

Contents

Part I: Plenary Lectures

The Paul Vieille Memorial Lecture: The Application of Hook-Method Spectroscopy to the Diagnosis of Shock-Heated Gases <i>R. J. Sandeman</i>	3
Condensed Matter at High Shock Pressures <i>W. J. Nellis, N. C. Holmes, A. C. Mitchell, H. B. Radousky, and D. Hamilton</i>	15
A Review of Shock Waves Around Aeroassisted Orbital Transfer Vehicles <i>Chul Park</i>	27
Shock Wave Focusing Phenomena <i>H. Grönig</i>	43
Shock Dynamics of Noninvasive Fracturing of Kidney Stones <i>David A. Russell</i>	57
Realistic Numerical Syntheses of Shock-Excited Molecular Spectra <i>R. W. Nicholls, M. W. P. Cann, and J. B. Shin</i>	65
Auto-Ignition of Hydrogen by a Shock-Compressed Oxidizer <i>A. Sakurai</i>	77
Shock Waves in Helium at Low Temperatures <i>H. W. Liepmann and J. R. Torczynski</i>	87

Part II: Shock Propagation and Interactions

The Reflection of a Regular Reflection over a Secondary Ramp <i>J. M. Dewey, G. Ben-Dor, and K. Takayama</i>	99
Collision of Mach Reflections with a 90-Degree Ramp <i>J.-C. Li and I. I. Glass</i>	105
Multiple, Internal Conical Mach Reflections <i>B. E. Milton, D. Q. Duong, and K. Takayama</i>	113
Irregular Shock Diffraction Systems <i>L. F. Henderson</i>	121
Pseudo-stationary Mach Reflexion of Shock Waves <i>F. Seiler</i>	129
On the Effects of Shock Wave Reflection in a Confined Space <i>K. C. Phan and J. L. Stollery</i>	139
Transformation of a Plane Uniform Shock into Cylindrical or Spherical Uniform Shock by Wall Shaping <i>Y. Saillard, H. Barbry, and C. Mounier</i>	147
On the Occurrence of Regular Reflection of Shocks in Concave Corner Flows <i>R. Niehuis, H. Schöler, and H. Hornung</i>	155

viii *Contents*

Experimental Study of Shock Wave Reflection in a Narrow Channel <i>J. Brossard, N. Charpentier, T. V. Bazhenova, V. P. Fokeev, A. A. Kalachev, and A. I. Kharitonov</i>	163
Air-Induced Ground Pressure Waves in Granular Soil Materials <i>D. Hveding</i>	171
Wave and Thermal Phenomena in H.S.-Tubes with an Area Constriction <i>E. Brocher and M. Kawahashi</i>	179
Shock Wave Interaction with High Sound Speed Layers <i>W. J. Glowacki, A. L. Kuhl, H. M. Glaz, and R. E. Ferguson</i>	187
On Oblique Shock Waves with a Phase Transition in Relativistic Gasdynamics <i>A. Granik</i>	195
The Reflection of a Mach Reflection over a Secondary Ramp <i>G. Ben-Dor, J. M. Dewey, and K. Takayama</i>	203
Interaction of Weak Shock Waves Reflected on Concave Walls <i>M. Nishida, T. Nakagawa, T. Saito, and M. Sommerfeld</i>	211
Interaction of Oblique Shock-Wave Reflections in Air and CO ₂ with Downstream Obstacles <i>H. M. Glaz, I. I. Glass, J.-C. Li, and P. A. Walter</i>	219
An Interferometric and Numerical Study of Pseudo-stationary Oblique-Shock-Wave Reflections in Sulfur Hexafluoride (SF ₆) <i>T. C. J. Hu and I. I. Glass</i>	227
Transition from Mach to Regular Reflection of a Shock Wave over a Concave Corner <i>K. Matsuo, T. Aoki, H. Hirahara, and N. Kondoh</i>	235

Part III: Shock-Generated Chemical Kinetics

Measurements of N Atom Concentrations in Dissociation of N ₂ by Shock Waves <i>P. Roth and K. Thielen</i>	245
Oxidation of Cyanogen. IV. The Mechanism of the Oxidation in the Presence of Hydrogen <i>Assa Lifshitz and Menashe Bidani</i>	253
Determination of the High Temperature Rate Constant of the Reaction 2NH → 2H + N, in the Pyrolysis of Hydrazoic Acid, HN ₃ , <i>K. Hori, M. Oya, H. Tanaka, and T. Asaba</i>	261
A Shock Tube Study of the Pyrolysis of Partially Deuterated Propenes <i>V. Subba Rao and Gordon B. Skinner</i>	269
Shock Tube Study of Acetaldehyde Oxidation <i>A. Koichi Hayashi and Toshi Fujiwara</i>	277
Chemical Kinetics Modeling of the Influence of Molecular Structure on Shock Tube Ignition Delay <i>Charles K. Westbrook and William J. Pitz</i>	287

Shock-Tube Pyrolysis of Acetylene: Sensitivity Analysis of the Reaction Mechanism for Soot Formation <i>M. Frenklach, D. W. Clary, W. C. Gardiner, Jr., and S. E. Stein</i>	295
Empirical Modeling of Soot Formation in Shock-Tube Pyrolysis of Aromatic Hydrocarbons <i>M. Frenklach, D. W. Clary, and R. A. Matula</i>	303
Single-Pulse Shock Tube Examination of Hydrocarbon Pyrolysis and Soot Formation <i>M. B. Colket III</i>	311
Single Pulse Shock Tube Studies on the Stability of Aromatic Compounds <i>Wing Tsang and David Robaugh</i>	319
Theoretical and Experimental Study of Vibrational Non-equilibrium <i>F. Offenhäuser and A. Frohn</i>	327
Ignition Delay Times of Cyclopentene Oxygen Argon Mixtures <i>Alexander Burcat, Christopher Snyder, and Theodore Brabbs</i>	335
Absorption Measurement on Methane and Hydroxyl Radicals in a Thermal Non-equilibrium Boundary Layer <i>W. Sauer and J. H. Spurk</i>	343
The Discharge Flow/Shock Tube as a Method for Studying Contact Surface Mixing <i>Patricia M. Borrell and Peter Borrell</i>	351
Perturbation Analysis of Reactive Flowfields in Shock Tubes <i>Yasunari Takano</i>	359
Numerical Simulations of the Initiation of Gaseous Detonations in Shock Tubes <i>K. Kailasanath, E. S. Oran, and J. P. Boris</i>	367
Shock Initiation and Detonation Propagation in Tubes Confining an Explosive Air Flow <i>A. Persson and L. Jerbyrd</i>	375
A Shock Tube Study of the Decomposition of Chlorine Dioxide <i>C. Paillard, G. Dupré, S. Youssefi, R. Lisbet, and N. Charpentier</i>	381
Part IV: Shock Computation, Modeling, and Stability Problems	
Numerical Prediction of Shock Wave Diffraction <i>R. Hillier and J. M. R. Graham</i>	391
Computation of Nonstationary Strong Shock Diffraction by Curved Surfaces <i>J. Y. Yang, C. K. Lombard, and D. Bershadler</i>	399
The Effects of Wedge Roughness on Mach Formation <i>Charles E. Needham, Henry J. Happ, and Dana F. Dawson</i>	407
Instability of Interfaces Submitted to Shock Acceleration and Deceleration <i>L. Houas, R. Brun, and M. Hanana</i>	415
Stability and Collapsing Mechanism of Strong and Weak Converging Cylindrical Shock Waves Subjected to External Perturbation <i>R. A. Neemej and Z. Ahmad</i>	423

x *Contents*

Role of the Boundary Conditions in the Problem of the Linear Stability of the Sedov Point Blast Solution <i>David L. Book</i>	431
Model Calculations of the Precursor Ahead of the Shock Front in Inert Gases <i>D. Krauss-Varban</i>	439
Application of the Generalized Riemann Problem Method for 1-D Compressible Flow with Material Interfaces <i>M. Ben-Artzi and A. Birman</i>	447
Time Evolution of the Rarefaction Wave with Entropy Increase Modified Taub-Equation for Shock Experiments <i>R. W. Larenz and U. Steffens</i>	453
Two-Dimensional Shock Focusing and Diffraction in Air and Water <i>H. Olivier and H. Grönig</i>	461

Part V: Shock Wave Aerodynamics

Quantitative Study of Shock-Generated Compressible Vortex Flows <i>M. Mandella, Y.J. Moon, and D. Bershader</i>	471
Unsteady Drag over Cylinders and Aerofoils in Transonic Shock Tube Flows <i>K. Takayama and K. Itoh</i>	479
Numerical Simulation of Steady and Unsteady Shock Boundary Layer Interaction <i>E. Katzer, H. Oertel, Jr., and H. Reister</i>	487
Leading Edge Effects on Boundary Layers Behind Weak Shock Waves <i>B. E. L. Deckker and D. Singh</i>	495
Shock-Tunnel Studies of Separation Avoidance by Boundary-Layer Bleeding in Hypersonic Flow over Flared Bodies <i>Lucien Z. Dumitrescu and Steliană Preda</i>	503
Shock Wave–Laminar Boundary Layer Interaction at Finite Span Compression Corners <i>R. J. Stalker and J. P. Rayner</i>	509
Shock Dynamics in Heated Layers <i>Mark A. Fry and David L. Book</i>	517
Rotational Motion Generated by Shock Propagation Through a Nonuniform Gas <i>J. M. Picone, J. P. Boris, E. S. Oran, and R. Ahearne</i>	523

Part VI: Experimental Methods

A Method for Performing Oblique Shock–Bow Shock Interaction in Double Driver Shock Tube (Tunnel) <i>Z. Y. Han, Z. Q. Wang, X. Z. Yin, J. C. Yao, A. D. Du, and K. Wang</i>	533
Fast Loading of Metals Using a Shock Tube: Application to Aluminum <i>Wesley R. Smith</i>	541
Spray Detonation Studies Using Laser Doppler Techniques <i>G. Smeets</i>	547

Self-Acting Double Shock Tubes and Application to Experiment of Gases Mixing Process <i>H. Oguchi, H. Ohue, S. Sato, and K. Funabiki</i>	555
Study on Shock Waves in Low Temperature Gas by Means of a Non-diaphragm Shock Tube <i>K. Maeno and S. Orikasa</i>	563
Ignition of Combustion Reactions Between Driver and Driven Gases in a Diaphragmless Flexible Shock Tube <i>Yong W. Kim</i>	571
Blast-Wave Density Measurements <i>D. V. Ritzel</i>	579
Simultaneous Laser Measurements of Velocities and Particle Sizes in Two-Phase Flows <i>Y. M. Timnat and Y. Levy</i>	587
Shock Waves in a Gas Filled Flexible Tube <i>J. Brossard, J. Renard, and M. Aminallah</i>	595
Free-Flight Oscillatory Experiments in a Hypersonic Gun Tunnel <i>R. A. East and T. J. Hillier</i>	601
Turbulent Mixing Measurements Using Short-Duration Jets <i>Corso Padova</i>	609
Shock Tube Measurements of Convective Heat Transfer from a High Reynolds Number, Particle-Laden, Turbulent, Non-steady Boundary Layer <i>G. T. Roberts, D. Kilpin, P. Lyons, R. J. Sandeman, R. A. East, and N. H. Pratt</i>	619
Experimental Study of Pressure and Heat Flux Distribution on Indented Nosetip Models in a Shock Tunnel <i>H. T. Fan and G. X. Gou</i>	627
Holographic Interferometry Observation of the Propagation of Cavitation Induced Shock Waves in an Ultrasonic Vibratory Type Testing <i>N. Sanada, K. Takayama, O. Onodera, and J. Ikeuchi</i>	633
Underwater Shock Wave Focusing: An Application to Extracorporeal Lithotripsy <i>K. Kambe, M. Kuwahara, S. Kurosu, K. Takayama, O. Onodera, and K. Itoh</i>	641
Some Heat Transfer Measurements over a Sphere-Cone in High Enthalpy Non-equilibrium Flow <i>S. L. Gai, P. R. A. Lyons, J. P. Baird, and R. J. Sandeman</i>	649
A High Repetition Rate, Low Temperature Shock Tube <i>E. L. Resler, Jr., and S. H. Bauer</i>	657

Part VII: Shocks in Multiphase and Heterogeneous Media

An Experimental Study on Shock Waves Propagating Through a Dusty Gas in a Horizontal Channel <i>H. Sugiyama, H. Hatanaka, A. Takimoto, and T. Shirota</i>	667
Structure of Shock Waves in Dusty Gases <i>R. S. Srivastava</i>	675

Shock Wave Reflections in Dusty Gas <i>M. Sommerfeld, M. Selzer, and H. Grönig</i>	683
Measurement of Large Mass Fractions in Dusty Gases with Weak Shock Waves <i>J. Ming and A. Frohn</i>	691
Experimental Observation of the Structure of Shock Waves in Dusty Gas <i>Yu Hongru, Lin Jiangmin, Yuan Shengxue, and Li Zhongfa</i>	699
Two-Phase Oxygen-Carbon Dust Flow Through a Normal Shock Wave <i>I. Elperin, O. Igra, and G. Ben-Dor</i>	705
Shock Waves in Binary Gas Mixtures <i>R. Herczynski, M. Tarczynski, and Z. Walenta</i>	713
Experimental Investigation of Weak Shock Waves, Propagating in a Fog <i>H. W. J. Goossens, M. J. C. M. Berkelmans, and M. E. H. van Dongen</i>	721
Pressure Increase in Two-Phase Media Behind Air Shock Waves and by Shock Wave Accelerated Pistons <i>G. Patz and G. Smeets</i>	729
Underwater Explosion of Two Spherical or Nonspherical Bubbles and Their Interaction with Radiated Pressure Waves <i>S. Fujikawa, H. Takahira, and T. Akamatsu</i>	737
Radial Flow of a Metastable Liquid <i>Raymond J. Emrich</i>	745
Spatial Distributions of Dust Particles Dispersed by a Shock Wave over a Dust Layer <i>Takashi Adachi and Tateyuki Suzuki</i>	753
Limiting Gas-Particle Flows—A New Approach <i>C. K. Baruah and N. M. Reddy</i>	761
The Structure of Shock Waves in a Boiling Liquid <i>V. Ye. Nakoryakov, B. G. Pokusaev, and I. R. Shreiber</i>	769
Homogeneous and Heterogeneous Condensation of Non-ideal Binary Vapour Mixtures in Shock Tube Expansion Flow <i>G. H. Spiegel, R. A. Zahoransky, and S. L. K. Wittig</i>	775
Stochastic Simulation of Condensation in Supersonic Expansions (Ar) <i>C. F. Wilcox, Jr., and S. H. Bauer</i>	783
Part VIII: High Energy Gas Excitation and Wave Phenomena	
High-Energy Air Shock Study in a Grout Pipe <i>H. D. Glenn, D. D. Keough, H. R. Kratz, D. A. Duganne, D. J. Ruffner, and D. Baum</i>	795
Shock Tunnel Measurements of AOTV Bow Shock Location <i>Dick Desautel</i>	803
Linear and Nonlinear Absorption of Hot SF ₆ and NH ₃ at 10.6 μm <i>R. H. Krech, L. M. Cowles, G. E. Caledonia, and D. I. Rosen</i>	811

Time Resolved Absorption Technique for Shock-Tube Kinetics Using Pulsed Laser Sources <i>J. H. Kiefer, J. S. Sitasz, A. C. Manson, and H. C. Wei</i>	819
Shock Tube Study of High Temperature Absorption Spectroscopy of CH at 431 nm <i>Michel Y. Louge and Ronald K. Hanson</i>	827
Studies of Collision-Induced Emission in the Fundamental Vibration-Rotation Band of H ₂ <i>G. E. Caledonia, R. H. Krech, T. Wilkerson, R. L. Taylor, and G. Birnbaum</i>	835
Development and Control of Laser Sustained Absorption Waves <i>M. Onorato, D. Tordella, M. Cantello, L. Garifo, and F. Pandarese</i>	843
Wave Behaviour in a High Average Power Excimer Laser <i>M. L. Sentis, B. L. Fontaine, and B. M. Forestier</i>	851
The Effects of Flow Blockage in a Blast Simulator and the Mitigation of These Effects with Flared and Vented Test Chambers <i>Lynn W. Kennedy and Russell E. Duff</i>	859
Part IX: Technical Applications and Shocks in Condensed Matter	
Study of Mach Reflection in PMMA Plates <i>A. Henckels, K. Takayama, and H. Grönig</i>	869
Shock Wave Aspects of Dynamic Powder Compaction <i>N. W. Page</i>	877
Microscopic Simulations of Shock Propagation in Condensed Media: Comparison Between Real Time and Frequency Domains <i>A. M. Karo, J. R. Hardy, and M. H. Mehlman</i>	885
Shock Wave Interaction with Nuclear Fuel Bundles in Gas-Liquid Stratified Flow Inside Pressure Tubes <i>S. C. Sutradhar and J. S. Chang</i>	893
High Temperature Heat Transfer for Gas Turbines Using Shock Tubes <i>Henry T. Nagamatsu and Robert E. Duffy</i>	901
Magnetohydrodynamic Control of Blast Energy: A Feasibility Experiment <i>C. A. Andrade</i>	909
Previous Proceedings in This Series	919
Author Index	921