6a	Session 6b	Session 6c	Session 8a	Session 8b	Session 8c	Session 11a	Session 11b	Session 11c
10:50 12:50															
12:50 13:50	Lunch														
13:50 15:50	Session 1a	Session 1b	Session 1c	Session 4a	Session 4b	Session 4c	Excursion			Session 9a	Session 9b	Session 9c	Farewell Party		
15:50 16:50	Coffee/Tea Breaks and Poster Sessions									Coffee/Tea Breaks and Poster Sessions					
16:50 17:50	Harold Grad Lecture			Lloyd Thomas Lecture						James Weir Lecture					
19:00 21:00	Welcome Reception			IAC Meeting			Banquet								

- Conference venue: Technology Innovation Centre, University of Strathclyde, Glasgow, UK
- Banquet venue: The Trades Hall of Glasgow, 85 Glassford Street, Glasgow, G1 1BQ, UK
- IAC meeting: Colins Building, 22 Richmond St, Glasgow G1 1XH, UK

Conference venue: Technology Innovation Centre, University of Strathclyde, Glasgow, UK

Monday (July 23rd)

8:00-9:15	Registration		
	Main Auditorium		
9:15-9:35	Welcome & Opening Remarks		
9:35-9:50	Reese: Graeme Bird: a life in rarefied gas dynamics		
9:50-10:50	Xu: Graeme Bird Lecture		
10:50-11:50	Hadjiconstantinou: Mission almost impossible: improving on Bird's direct simulation Monte Carlo		
11:50-12:10	Alexeenko: Innovation in Rarefied Gas Dynamics: The Contributions of Professor E. Phillip Muntz		
12:10-12:30	Takata: Knudsen pump and memories of Professor Muntz in Kyoto		
12:30-12:50	Bondar, Shoen, Kokhanchik: Nonequilibrium velocity distribution in steady regular shock-wave reflection		
12:50-13:50	Lunch		
	Room A	Room B	Room C
	Session 1a: Boltzmann and Related Equations	Session 1b: Jets and Plumes	Session 1c: Evaporation/Condensation
	Chair: S. Takata	Chair: J. Fernández	Chair: A. Frezzotti
13:50-14:10	Bernhoff: Discrete Quantum Boltzmann Equation	Invited talk Montero: Onset and Near-field Flow Evolution in Supersonic Jets of H ₂	Gibelli, Lockerby, Sprittles: Velocity distribution function of spontaneously evaporating atoms
14:10-14:30	Bisi, Groppi, Spiga, Bobylev, Potapenko: On consistent BGK models for gas mixtures		Inaba, Yano: Molecular Gas Dynamics on Unsteady Flow of Binary Gas Mixture with Evaporation and Condensation
14:30-14:50	Saveliev: Two-particle kinetic equation and its self-similar exact solutions	Cai: From Collisionless to Continuum: Dilute Jet Impingement at An Inclined Plate	Kinefuchi, Yoshimoto, Lu, Wang: Analysis of Evaporating Flows of Polyatomic Molecules from Two-dimensional Slit Pore Arrays
14:50-15:10	Jaiswal, Alexeenko, Hu: A Discontinuous Galerkin Fast Spectral Method for the Full Boltzmann Equation with General Collision Kernels	Gaveau, Mons, Bruel: Conformational landscape of the SF ₆ dimer as revealed by various free jet conditions	Otic, Yonemura: Numerical Analysis of the Vapor Layer below a Leidenfrost Droplet on Micro-sized Asymmetric Surfaces
15:10-15:30	Shizgal: Kappa and other nonequilibrium distributions from the Fokker-Planck equation and the relationship to Tsallis entropy	Yuan, Zhao, Chen: Numerical study of heat flux reduction mechanism of the counterflowing jet in rarefied flows	Woronowicz, Investigation of Transient Gas Phase Column Density Due to Droplet Evaporation
15:30-15:50	Barranger, Bisi, Brull, Desvillettes: On the Chapman-Enskog asymptotics for a mixture of monoatomic and polyatomic rarefied gases	Zheng, Cai, He: Hybrid PIC-DSMC simulation of background gas in electric propulsion test facility	Yano, Transition from condensation to evaporation induced by reflection of simple wave at vapor-liquid interface
15:50-16:50	Coffee/Tea breaks and Poster Sessions		
		Room B+C	
16:50-17:50	Struchtrup: Harold Grad Lecture (chaired by D. Lockerby)		
19:00-21:00	Welcome Reception (Foyers)		

Tuesday (July 24th)			
	Room A	Room B	Room C
	Special Session in High Reynolds Number Flows	Session 2b: Numerical Methods	Session 2c: DSMC Development and Applications
	Chair: D. Levin	Chair: I. Martin	Chair: I. Boyd
8:30-8:50	Gai , Prakash, Khraibut, O'Byrne: Large Scale Hypersonic Separated Flows at Moderate Reynolds Number and Moderate Density	Alekseenko , Limbacher: Evaluating Discontinuous Galerkin Discretizations of the Boltzmann Collision Integral in $O(M^2)$ Operations	Croizet , Gagnol: Molecular mass effect on the flow of a thermal binary gas mixture in a circular micro channel
8:50-9:10		Chen : Quadrature with equilibrium offset and its application on adaptive velocity grid	Dadzie , Christou, Marschall, Thomas: High Speed Rarefied Gas Flows as Driven by Porosity Gradient at Comet Surfaces
9:10-9:30	Gallis, Bitter, Koehler, Torczynski, Plimpton, Moore , Papadakis: DSMC Simulations of Turbulent Flows at Moderate Reynolds Numbers	Zhu , Zhong, Xu: A third-order multiderivative unified gas-kinetic scheme	Frezzotti : A numerical study of temperature jumps in evaporation of water
9:30-9:50		Babovsky : Shocks in the context of Discrete Velocity Models	Groll , Frieler: On dynamic collision-selection limiter schemes for high density gradient simulations of cold-gas space propulsion systems
9:50-10:10	Invited talk Levin , Tumuklu, Theofilis: Hypersonic Flows at Moderate Reynolds Numbers	Istomin : PAINeT: an object-oriented software package for calculation of gas dynamics and transport coefficients in non-equilibrium gas mixture flows	Mertz , Dramont, Dumas: Sensitivity Analysis and Uncertainties Quantification on a DSMC Code with Chemical Reactions
10:10-10:30		Jaiswal , Alexeenko, Hu: Fast Deterministic Solution of the Full Boltzmann Equation on Graphics-Processing Units	Hepp , Grabe, Hannemann: Non-equilibrium parameter for a hybrid Fokker-Planck / DSMC scheme
10:30-10:50	Coffee/Tea breaks		
	Special Session in High Reynolds Number Flows	Session 3b: Numerical Methods	Session 3c: DSMC Development and Applications
	Chair: D. Levin	Chair: X. Shan	Chair: S. Stefanov
10:50-11:10	Manela , Zhang: Non-small Reynolds number effects on the stability of Kolmogorov flow in a rarefied gas	Jenny , Gorji: Computationally Efficient Cloud-In-Cell Algorithm for the Linearized Vlasov-Fokker-Planck Equation	Yang, Sun : Analysis of Thermal Non-equilibrium Effect in H ₂ -O ₂ Detonation Using DSMC Simulation
11:10-11:30		Jun , Grabe, Hannemann: Cubic Fokker-Planck-DSMC Hybrid Method For Diatomic Rarefied Gas Flow through a Slit and an Orifice	Liechty , Wise, Subramaniam, Stephani: Comparison of CFD and DSMC Using Calibrated Transport Parameters
11:30-11:50	O'Byrne , Kaseman, Page, Gao, Gai: Laser Diagnostics for Hypersonic and Micro-Scale Flows in the Slip Regime	Aksenova, Khalidov : Simulation of Unstable Rarefied Gas Flows in a Channel for Different Knudsen Numbers	Cebrián , Tamrazian, Sebastiao, Spencer, Alexeenko: DSMC-SPARTA Aerodynamic Characterization of a Deorbiting CubeSat
11:50-12:10		Kolobov , Levko, Arslanbekov: Boltzmann-Fokker-Planck Kinetic Solver with Adaptive Mesh in Phase Space	Kamal , Kawagoe, Yonemura: DSMC Simulation of a Gas Flow Around a Solid Body with Microstructure Immersed in a Gas with Temperature Gradient
12:10-12:30	McGilvray , Doherty: Development of Hypersonic Test Facilities at the University of Oxford	Liu , Yu, Li: A Kinetic Hybrid-Flux WENO Scheme for Compressible Flows	Matsumoto , Tanaka, Koga, Morokuma: Monte Carlo Simulation of a Gas Transport System Based on Thermal Induced Flow
12:30-12:50		Martin : Phase Space Spanning Adaptive Quadrature for Kinetic Simulation of Rarefied Gas and Plasma	Matsumoto , Hori, Yoshimoto, Takagi, Kinefuchi: Low variance Monte Carlo simulation of the one-dimensional non-equilibrium flow near a vapor-liquid interface

12:50-13:50	Lunch		
	Session 4a: Multiscale Modelling	Session 4b: Numerical Methods	Session 4c: DSMC Development and Applications
	Chair: C. Zhong	Chair: J. Hu	Chair: P. Jenny
13:50-14:10	Bariselli, Frezzotti, Magin, Hubin: Multiphase modeling of liquid droplets in rarefied gas flows by means of a coupled DSMC-SPH solver	Rogozin, Aristov, Peng, Li: Computational modeling of the Boltzmann equation: the projection-interpolation method and gas-kinetic unified algorithm	Maxwell: Supersonic Wind Tunnel with Rarefied Flow
14:10-14:30	Jiang, Mao, Li: Numerical Simulation of the Jet and Hypersonic flow Interaction with UGKS	Pennie, Gamba: Conservative Spectral Methods for the Landau Equation	Meskos, Stefanov: DSMC calculations of binary gas mixing in simple micro-sized configurations
14:30-14:50	Singh, Myong: Three-dimensional discontinuous Galerkin method for the second-order Boltzmann-Curtiss constitutive model in continuum-rarefied gas flows	Wu, Peng, Li, Jiang: A Kinetic Model for Thermodynamic Non-equilibrium Polyatomic Gases with Quantum Vibrational Energy and Application in Gas-kinetic Unified Algorithm	Moore, Fuller: SPARTA Kokkos: A Massively Parallel and Multithreaded DSMC Code
14:50-15:10	Liu, Xu: A Unified Gas-kinetic Scheme for Dilute Disperse Gas-Particle Multiphase System	Todorova, Steijl: Discrete-velocity simulations of high-speed flows based on binary gas mixture kinetic models	Morgado, Nowakowski, Lemarchand: DSMC Simulation of Confined Turing Pattern
15:10-15:30	Xiao, Cai: A velocity-space adaptive unified gas kinetic scheme for multiscale flow simulation	Wu: On the accuracy of macroscopic equations in the light scattering by rarefied gas	Liang, Li, Du: DSMC Simulation of High Temperature and Rarefied Gas effects on Reentry Capsule Aerodynamics across Multi-Flow Regimes
15:30-15:50	Zhang, Onskog: Analysis of Rayleigh-Benard instability using molecular simulation and Langevin dynamics	Zhu, Chen, Guo, Zhang: GPU acceleration of an iterative discrete velocity method with memory reduction technique	
15:50-16:50	Coffee/Tea breaks and Poster Sessions		
		Room B+C	
16:50-17:50	van de Sanden: Lloyd Thomas Lecture (Chaired by D. Emerson)		
19:00-21:00	IAC meeting		
	Wednesday (July 25th)		
	Room A	Room B	Room C
	Session 5a: Molecular Dynamics and Other Particle Methods	Session 5b: Numerical Methods	Session 5c: Space Vehicle Aerodynamics/ Hypersonic Flows
	Chair: Y. Bond	Chair: D. Bruno	Chair: R. Myong
8:30-8:50	Benites, Sharipov: Quantum calculations of transport coefficients for helium - argon mixture at low density based on ab initio potentials	Invited talk Shan: Lattice Boltzmann method for rarefied gas dynamics: theoretical foundation and numerical verification	Borner, Meurisse: DSMC Simulations of Mars Science Laboratory Reentry from Rarefied to Continuum Conditions
8:50-9:10	Martin, Eckhardt: Denoising of Quasi-Steady Particle Simulation		Stepanenko, Zhdanov: Relaxation and transport phenomena in partially ionized molecular plasma: the properties of heavy components
9:10-9:30	Fei, Liu: A Convection-Collision Coupled Stochastic Particle Algorithm of BGK Model for Multi-Scale Gas Flows	Tatsios, Valougeorgis: Boundary including synthetic iteration schemes for the Discrete Velocity Method	Wysong, Gimelshein, Alexeenko, Gallis, Levin, Panesi: Hypersonic Nonequilibrium Model Comparison and Validation Cases
9:30-9:50	Yamamoto, Kobayashi, Watanabe, Fujii, Kon, Takahira: Molecular Gas Dynamics Analysis of Vapor-Gas Flow inside Collapsing Bubble	Pan, Zhong, Zhuo, Yuan: A Fourth Order Discrete Unified Gas-Kinetic Scheme	Higdon, Goldstein, Varghese: DSMC Simulation of a Radiating Hypersonic Flow

9:50-10:10	Kosyanchuk , Yakunchikov: Rarefied gas flows in structures with high-frequency oscillating elements	Morris : A hybrid DSMC and discrete element modeling approach for particle flows that span dilute to dense regimes	Kaplan , Boyd: Drag Analysis of an Orbiting Tumbling Body at the Onset of Reentry
10:10-10:30	Mehta, Levin : Colloid Droplet Rupture Analysis using Molecular Dynamics	Sahai , Lopez, Johnston, Panesi: Novel Approach for Modeling Non-Equilibrium Kinetics and Radiation for CO ₂ Wake Flows	Chen , Ou: Simulation of hypersonic flows in near continuum regime using DSMC and a new extended continuum model
10:30-10:50	Coffee/Tea breaks		
	Session 6a: Molecular Dynamics and other Particle Methods	Session 6b: Porous Media Flows	Session 6c: Space Vehicle Aerodynamics/ Hypersonic Flows
	Chair: F. Sharipov	Chair: C. White	Chair: P. Varghese
10:50-11:10	Luo , Day: Monte Carlo Simulation of a Dynamic Sieve System	Invited talk Graur : Permeability and pore characteristic dimension measurements in micro porous media	Invited talk Li : Gas-Kinetic Unified Algorithm for Computable Modeling of Boltzmann Equation and Applications to Aerothermodynamics for Falling Disintegration of Tiangong-type Spacecraft
11:10-11:30	Murugesan , Sirmas, Radulescu: Molecular level investigation of non-equilibrium effects on thermal ignition of reactive gases		
11:30-11:50	Nakamura , Yano: Determination of the Evaporation Coefficient of Water Based on Molecular Gas Dynamics	Besser , Baune, Thoming: Towards understanding gas flow in functionalized mesoporous solids	Agarwal , Gardner: The Effects of Rarefaction and Thermal Non-equilibrium on a Blunt Body and a Bicone in Hypersonic Flow and their Shape Optimization for Reducing both Drag and Heat Transfer
11:50-12:10	Meng, To , Leonard: Direct method of identifying slip and jump coefficients for gas flows using Molecular Dynamics	Kawagoe , Yonemura: Investigation of Tortuosity of Nanoscale Porous Media Based on Paths of Moving Gas Molecules	Bandivadekar , Minisci: OpenFOAM Based Modelling and Simulation of Transpiration Cooling Systems for Re-entry Vehicles
12:10-12:30	Grover, Singh, Torres, Schwartzentruber : Direct Molecular Simulation of Oxygen Dissociation	Pavan : kinetic theory for porous media: validation with experimental data in ducts and tubes	Zuppardi : Effects of SWBLI and SWSWI in Martian Atmosphere Entry
12:30-12:50	Sharma, Kumar : Bulk Viscosity of Gases via Non-equilibrium Molecular Dynamics Approach	Casseau, White : Effective Diffusivity in Porous Media Under Rarefied Gas Conditions	Campoli , Oblapenko, Mekhonoshina, Kustova: Numerical investigation of hypersonic non-equilibrium flow around blunt body by COOLFluid-Kappa coupling
12:50-13:50	Lunch		
13:50-19:00	Excursion		
19:00-22:00	Banquet		
Thursday (July 26th)			
	Room A	Room B	Room C
	Session 7a: Molecular Dynamics and Other Particle Methods	Session 7b: Experimental Techniques	Session 7c: Moment Methods
	Chair: N. Hadjiconstantinou	Chair: M. Gaveau	Chair: H. Struchtrup
8:30-8:50	Invited talk Sharipov : Ab initio modelling of rarefied gas flows	Invited talk Perrier : Shock wave interaction at microscale: From microsystem to human cell	Gupta , Torrilhon: Heat flux in binary gas mixtures confined between parallel plates via moment equations
8:50-9:10			Jiang , Zhao, Chen: Shock Structure Singularity Smoothed by Adiabatic Approximation of Generalized Hydrodynamics

9:10-9:30	Swaminathan-Gopalan , Stephani: Study of Inelastic Scattering of O2 on carbon: Comparison of Molecular Dynamics Simulation and Molecule-Surface Scattering Theory	Lorrain , Capon, Boyce, Maldonado, Ketsdever: Experimental Investigation of LEO Plasma-Body Interactions	Koellermeier : Improving the Convergence of Moment Methods for Rarefied Gases Using Filters
9:30-9:50	Yamaguchi , Kikugawa: Molecular Dynamics Study on Thermal Transpiration Flow in Nanochannel with Explicit Wall Model	Le Page , O'Byrne, Gai: Rotational Temperature Imaging of a Leading-Edge Separation in Hypervelocity Flow	Lockerby , Claydon, Shrestha, Rana, Sprittles: Fundamental Solutions to the Regularised 13-Moment Equations: Efficient Simulation of 3D Creeping Flows
9:50-10:10	Beyer , Pfeiffer, Fasoulas: First Steps toward the Coupling of the DSMC Particle Code PICLas with the Radiation Solver PARADE	O'Byrne : Doppler-Free Velocity Measurements in a Low-Density Plasma	Reddy , Ganesan: The 35-Moment Closure for Hard-Sphere Gas and Application to Shock Wave Problem
10:10-10:30	Binder , Fasoulas: Validation of Grid Current Simulations Using the Particle-In-Cell Method for a Micro Ion-Thruster	Ozawa , Suzuki, Fujita: Investigation of Condensation and Evaporation Effect on CO2 Hypersonic Rarefied Aerodynamic Measurements	Rana : H-theorem and boundary conditions for regularized 26 moment equations
10:30-10:50	Coffee/Tea breaks		
	Session 8a: DSMC Development and Applications	Session 8b: Experimental Techniques	Session 8c: Gas Kinetic Modelling
	Chair: Q. Sun	Chair: S. O'Byrne	Chair: V. Giovangigli
10:50-11:10	Pan , Subramaniam, Stephani: A Two-step Binary Collision Recombination Model with Orbiting-pair Cross-sections in DSMC	Chen , Yang, Li, Tian, Li, Long, Wang: Investigation of Electron Beam Fluorescence Diagnostics in Low-density Wind Tunnel	Invited talk Takata : A construction of kinetic model for nonideal gases
11:10-11:30	Chinnappan, Abhishek , Kumar, Arghode: Transport of Non-spherical Particle in Free Molecular Regime Using the DSMC Method	Falcinelli : Photo- and Penning- ionization electron spectroscopy of simple molecules: A comparative study to characterize the transition state of autoionization reactions	
11:30-11:50	Basov, Rouwette, Petkow : A Grid-less DSMC Solver with Noise Reduction and Conservative Particle Merging	Fratantonio , Yeachana, Cardenas, Colin, Barrot: Imaging technique for measuring the diffusion of diacetyl and acetone vapors at low pressures	Sato , Yamada, Nishiwaki: Topology Optimization for Channel Flow Problems of Rarefied Gas Based on a Deterministic Approach
11:50-12:10	Wang : DSMC Implementing Generalized Hypersonic Equivalence Principle for Viscous Flows	Zhou , Cai, He: Experimental and Numerical Investigations on the TMAC between the Spacecraft and Its Plume	Busuioc , Ambruş : Lattice Boltzmann approach to non-Cartesian shock wave simulations using the vielbein formalism
12:10-12:30	Reschke , Ballester, Herdrich, Pfeiffer, Fasoulas: Validation of DSMC and CFD Based Catalysis Modeling using Plasma Wind Tunnel Flows		Kremer , Fourteen Moment Method for Moderately Dense Granular Gases
12:30-12:50	Lotfian, Roohi, Stefanov : Periodically Patterned Radiometric Pumps: Novel configurations and further application		Garzo , Khalil: Transport properties of driven inelastic Maxwell mixtures
12:50-13:50	Lunch		
	Session 9a: Reaction and Relaxation Processes	Session 9b: Hypersonic flows/Gas-surface Interactions	Session 9c: RGD Related Applications
	Chair: E. Kustova	Chair: C. Day	Chair: G. Kremer
13:50-14:10	Arima , Ruggeri, Sugiyama: Rational Extended Thermodynamics for Molecular Relaxation Processes in Rarefied Polyatomic Gases	Riabov , Botin: Shock/Shock Interference in Hypersonic Low-Density Flows near a Cylinder	Masurel, Bianca, Lemarchand : Thermostatted Kinetic Theory Approach to the Competition Between Cancer and Immune System Cells
14:10-14:30	Gorbachev : Approximations for the Non-Equilibrium Reaction and Relaxation Rates	Ryakhovskiy , Schmidt: Numerical Simulation of MHD High-Speed Non-Equilibrium Flow Control	Aristov : Application of Kinetic Methods in Econophysics

14:30-14:50	Macdonald , Jaffe, Panesi: Hybrid reduced order model for N ₂ -N ₂ interactions for application to dissociation and energy transfer processes	Sharma , Munafo, Panesi: Characterization of Non-Equilibrium Hypersonic Flows using Maximum Entropy Linear Model	Bruno , Frezzotti: Dense gas effects in the RBS spectra of SF ₆
14:50-15:10	Poondla , Varghese, Goldstein: Modeling of Chemical Reactions Using Quasi-Particle Simulation (QUIPS)	Nakauchi , Mabuchi, Hori, Yoshimoto, Kinefuchi, Takeuchi, Tokumasu: Gas-Surface Dynamics of Oxygen Molecule on Nafion Ionomer Membrane	Hadj-Nacer , Higley, Maharjan, Zampella, Greiner: Temperature Prediction of a Used Nuclear Fuel Canister under Rarefied Gas Condition
15:10-15:30	Wang , Xu: On the Numerical Simulation of Chemical Reactive Flows with Unified Gas-kinetic Scheme	Takahashi, Enoki , Oshima, Yamada, Suzuki: Aerodynamics of Inflatable Nano-Satellite "EGG" in Low Earth Orbit and Reentry Duration	Marques Jr, Méndez , Velasco: A multiclass traffic flow model based on the Prigogine-Herman-Boltzmann equation
15:30-15:50	Kustova , Armenise: Mechanisms of Coupled Vibrational Relaxation and Dissociation in Carbene Dioxide	Aoki, Giovangigli : A Kinetic Model of Reactive Crystal Surfaces	Tamura, Sugimoto , Yashima: Desktop Gas Isotope Separation by Knudsen Pump
15:50-16:50	Coffee/Tea breaks and Poster Sessions		
	Room B+C		
16:50-17:50	Boyd: James Weir Lecture (Chaired by Y Zhang)		
	Friday (July 27th)		
	Room A	Room B	Room C
	Session 10a: Gas Kinetic Modelling	Session 10b: Gas-Surface Interactions	Session 10c: Non-equilibrium Flows
	Chair: L. Wu	Chair: P. Perrier	Chair: A. Xu
8:30-9:10	Invited talk Myong : Physics of polyatomic gases in non-equilibrium based on the second-order Boltzmann-type kinetic theory	Invited talk Yao : Direct measurement of adsorbed/free methane in shale	Invited talk Aristov : Nonclassical transport in nonequilibrium flows
9:10-9:30	Carvalho , Soares: Bidimensional linear stability of a detonation wave: kinetic approach and numerical results	Aksenova , Khalidov: Inverse Problem of Finding Surface Roughness Parameters in Rarefied Gas Flow	Reyes , Santos: Nontrivial Time Evolution of the Microscopic State of a Dissipative Fluid
9:30-9:50	Takata, Hattori : Slip/Jump Coefficients and Knudsen-Layer Corrections for the Shakhov Model Occurring in the Generalized Slip-Flow Theory	Andric , Jenny: Numerical Investigation and Modeling of Polyatomic Gaseous Species Scattering from Solid Surface in the Case of Strong Thermal Non-Equilibrium	Quesada , Cárdenas, Baldas, Barrot, Colin: Performance study of a multistage Knudsen pump with tapered assemblies
9:50-10:10	Jayaraman , Liu, Lopez, Panesi: A Translational Non-Equilibrium Model Based on Multi-Group Maximum Entropy Approach	Bayer-Buhr , Fieback, Gross: Thermal accommodation coefficients on ceramic surfaces	Rovenskaya, Croce : Numerical analysis of thermally generated flow based on the kinetic approach
10:10-10:30	Kim : Two-temperature model parameters for oxygen	Kammara , Chinnappan, Kumar: Effect of Surface Roughness on Tangential Momentum Accommodation Coefficient	Yakunchikov , Kosyanchuk: Gas separation effect induced by filaments with different temperatures
10:30-10:50	Coffee/Tea breaks		
	Session 11a: Gas Kinetic Modelling	Session 11b: RGD Related Topics	Session 11c: Non-equilibrium Flows
	Chair: X. Gu	Chair: M. Grabe	Chair: V. Aristov

10:50-11:10	Kosareva , Nagnibeda: On the Influence of Kinetic Models on parameters of CO ₂ /CO/O ₂ /C/O Mixture Flows Behind Shock Waves	Li , Li: Mesoscopic Statistics of Decaying Isotropic Turbulence	Taguchi , Kakehashi: Cross-Coupling Effect of Flow and Heat Transfer in a Slow Flow of a Rarefied Gas Past a Sphere
11:10-11:30	Kuechlin , Jenny: Estimating Mixed Spatial Derivatives of Moments from Particles	Xu , Zhang, Zhang, Gan: Discrete Boltzmann Modeling of Nonequilibrium Effects in multiphase flow	Tsimpoukis , Naris, Valougeorgis: Oscillatory pressure driven flow of binary gas mixtures between parallel plates
11:30-11:50	Subramaniam , Stephani: State-based transport and scattering properties for the O+O ₂ system	Megias, Santos : Free Cooling of Multicomponent Granular Gases of Rough Particles. A Unified View of 2D and 3D Systems	Ben-Ami , Manela: High-Order Thermal Effects in Oscillatory Couette Flow of a Rarefied Gas
11:50-12:10	Lorenzani : Which Kinetic Model Should Be Used to Describe Time-Dependent Flows of Binary Gas Mixtures	Taitano , Chacón, Simakov: High-Order Low-Order Nonlinear Convergence Accelerator for the Rosenbluth-Fokker-Planck Collision Operator	Nizenkov , Pfeiffer, Fasoulas: BGK simulations of a non-reactive carbon-dioxide flow around a flat-faced cylinder
12:10-12:30	Polewczak : Modified Simple Reacting Spheres (MSRS) kinetic model of reacting dense fluids	Chen , Li, Liu, Zhang, Liu: Uncertainty Quantification of the Surface Properties in Hypersonic Rarefied Cylinder Flows	Yonemura , Kawagoe: A Study on a Force Exerted on Microscale Object due to a Non-Uniform Temperature Field
12:30-12:50	Padrino , Lockerby, Sprittles; Thermophoresis of a spherical particle: Modeling through moment-based, macroscopic transport equations	Wang , Yu, Chen, Zhang, Liu: Microscale shock - Taylor vortex interaction with NS and DSMC simulation	Liu , Liu, Tang: Rarefaction Throttling Effect: Influence of the Bend in Microscale Gas Flow
12:50-15:50	Lunch and Farewell Party		

Poster Presentations

PS1: Boltzmann and Related Equations

Post No.	Authors	Title
1	Agarwal, Qian	Computation of Shock Waves in Binary Inert Gas Mixtures Using the Generalized Boltzmann Equation
2	Alekseenko, Wood	Ultra Sparse Approximations of Spatially Homogeneous Kinetic Solutions to the Boltzmann Equation
3	Majorana	Deterministic Numerical Solutions to a Semi-Discrete Boltzmann Equation

PS2: Numerical Methods

Post No.	Authors	Title
4	Aristov, Ilyin, Rogozin	Hybrid Numerical Schemes Based on Coupling Discrete-Velocities Models for the BGK and LBGK Equations
5	Kim, Sohn, Myong, Ejtehadi	Finite Volume Approach of Electro-Magnetic Field Coupled with Charged Particle Simulation
6	Gijare, Bhagat, Dongari	Implementation of Knudsen Layer in OpenFOAM Solver for Modeling of High-Speed Couette Flows in Slip and Early Transition Flow Regime
7	He, Ren, Cai, Wang, Zhang	Velocity Space Discretisation for Deterministic Solution of Hypersonic Rarefied Flow
8	He, Xiao	A Discontinuous Galerkin Framework for Solving Nonlinear Coupled Constitutive Model
9	Ilyin	A novel conservative velocity discretization approach for BGK model and the Lattice Boltzmann method
10	Su, Wang, Zhang, Wu	Hybridizable Discontinuous Galerkin Method with Fast Convergence to Steady Solutions of the Kinetic Equation
11	Aristov, Ilyin, Zabelok, Kolobov, Arslanbekov	Adaptive Boltzmann-LBM Solver
12	Gao, Zhuo, Zhong	A Circular function-based Discrete Unified Gas-Kinetic Scheme

PS3: DSMC Development and DSMC Applications

Post No.	Authors	Title
13	Chae, Baek	DSMC Analysis of Bipropellant Thruster Plume Impingement by a Grouping Species Method
14	Jaiswal, Sebastiao, Alexeenko	DSMC-SPARTA Implementation of M-1 Scattering Model
15	Jaiswal, Sebastiao, Strongrich, Alexeenko	FEMTA Micropropulsion System Characterization by DSMC
16	Abhishek, Khan, Kumar	Characteristics of Plug Nozzle in Rarefied Regime using the Direct Simulation Monte Carlo Method
17	Luo, Wang	Analytical and DSMC Study of Vibrational Nonequilibrium Effects on Rarefied Gas Flows
18	Pikus, Sebastiao, Alexeenko, Gallis	DSMC-SPARTA Implementation of Majorant Collision Frequency Scheme
19	Singh, Schwartzentruber	Collision Models for Direct Simulation Monte Carlo of Hypersonic Flows
20	Ambrus, Sofonea	Lattice Boltzmann approach to rarefied channel flows using half-range Gauss-Hermite quadratures
21	Song, Sun	DSMC Simulation of Gas Heat Transfer Between Coaxial Cylinders
22	Xue, Sun	Investigation of Shock Attenuation in Shock Tube Using DSMC Method

PS4: Molecular Dynamics and Other Particle Methods

Post No.	Authors	Title
23	Huang, Jin, Han, Cheng	Particle Simulation of Hypersonic Flow Based on Unstructured Adaptive Grid Method
24	Nayak, Kammara, Arghode, Kumar	Molecular Dynamics Study of the Sintering of Ni-coated Al Nanoparticles
25	Sharma, Kumar	Mechanical Response of CNT-Polyethylene Nanocomposite using Molecular Dynamics Approach

PS5: Porous Media Flows

Post No.	Authors	Title
26	Droudian, Andric, Jenny	Gas flow characterization through atomically-thin porous media in the rarefied-continuum transition regime
27	Johansson, Pavan, Perrier, Vicente, Graur, Stefanov	Transient DSMC method and Kinetic simulations of gas flow in Porous media
28	Germanou, Ho, Zhang, Wu	Intrinsic and apparent gas permeability of heterogeneous and anisotropic ultra-tight porous media
29	Hori, Yoshimoto, Takagi, Kinofuchi	Molecular Transport Simulation of Knudsen and Surface Diffusion in Porous Structures
30	Komatsu, Kawagoe, Yonemura	Applicability of Kawagoe-Yonemura Expression to Gas Flow through Packed Beds of Micro-/Nanoscale Particles
31	Jambunathan, Sawant, Levin	Flow through Porous Media with an Application to TPS
32	Apostolopoulou	Predicting Fluid Transport in Complex Porous Networks: Advantages and Disadvantages of Stochastic vs. Deterministic Approaches

PS6: Jets and Plumes

Post No.	Authors	Title
33	Chinnappan, Kumar, Arghode	DSMC Study of Plume Impingement on a Lunar Surface
34	Bykov, Gorbachev	Cluster Formation Process in Metal Vapor Plume
35	Grabe, Dettleff, Hannemann	Effect of Source Geometry on Fully Expanding Free Jets
36	Lee	Rarefied Plume Analysis of HAN Green Propellant Thruster
37	Oh	Analysis of Nozzle Flow and Plume at High Altitude using SMILE code

PS7: Experimental Techniques

Post No.	Authors	Title
38	Bruno	Sensitivity of shocked air emission spectra on CR models
39	Tejeda, Fernández, Montero	Diagnostics of D ₂ , D ₂ +H ₂ and D ₂ +He supersonic jets by Raman spectroscopy

PS8: Space Vehicle Aerodynamics/ Hypersonic Flows

Post No.	Authors	Title
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40	Ejtehadi, Myong	Simulation of rarefied dusty gas flows with applications to the Lunar landing problem using a discontinuous Galerkin method
41	Kashkovsky, Vashchenkov, Shevyrin, Shkredov, Krylov, Bondar	Aerothermodynamics of the Federation crew module at high-altitude reentry
42	Baranger, Mathiaud, Pellegrini, Mieussens	Modeling, numerical method and validation for the simulation of hypersonic rarefied gas flows
43	Jin, Huang, Wang, Cheng	Evaluation of Atmospheric Drags for Satellites in Low Earth Orbit Using Various Atmospheric Models
44	Lyu, Huang, Cheng, Yu, Li, Yu	Validation and Application of Gas Radiation Computation at Earth Re-entry Conditions
45	Liu, Chen, Yu, Zhang, Liu	On the Shock/step-interface Interaction in Macroscale and Microscale Conditions
PS9: RGD Related Applications		
Post No.	Authors	Title
46	Perciante, Mendez	A Boltzmann-like kinetic model for pedestrian bidirectional flow
47	Ilyin	The application of the Lattice Boltzmann method to the one-dimensional modeling of blood flows in elastic vessels
PS10: Evaporation/Condensation		
Post No.	Authors	Title
48	Barbante, Frezzotti	A Kinetic Model for Evaporation of a Simple Fluid from Nanopores
49	Polikarpov, Graur, Sharopov	Evaporation and condensation in gaseous mixtures
50	Sheng, Sun, Tang, You, Pu, Wang	Molecular Dynamics Simulation of Condensation of Vapor in Nanochannels
51	Watanabe, Sato, Hori, Yoshimoto, Takagi, Kinefuchi	Measurement of Non-equilibrium Velocity Distribution of Evaporating Molecules from a Liquid Surface
52	John, Emerson, Enright, Sprittles, Lockerby	Understanding Nanopore Evaporation using Direct Simulation Monte Carlo
PS11: Gas Kinetic Modelling		
Post No.	Authors	Title
53	Araki	Extension of Radiosity View Factor Model to Free Molecular Flow with Non-Maxwellian Inflow Condition
54	Chung, Jenny, Gorji	Investigations of a Linear Kinetic Model for the Vlasov- Fokker-Planck Equation
55	Bager, Dadzie, Ocone	Evaluation of Bi-Velocity Method in Two-Fluid Model in OpenFOAM
56	Gorbachev	Non-Equilibrium Nucleation Model
57	Pfeiffer, Nizenkov	Comparison of different Bhatnagar-Gross-Krook models by means of a nozzle expansion
58	Rongali, Reddy, Alam	Bulk Hydrodynamics and Rheology of Gravity-Driven Poiseuille Flow of Maxwell Molecules
59	Tena, Santos	Kinetic Theory of Soft Matter. The Penetrable-Square-Well Model
60	Sasse	Phenomena in numerical simulations of gas mixtures
61	Söderholm	Regularized Boundary Conditions for Regularized Burnett Equations
62	Alibert, Pavan, Schneider	Using phi-divergence for building bkg
63	Boudin, Grec, Pavan	Stefan Maxwell and Fick diffusions derived from kinetic theory and stiff hyperbolic systems
64	Suzuki	Granular Flow Induced by High-Speed In-plane Impact on Particle Sheet and Its Fluid Dynamic Description
PS12: Gas-Surface Interactions		
Post No.	Authors	Title
65	Chang	Performance evaluation of accommodation coefficient in Knudsen layer under different Knudsen number
66	Chernyak, Sograbi	The dependence of thermophoresis on molecule-surface interaction
67	Gu, Emerson, John	Effect of surface modification on steady flow past a stationary circular micro cylinder
68	Han	Wettability Effects on Transport Phenomena of Oxygen Molecules through an Hourglass-shaped Pore
69	Stefanov, Brancher, Graur, Frezzotti	Adsorption-desorption modeling
70	Abhishek, Kammarra, Kumar	Single Particle Trajectory Analysis for the Evaluation of Surface Accommodation Coefficients
71	Saveliev, Yonemura	Two-particle Kinetic Equation and Simulations Using Quasiparticle Pairs and Velocity Moments
72	Sazhin	The Impact of Surface Roughness on Internal Free Molecular Gas Flow
73	Zhdanov, Stepanenko	Boundary slip phenomena in a multicomponent gas mixture
PS13: Plasma Flows, Processes and Applications		
Post No.	Authors	Title
74	Cai, Cooke	Simple Electron Temperature and Potential Relations in Dilute and Cold Plasma Flows
75	Capon, Brown, Boyce	Ionospheric Aerodynamics: Comparison of Numerical and Experimental Predictions
76	Yamada, Kaise, Umezawa	Shock Tube Study of Nonequilibrium Plasma flows in a Mars Entry Flight Condition
77	Koike	Rigid Body Motion in a Special Lorentz Gas: Mathematical Analysis
78	Jambunathan, Levin	Fully Kinetic PIC-DSMC Simulations of Ion Thruster Plasma Plumes
79	Tran, Martin	Impact of Electron-neutral Collisions and Sheath Boundary Effects on Electron Transport in Hall-effect Thrusters
PS14: Moment Methods		
Post No.	Authors	Title
81	Struchtrup, Frezzotti	Moment Equations for the Enskog-Vlasov Equation
82	Timokhin, Struchtrup, Kokhanchik, Bondar	R13 Moment Equations Applied to Supersonic Flow with Solid Wall Interaction
83	Yang, Gu, Emerson, Zhang, Tang	Comparative Study of the Discrete Velocity and the Moment Method for Rarefied Gas Flows
PS15: Reaction and Relaxation Processes		

Post No.	Authors	Title
84	Wysong, Gimelshein, Bykova, Shatalov	Impact of Flow Nonequilibrium in Oxygen Shock Absorption Analysis
85	Kunova, Kustova, Papina, Savelev	Validation of Vibrational State-Dependent Rate Coefficients of Zeldovich Reactions
86	Oblapenko, Kustova, Hannemann	Assessment of Recent Thermo-chemical Relaxation Models Using the DLR-TAU Code
87	Kunova, Nagnibeda, Papina	Vibrational-Chemical Coupling in Non-Equilibrium Air Nozzle Flows
PS16: Non-equilibrium Flows		
Post No.	Authors	Title
88	Ami, Manela	High-Order Thermal Effects in Oscillatory Couette Flow of a Rarefied Gas
89	Abramov, Butkovskii	Similarity parameters in the Rarefied Couette Problem
90	Abramov, Butkovskii	Reynolds Analogy for the Rarefied Rayleigh Problem: Similarity parameters
91	Butkovskii	Shear Stress and Energy Flux Maxima in the Rarefied Cylindrical Couette Problem
92	Abramov, Alexandrov, Butkovskii	Conditional Maxima of Energy Fluxes in the Heat Transfer Problem and in the Longitudinal Cylindrical Couette Problem for the Rarefied Gas
93	Baranger, Marois, Mathe, Mathiaud, Mieussens	A BGK model for high temperature rarefied gas flows
94	Alekseev, Kosareva, Kustova, Nagnibeda	Shock Waves in Carbon Dioxide: Simulations Using Different Kinetic-Theory Models
95	Poleshkin, Shershnev, Kudryavtsev, Malkov	Numerical Simulation of Rarefied Gas Flows in the Field of Body Force
96	Manela, Pogorelyuk	The response of a gas in a slab to instantaneous insulation of its boundaries
97	Manela, Ami	Acoustic field of a pulsating cylinder in rarefied gas
98	Shoiev, Vashchenkov, Shevyrin, Bondar	Validation of DSMC/NS Computations for High-Enthalpy Non-Equilibrium Flows in Ground and Flight Tests
99	Wang, Su, Wu, Zhang	Oscillatory rarefied gas flow inside a three dimensional rectangular cavity
PS17: Transport Properties		
Post No.	Authors	Title
100	Kustova, Mekhonoshina	Bulk Viscosity in Carbon Dioxide
101	Ambrus	Analysis of transport coefficients in the ultrarelativistic Anderson-Witting-Boltzmann equation
102	Istomin, Kustova	State-to-State Transport Properties of Argon and Carbon Ionized Atomic Mixtures
103	Kustova, Kornienko	Generalization of Mason-Saxena Formulas for the Case of State-resolved Diffusion Coefficients
104	Riabov	Limitations of the Bulk Viscosity Approach in Modeling the Expanding Nitrogen Flows
PS18: Micro/nano Flow		
Post No.	Authors	Title
105	Bhagat, Gijare, Dongari	Numerical Modeling Study of Knudsen Layer Effects in Microscale Gas Flows
106	Timokhin, Tikhonov	Numerical Simulations of Micro-Channel Devices with Lattice Boltzmann Method
107	Mistry, Kammara, Kumar	Co-axially Rotating Carbon Nanotubes: A Novel Mechanism for Nanoscale Pumping of Fluids
108	Xie, Gibelli, Borg, Lockerby, Reese	Variation of Molecular Mean Free Path in Confined Geometries
109	Ding, Chen, Shao, Zhang, Liu	DSMC Study of the Real Gas Effect on Lateral Jet Interaction of THAAD-like Missile
110	Lian, Striolo, Coppens	Modelling of fluid transport across porous material by classical density functional theory and effective medium theory
111	Cinquegrana, Votta, E. Trifoni	DSMC simulations for assessment of Rarefaction Effects during NASA tests at SCIROCCO

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