CONTENTS

Preface
Maha Ashour-Abdalla, Tom Chang, and Paul Dusenbery  x

Solar Processes and Solar Wind, Vortex Sheets, Magnetic Helicity, and MHD Turbulence

The Evolution of Magnetic Helicity in Compressible Magnetohydrodynamics with a Mean Magnetic Field
S. Ghosh, W. T. Stribling, M. L. Goldstein, and W. H. Matthaeus  1

Magnetohydrodynamic Turbulence and its Relationship to Interplanetary Magnetic Fluctuations
M. L. Goldstein  7

Observed Properties of Helical Interplanetary Magnetic Fields
M. L. Goldstein, D. A. Roberts, and C. A. Fitch  21

A Simulation Study of the Formation of Solar Prominences
L. C. Lee, G. S. Choe, and S.-I. Akasofu  29

Laval Nozzle Effects in Solar Wind—Exosphere Interaction
K. Sauer, K. Baumgärtel, Th. Roatsch, and J. F. McKenzie  43

On Interacting Plasma Vortex Sheets
E. Siregar, D. A. Roberts, and M. L. Goldstein  49

Decay of Magnetic Helicity in Ideal Magnetohydrodynamics with a DC Magnetic Field
T. Stribling and W. H. Matthaeus  55

Waves, Particle Acceleration, and Wave-Particle Interactions

Some Electron Conic Generation Mechanisms
M. Andre and L. Eliasson  61

Kinetic Alfven Wave Instability and Wave-Particle Interaction at the Magnetopause
S. Y. Fu, Z. Y. Pu, S. C. Guo, and Z. X. Liu  73

High Frequency Electrostatic Plasma Instabilities and Turbulence Layers in the Lower Ionosphere

Laboratory Experiments on Particle Acceleration Processes Associated with Parallel Electric Fields
Z. Jin, J. Hamila, R. C. Allen, S. Meassick, and C. Chan  95

Nonlinear Wave-Particle Interaction Leading to Chaotic Ion Motion in the Magnetosphere
S. P. Kuo and A. Y. Ho  99

Extended (Bi-Modal) Ion Conics at High Altitudes
W. K. Peterson, H. L. Collin, M. F. Doherty, and C. M. Bjorklund  105

Nonlinear Wave-Particle Interactions in the Magnetosphere
M. Prakash  119
CONTENTS

Transversely Accelerated Ions in the Topside Ionosphere
J. M. Retterer, T. Chang, and J. R. Jasperse 127

Are Relativistic Effects Significant for the Analysis of Whistler-Mode Waves in the Earth's Magnetosphere?
S. S. Sazhin, A. E. Sumner, and N. M. Temme 139

Magnetotail, Current Sheet and Disruptions, Reconnections and Substorms
Quasi-Periodic Global Substorm Generated Flux Variations Observed at Geosynchronous Orbit
R. D. Belian, T. E. Cayton, and G. D. Reeves 143

Observed Features in Current Disruption and Their Implications to Existing Theories
A. T. Y. Lui 149

Particle Acceleration Very Near an X-line in a Collisionless Plasma
L. R. Lyons and D. C. Pridmore-Brown 163

Formation of the Macroscopic Tail Current Sheet in a Microscopic Distributed-Source Model
P. L. Pritchett and F. V. Coroniti 171

Vortex-Induced Reconnection and Turbulent Reconnection in Magnetospheric Boundary Regions
Z. Y. Pu, S. Y. Fu, Z. X. Liu, and F. Li 181

Magnetic Reconnection and Current-Sheet Formation at X-type Neutral Points
R. S. Steinolfson, L. Ofman, and P. J. Morrison 189

Chaos and Nonlinear Dynamics
The Influence of Chaotic Particle Motion on Large Scale Magnetotail Stability
J. Büchner and A. Otto 197

Global Consequences of Nonlinear Particle Dynamics in the Magnetotail
J. Chen and D. L. Holland 205

Collisionless Resistivity and Velocity Power Spectrum for the Geomagnetic Tail
W. Horton, J. Hernandez, and T. Tajima 223

Modeling Particle Distributions with Noninteracting Particles
R. F. Martin, Jr. 233

Neutral Line Energetic Ion Signatures in the Geomagnetic Tail: Comparisons with AMPTE Observations
T. W. Speiser and R. F. Martin, Jr. 243

Auroral Processes and Cusp Plasmas
Fine-Scale Structures in Auroral Arcs: An Unexplained Phenomenon
J. E. Borovksy 255
CONTENTS

Coupling Between Mesoscale and Microscale Processes in the Cusp and Auroral Plasmas
J. L. Burch, C. S. Lin, J. D. Menietti, and R. M. Winglee 269

Auroral Plasma Dynamics in the Presence of a Finite-Width Current Filament and V-Shaped Potential Drop

Micro and Meso Scale Measurements by the Freja Satellite
R. Lundin and G. Haerendel 295

Radiation Belt, Micro/Meso Phenomena, Dynamo Effect, and Vlasov Hybrid Simulation

Stormtime Ring Current and Radiation Belt Ion Transport: Simulations and Interpretations
M. W. Chen, M. Schulz, L. R. Lyons, and D. J. Gorney 311

Investigation of Flow Pattern for Dynamo Effect on Reversed Field Pinch
S. Koide and J.-I. Sakai 325

A Novel Technique for the Numerical Simulation of Collision Free Space Plasma-Vlasov Hybrid Simulation (VHS)
D. Nunn 331

Electromagnetic Components of Auroral Hiss and Lower Hybrid Waves in the Polar Magnetosphere
H. K. Wong 339

Plasma Sheet, Magnetosheath, and Solar Wind-Magnetosphere Interaction

Solar Wind-Magnetosphere Interaction as Simulated by a 3D, EM Particle Code
O. Buneman, K.-I. Nishikawa, and T. Neubert 347

AMPTE/IRM Observations of the MHD Structure of the Plasmasheet Boundary: Evidence for a Normal Component of the Magnetic Field
C. A. Cattell, C. W. Carlson, W. Baumjohann, and H. Lühr 357

Observation of High Speed Flows \( V > V_{sw} \) in the Magnetosheath During an Interval of Strongly Northward IMF

The Dynamical Plasma Sheet Boundary Layer: A New Perspective
G. Ganguli, H. Romero, and P. Dusenbery 371

Comments and Questions on the Plasma Sheet Boundary and Boundary Layer
G. K. Parks and M. P. McCarthy 385