An Iterative Solution to the Surface Scattering Problem: Application to He Diffraction by Cu	637
Analytical Studies of Gas-Surface Interaction	645
Quasiclassical Theory of Vibrational-Rotational Excitation and Adsorption of Molecular Gas by Crystalline Surface	653
H-Atom Beam Scattering from a Ni (110) Surface Covered with a c(2x2) Carbon Layer	661
Experimental Determination of Momentum Transfer Coefficients in Hypersonic Free Molecular Flow and Distribution Function Recovery of Reflected Molecules	669
Bounds of Linear Transter and Accommodation at the Gas-Solid Interface	677
Some Aspects of Nonequilibrium Free Molecular Nitrogen Flow-Metal Surface Interaction	687
VOLUME 2	
X. COLLISIONAL PROCESSES	
Analytical Formulae for Cross Sections and Rate Constants of Elementary Processes in Gases	697
Relaxation of Velocity Distribution of Electrons Cooled (Heated) by Rotational Excitation (De-Excitation) of N <sub>2</sub>	705
Effects of the Initial Molecular States in High-Energy Scattering of Molecular Beams	717

Differential Cross Sections for Ion-Pair Formation with Selection of the Exit Channel M.J.P. Maneira, A.J.F. Praxedes, and A.M.C. Moutinho	725
Low-Temperature Viscosity Cross Sections Measured in a Supersonic Argon Beam II	733
Excited Oxygen Iodine Kinetic Studies D. Pigache, D. David, J. Bonnet, and G. Fournier	741
Determination of Antisymmetric Mode Energy of CO <sub>2</sub> Injected Into a Supersonic Nitrogen Flow V.A. Volkov, A.P. Zuev, N.N. Ostroukhov, and B,K. Tkachenko	749
XI. MOLECULAR BEAMS	
Where are We Going with Molecular Beams? (Invited Paper) J.B. Fenn	761
Cesium Vapor Jettarget Produced with a Supersonic Nozzle A. Athanasiou and O.F. Hagena	777
Basic Features of the Generation and Diagnostics of Atomic Hydrogen Beams in the Ground and Metastable 22S <sub>12</sub> States to Determine the Fundamental Physical Constants	787
Optical Pumping of Metastable Neon Atoms in a Weak Magnetic Field	795
CO <sub>2</sub> -Laser Excitation of a Molecular Beam Monitored by Spontaneous Raman Effect	799
Time-of-Flight and Electron Beam Fluorescence Diagnostics: Optimal Experimental Designs	807
Molecular Beam Time-of-Flight Measurements in a Nearly Freejet Expansion of High Temperature Gas Produced by a Shock Tube	815
XII. ELECTRON-BEAM DIAGNOSTICS	
Electron-Beam Diagnostics of High Temperature Rarefied Gas Flows	825

Excitation Models Used in the Electron Beam  Beam Fluorescence Technique	833
Electron-Beam Diagnostics in Nitrogen: Multiquantum Rotational Transitions	839
XIII. FREE JETS, NONEQUILIBRIUM EXPANSIONS	
Free Jet as an Object of Nonequilibrium Processes Investigation (Invited Paper)	849
State Dependent Angular Distributions of Na <sub>2</sub> Molecules in a Na/Na <sub>2</sub> Free Jet Expansion	865
Molecular Beam Time-of-Flight Measurements and Moment Method Calculations of Translational Relaxation in Highly Heated Free Jets of Monatomic Gas Mixtures	879
Rovibrational State Population Distributions of CO (v $\leqslant$ 4, J $\leqslant$ 10) in Highly Heated Supersonic Free Jets of CO-N <sub>2</sub> Mixtures	887
Free Jet Expansion with a Strong Condensation Effect N.G. Gorchakova, P.A. Skovorodko, and V.N. Yargin	895
Measured Densities in UF $_{6}$ Free Jets $\ \ldots \ \ldots \ \ldots \ \ldots$ P.A. Hoisington and S.S. Fisher	903
Rotational Relaxation of NO in Seeded, Pulsed Nozzle Beamd H.W. Lülf and P. Andresen	911
The Free-Jet Expansion from a Capillary Source D.R. Miller, M.A. Fineman, and H. Murphy	923
Rotational Relaxation in High Temperature Jets of Nitrogen R.G. Sharafutdinov, A.E. Belikov, N.V. Karelov, and A.E. Zarvin	931
Translational Nonequilibrium in a Free Jet Expansion of a Binary Mixture	939

Laser Induced Fluorescence Study of Free Jet Expansions P. Willems, H. Hulsman, and F. Aerts		•	•	951
XIV. JET-SURFACE INTERACTIONS				
Experimental Study of Plume Impingement and Heating Effect of Ariane's Payload		•	•	965
The Interaction of a Jet Exhausting from a Body with a Supersonic Free Flow of a Rarefied Gas I.N. Larina	•	•	•	975
Modelling Control Thruster Plume Flow and Impingement . H. Legge and RD. Boettcher	•	•	•	983
Impingement of a Supersonic, Underexpanded Rarefied Jet upon a Flat Plate				993
Some Peculiarities of Power and Heat Interaction of a Low Density Highly Underexpanded Jet with a Flat Plate	•	•	•	1001
XV. CONDENSATION IN FLOWS				
Nonequilibrium Condensation in Free Jets	•	•	•	1011
Condensation and Vapour-Liquid Interaction in a Reflected Shock Region			•	1019
Homogeneous and Heterogeneous Condensation of Nitrogen in Transonic Flow				1033
Investigation of Nonequilibrium Homogeneous Gas Condensation			•	1043
The Peculiarities of Condensation Process in Conical Nozzle and in Free Jet Behind It P.A. Skovorodko	•	•		1053
Investigation of Nonequilibrium Argon Condensation in Supersonic Jet by Mass-Spectrometry, Electron Diffraction and VUV Emission Spectroscopy	n			1063

## XVI. CLUSTERS AND NUCLEATION KINETICS

The Microscopic Theory of Clustering and Nucleation (Invited Paper)	1073
Kinetics of Cluster Formation and Growth in the Process of Isothermal Condensation	1087
Relaxation Processes in a Molecular Dynamic Model of Cluster from the Lennard-Jones Particles S.P. Protsenko and V.P. Skripov	1097
Quantum-Chemical Study of Processes with Cluster Isomerism	1105
The Homogeneous Nucleation at the Continuously Changing Temperature and Vapour Concentration	1113
Molecular Clusters as Heterogeneous Condensation Nuclei V.A. Zagaynov, A.G. Sutugin, and A.A. Lushnikov	1121
XVII. EXPERIMENTS WITH CLUSTERS	
The Photochemistry of Small Van Der Waals Molecules as Studied by Laser Spectroscopy in Supersonic Free Jets (Invited Paper)	1131
Diagnostics of Clusters in Molecular Beams (Invited Paper)	1141
Experimental Studies of Water-Aerosol Explosive Vaporization	1165
Laser Probing of Cluster Formationa and Dissociation in Molecular Beams	1173
Free Molecule Drag on Helium Clusters J. Gspann	1187
Vibrational Relaxation Kinetics in a Two-Phase Gas-Cluster System	1195

## XVIII. GAS-PARTICLE FLOWS

Long-Range Attraction in the Collisions of Free-Molecular and Transition Regime Aerosol Particles (Invited Paper)	1205
W.H. Marlow	
Nonequilibrium Statistical Theory of Dispersed Systems A.G. Bashkirov	1221
The Mechanism of Strong Electric Field Effect on the Dispersed Media in the Rarefied Gas A.G. Gagarin, V.H. Vigdorchik, and Yu.N. Savchenko	1227
Generation of High-Speed Aerosol Beams by Laval Nozzles W.J. Hiller and J. Hägele	1235
Kinetic Model of a Gas Suspension Yu. Lunkin and V. Mymrin	1245
XIX. GAS MIXTURES	
Kinetic Phenomena in the Rarefied Gas Mixtures Flowing Through 'Channels (Invited Paper)	1255
On the Discrete Boltzmann Equation for Binary Gas Mixtures . N. Bellomo and L.M. de Socio	1269
Peculiarities and Applicability Conditions of Macroscopic Description of Disparate Molecular Masses Mixture Motion	1277
o.g. buzykin, v.s. gaikin, and n.k. Makasnev	
Numerical Solution of the Boltzmann Kinetic Equation for the Binary Gas Mixture	1285
XX. SPECIES/ISOTOPE SEPARATION	
Gas or Isotope Separation by Injection into Light Gas Flow S.F. Chekmarev	1297
Molecular Diffusion through a Fine-Pored Filter Versus Resonate IR-Radiation Intensity V.A. Kravchenko, A.N. Orlov, and Yu.N. Petrov	1308
On Limiting Situations of Gas Dynamic Separation Yu.S. Kusner, B.L. Paklin, and A.K. Rebroy	1313

A Study of Reverse Leaks	1319
Investigation of Nonequilibrium Effects in Separation Nozzles by Mone-Carlo Simulation	1327
Separation of Binary Gas Mixtures at Their Effusion Through a Capillary and a Nuclear Filter into Vacuum	1341
XXI. IONIZED GASES	
Effects of Nonideality in Quantum Kinetic Theory W. Ebeling	1351
Molecular Mass and Heat Transfer of Chemical Equilibrium Multicomponent Partially Ionized Gases in Electromagnetic Field	1359
Sepectroscopic Study of a Plasma Flow Along the Stagnation Streamline of a Blunt Body	1367
On Model Kinetic Operators and Corresponding Langevin Sources for a Non-Equilibrium Plasma I. Pavia-Veretennicoff and V.V. Belyi	1375
XXII. RELATED FIELDS	
Rarefied Gas Dynamics as Related to Controlled Thermonuclear Fusion (Invited Paper)	1389
Vacuum Ejectors with Appreciably Uneven Flows in Channels at Low Reynolds Numbers V.G. Jarinov	1405
Simulation of the Process of the Cosmic Body Formation	1413
INDEX	1421