

CONTENTS

PREFACE	v
INTERNATIONAL SCIENTIFIC COMMITTEE	vii

LOCAL ORGANIZING COMMITTEE AT TOHOKU UNIVERSITY	vii
--	-----

CHAPTER 1

DOUBLE LAYERS, SHEATHS, AND POTENTIAL STRUCTURES	1
---	---

1.1 Double Layers	1
--------------------------------	---

On Fluid Models of Stationary, Acoustic Double Layers (Invited)	
--	--

<i>M. A. Hellberg, M. A. Raadu, and R. L. Mace</i>	3
--	---

Particle Simulation of Double Layer (Invited)	
<i>H. Takamaru and T. Sato</i>	14

Space-Time Dependence of Non-Steady Double Layers	
<i>I. Aznäs and S. Torvén</i>	26

The Role of Low Energy Electrons for the Generation of Anode Double Layers in Glow Discharges	
<i>L. Biborosch, M. Sanduloviciu, and D. Ruscanu</i>	32

Arbitrary Amplitude Ion-Acoustic Double Layers in a Dusty Plasma	
<i>Y. N. Nejoh</i>	38

1.2	Sheaths	45
	Bounded Plasma Edge Physics as Observed from Simulations in 1D and 2D (Invited)	
	<i>D. Cooperberg, K. Cartwright, and C. K. Birdsall</i>	47
	Control of RF Sheath Structure in RF Diode Discharge	
	<i>N. Y. Sato, M. Iwama, Y. Hashimoto, T. Ikehata, T. Tanabe, and H. Mase</i>	59
	Observation of Density Gradients with Fine Structures and Low Frequency Wave Excitation at the Plasma-Sheath Bound- ary	
	<i>T. Honzawa, T. Sekizawa, and Y. Saitou</i>	65
	Double Sheath Associated with an Electron Emission to a Plasma Containing Negative Ions	
	<i>H. Amemiya, B. M. Annamtone, and J. E. Allen</i>	69
	Sheath Edge and Floating Potential for Multi-Species Plas- mas Including Dust, Particles	
	<i>H.-B. Valentini and F. Herrmann</i>	75
1.3	Potential Structures and Oscillations	81
	Potential Structure Formed at a Constriction of a DC He Positive Column and its Coupling with Ionization Wave	
	<i>L. Sirghi, K. Ohe, and G. Popa</i>	83
	Potential Structure in a New RF Magnetron Device with a Hollow Electrode	
	<i>G. Tochitani, Y. Tsurume, Y. Ohtsu, and H. Fujita</i>	88
	Potential Disruption in a RF Afterglow Electronegative Plas- ma	
	<i>G. Tochitani, T. Seki, Y. Ohtsu, and H. Fujita</i>	92
	Potential Oscillation in a Strongly Asymmetry RF Discharge Containing Negative Ions	
	<i>M. M. Nasser, Y. Ohtsu, G. Tochitani, and H. Fujita</i>	96
	Effects of External Potential Control on Coulomb Dust Be- havior	
	<i>K. Tsuji, A. Yokoyama, Y. Sakawa, and T. Shoji</i>	100

Potential Structure of Carbon Arc Discharge for High-Yield Fullerenes Formation	
<i>H. Mase, H. Miyagi, T. Tanabe, N. Y. Sato, and T. Ikehata</i>	105

Control of Axial and Radial Potential Profiles in Tandem Mirrors (Invited)	
<i>M. Inutake</i>	110

CHAPTER 2

FIELD-ALIGNED ELECTRIC FIELDS AND RELATED PARTICLE ACCELERATIONS	123
---	-----

2.1 Field-Aligned Potential Formation

Formation of Large Potential Difference in a Plasma Flow along Converging Magnetic Field Lines (Invited)	
<i>S. Ishiguro, Y. Watanabe, R. Hatakeyama, and N. Sato</i>	125

Presheath Formation in front of an Oblique End-Plate in a Magnetized Sheet Plasma	
<i>A. Tonegawa, M. Ono, K. Kawamura, and K. Takayama</i>	137

Plasma Potential Formation Due to ECRH in a Magnetic Well	
<i>T. Kaneko, R. Hatakeyama, and N. Sato</i>	143

Electrostatic Potential Modification Due to C_{60}^- Production	
<i>W. Oohara, S. Ishiguro, R. Hatakeyama, and N. Sato</i>	149

Modifications of the Floating Potential and the Plasma Potential in a C_{60} Plasma	
<i>D. Strele, C. Winkler, and R. Schrittwieser</i>	155

Properties of Strongly Electronegative Plasma Produced at Afterglow of Electron Cyclotron Resonance Chlorine Plasma	
<i>T. Mieno and S. Samukawa</i>	160

2.2 Particle Accelerations

Potential Structures Due to an Electron Beam-Excited Localized HF-Discharge (Invited)	
<i>R. Schrittwieser, H. Gunell, and S. Torvén</i>	169

Experiments and Computer Simulations of Electric Field Spikes in Electron Beam-Plasma Interaction
H. Gunell, N. Brenning, S. Torvén, and J. P. Verboncoeur181

Magnetosonic Waves in Multi-Ion-Species Plasmas: Nonlinear Evolution and Ion Acceleration
M. Toida, D. Dougen, and Y. Ohsawa 187

Observation of Repetitive Electric Field Pulses Accompanying a Short Wave Train Near the Lower Hybrid Frequency in a High-Voltage Linear Plasma Discharge
Y. Takeda, H. Inuzuka, and K. Yamagiwa 193

Control of Potential **Profile** and Energy Transport to Machine Ends along Open Magnetic Field Lines in a Tandem Mirror
Y. Tatematsu, Y. Kiwamoto, T. Saito, Y. Yoshimura, H. Katanuma, and T. Tamano 199

Observation of Ion Acceleration in Picosecond Laser Produced Plasma Expanding across a Magnetic Field
V. N. Rai, M. Shukla, and H. C. Pant 205

Pellet Ablation Characteristics and the Effect on the Potential in **Toroidal Plasmas** (Invited)
K. V. Sato 211

CHAPTER 3

CROSS-FIELD ELECTRIC FIELDS, VELOCITY SHEAR, AND VORTEX FORMATION 223

3.1 Cross-Field Potential Structures 223

Laboratory Simulation of Transverse Magnetic Field Effects on Dynamics of Plasma Streams in Magnetosphere
Yu. P. Zakharov225

Double-Layer-like and Sheath-like Potential Structures across Magnetic Field Lines
K. Sato and F. Miyawaki 231

Relaxation of Virtual Cathode Oscillations due to Transverse Effects in a Crossed-Field Diode
K. L. Cartwright, J. P. Verboncoeur, V. P. Gopinath, and C. K. Birdsall237

Control of Radial Potential Profile and Related Low-Frequency Fluctuations in an ECR-Produced Plasma	
<i>M. Yoshinuma, K. Hattori, A. Ando, M. Inutake, T. Kaneko, R. Hatakeyama, and N. Sato</i>	243
Potential Formation in Magnetized Dusty Plasma	
<i>Y. Maemura, S.-C. Yang, and H. Fujiyama</i>	249
Potential Measurement Using Electrostatic Probe in Tokamak Boundary Plasma	
<i>A. Tsushima, H. Amemiya, and K. Uehara</i>	254
Studies on Radial Electric Field and Confinement in Toroidal Plasmas (Invited)	
<i>H. Sanuki</i>	260
3.2 Velocity Shear	275
Space Chamber Investigations of Transverse Velocity Shear Driven Plasma Waves	
<i>W. E. Amatucci, D. N. Walker, G. Ganguli, J. A. Antoniadis, D. Duncan, J. Bowles, V. Gavrishchaka, and M. E. Koepke</i>	277
Observations of the Velocity-Shear-Driven Instability in a Sodium Plasma (Invited)	
<i>J. J. Carroll III, M. E. Koepke, M. W. Zintl, C. A. Selcher, V. Gavrishchaka, and E. Csomortani</i>	283
The Effect of Negative Ions and Neutral Particle Collisions on the Parallel Velocity Shear Instability (Invited)	
<i>R. L. Merlini, T. An, J. Willig, and N. D'Angelo</i>	290
Low-Frequency Instabilities under a Cross-Field Electric Field in a $K^+ - C_{60}^-$ Plasma	
<i>K. Furuta, R. Hatakeyama, W. Oohara, and N. Sato</i>	300
3.3 Vortex Formation	307
Vortex Dynamics in Low Frequency Electrostatic Turbulence	
<i>P. K. Michelsen and J. J. Rasmussen</i>	309
Development of Spiral-Vortex Structures of the Plasma During Rotation in a Neutral Gas	
<i>T. Ikehata, H. Tanaka, N. Y. Sato, T. Tanabe, and H. Mase</i>	315

Vortex Formation of Particles in Magnetized Dusty Plasmas
(Invited)

H. Fujiyama, S. -C. Yang, Y. Maemura, K. Tazoe, and Y. Matsuda 321

CHAPTER 4

SOLITONS, SHOCKS, WAVES AND INSTABILITIES, AND RELATED NONLINEAR PHENOMENA 329

4.1 Solitons and Shocks 329

Refraction and Reflection of Ion Acoustic Solitons by Space
Charge Sheath

K. L. Cartwright and C. K. Birdsall 331

2D and 3D Solitons in Plasma: Structure, Stability, Dynamics

V. Yu. Belashov 337

Solitary Waves in an Ion-Beam Multi-Component Plasma
System

Y. Nakamura and H. Sugai 343

Shock Formation in a Q-Machine Plasma with Negative Ions

T. Takeuchi, S. Iieuka, and N. Sato 349

4.2 Waves and Instabilities 355

Single-Ended Q-Machine as a Source of Oscillations (Invited)

G. Popa and R. Schrittwieser 357

Numerical and Experimental Investigations of Period Doubling
of the Potential Relaxation Instability in an Electron-Rich
Q-Machine Plasma

M. Winter and R. Schrittwieser 368

Large Amplitude Electrostatic Ion Waves in an $e^- - e^{+\beta}$
Plasma

Y. N. Nejoh 374

Measurements of Alfvén Waves around the CRIT Releases-
Implications for Current Limitation in Alfvén Wings

N. Brenning 380

4.3 Nonlinear Phenomena	387
Self-Organization Phenomena in a Q-Machine Plasma	
<i>M. Sanduloviciu, G. Popa, and R. Schrittwieser</i>	389
Nonlinearity Related to Self-Organization in a Thermionic Vacuum Arc Discharge	
<i>M. Sanduloviciu, C. Stan, G. Musa, A. Popescu, I. Mustata, and A. Salabas</i>	395
Spontaneous Formation of Ordered Spatio-Temporal Structures in Laboratory and Nature	
<i>M. Sanduloviciu, E. Lotneanu, and G. Leu</i>	401
Nonlinear Evolution and Stabilization of Linearly Unstable Waves in an Electron-Beam Plasma	
<i>K. Yamagiwa, T. Itoh, and T. Nakayama</i>	407
Disruption of an Electron Hole Due to its Interaction with Ion Acoustic Waves in a Plasma	
<i>K. Saeki and H. Genma</i>	413
Expanding Plasma Clouds with Dust Particles (Invited)	
<i>Yu. I. Chutov, A. Yu. Kravchenko, P. P. J. M. Schram, and V. S. Yakovetsky</i>	419
LIST OF PARTICIPANTS.....	429
AUTHOR INDEX	439