CONTENTS / MAY 2013—VOL. 63, NO. 1T

Proceedings of the
JOINT CONFERENCE OF
NINTH INTERNATIONAL
CONFERENCE ON OPEN MAGNETIC SYSTEMS
FOR PLASMA CONFINEMENT
and
THIRD INTERNATIONAL WORKSHOP ON
PLASMA MATERIAL INTERACTION FACILITIES
FOR FUSION RESEARCH

ix Comments / Nermin A. Uckan

xi Preface: Joint Conference of Ninth International Conference on Open Magnetic Systems for Plasma and Third International Workshop on Plasma Material Interaction Facilities for Fusion Research / T. Imai

xii International Program Committee/Local Organizing Committee/Sponsors

1 Axially Symmetric Magnetic Mirrors: History of Development and Future Prospects / A. V. Burdakov, A. A. Ivanov, E. P. Kruglyakov, A. D. Beklemishev

8 GAMMA 10/PDX Project Status and Future / T. Imai et al.

16 Plasma-Wall Interaction Facilities in Korea / K.-S. Chung et al.

21 Overview of Innovative PMI Research on NSTX-U and Associated PMI Facilities at PPPL / M. Ono et al.

29 Development of Extended Heating Pulse Operation Mode at GOL-3 / A. V. Burdakov et al.


40 ECR Heating System for the Gas Dynamic Trap / P. A. Bagryansky et al.

46 Novosibirsk Project of Gas-Dynamic Multiple-Mirror Trap / A. Beklemishev et al.

52 Hybrid Reactor Studies Based on the Straight Field Line Mirror / O. Ågren, V. E. Moiseenko, K. Noack, A. Hagnestål, J. Källne, H. Anglart

58 Time Evolving Structure of Alfvén Ion-Cyclotron Waves in GAMMA 10 / R. Ikezoe et al.

(Continued)
(Continued)

64 Resonant Magnetic Perturbation for ELM Suppression with Helical Ferritic Steel Inserts in Tokamak DEMO Reactor / T. Takizuka, N. Oyama, T. Fukuda

70 Investigation of Advanced Divertor Magnetic Configuration for DEMO Tokamak Reactor / Nobuyuki Asakura et al.

76 Electron Cyclotron Resonance Near the Axis of a Mirror Trap / D. S. Bagulov, I. A. Kotelnikov


88 Plasma-Surface Interaction Activities in KSTAR / S.-H. Hong et al.

94 Application of a Magnetic Divertor in Gas Dynamic Trap Experiment / T. D. Akhmetov, A. A. Ivanov

100 First Results and Future Research Plan of Divertor Simulation Experiments Using D-Module in the End-Cell of the GAMMA 10/PDX Tandem Mirror / Y. Nakashima et al.

106 Hydrogen Solubility of FLiNaK with Hydrogen Plasma Interaction / Taihyeop Lho, Yong-Sup Choi, HyonJae Park

111 A Plasma Trap as a Target for Neutralization of the Negative Ion Beam / G. I. Dimov, A. V. Ivanov

115 Recent ICRF Heating Experiments for a Divertor Simulation Study on GAMMA 10 / M. Ichimura et al.

119 Stellarator-Mirror Hybrid with Neutral Beam Injection / V. E. Moiseenko, O. Ågren

123 Direct Thrust Measurement of a Permanent-Magnets Helicon Plasma Thruster for Space Propulsion / Kazunori Takahashi

127 Electron Temperature and Density Measurements by Using Thomson Scattering System in GAMMA 10 / M. Yoshikawa et al.

131 Recent Results in Research on Direct Energy Conversion for a Fusion System / H. Takeno et al.


139 A High Performance Field-Reversed Configuration Regime in the C-2 Device / H. Gota et al.

143 Mechanism of Toroidal Field Generation by Translation of a Field-Reversed Configuration / Toshiki Takahashi

147 Influence of Bias Magnetic Field Configuration on Equilibrium of Field-Reversed Configuration Plasma Sustained by Rotating Magnetic Field / Kiyoyuki Yambe, Michiaki Inomoto, Shigetumi Okada

152 Cylindrical Surface Waves and Slow-Wave Instabilities of Periodically Corrugated Cylinder / Kazuo Ogura, Kazumasa Yamamoto, Yoshihiro Kobari, Kiyoyuki Yambe

(Continued)
CONTENTS / MAY 2013—VOL. 63, NO. 1T

(Continued)

156 Nuclear Analysis of ITER Equatorial EC Launcher / K. Takahashi et al.

160 Dual Frequency ECRF System Development for JT-60SA / T. Kobayashi et al.

164 High-Density Helicon Plasma Sources: Basics and Application to Electrodeless Electric Propulsion / S. Shinohara et al.

168 The Use of Dipole Plasma Equilibrium for Magnetic Sail Spacecraft / I. Funaki, Y. Kajimura, Y. Ashida, H. Nishida, Y. Oshio, I. Shinohara, H. Yamakawa

172 Development of Antenna System and Simulation of Analysis Method for Digitally-Controlled Millimeter-Wave Interferometer / Yuichiro Kogi, Shingo Matsukawa, Masayuki Yoshikawa, Atsushi Mase, Yoshio Nagayama, Kazuo Kawahata

176 Electron Density and Fluctuation Measurements by Using a Frequency Multiplied Microwave Interferometer in the GAMMA 10 Anchor Cell / J. Kohagura et al.

180 Measurement of Divertor Heat Flux at the End-Cell of GAMMA 10 / Hiroto Matsuura et al.

184 GDMT-T: Superconducting Linear Device for PMI Studies / S. Polosatkin et al.

188 Plasma Characterization in Divertor Simulation Experiments with a V-Shaped Target on GAMMA 10/PDX / M. Sakamoto et al.


201 Using the Radiation of Hydrogen Atoms and Molecules to Determine Electron Density and Temperature in the Linear Plasma Device PSI-2 / M. Reinhart et al.


217 High Efficiency Helicon Plasma Source for PMI Studies / A. A. Ivanov et al.

221 Evaporation Properties of FLiNaK with Plasma Interaction / Yong-Sup Choi, HyonJae Park, Taihyeop Lho

225 Power Transmission Factor for Tungsten Target w/wo Fiber-Form Nanostructure in He Plasmas with Hot Electron Component Using Compact Plasma Device AIT-PID / S. Takamura, T. Miyamoto, N. Ohno

(Continued)
Deuterium Retention in Tungsten with Different Grain Elongation Direction Irradiated by Plasma in APSEDAS / A. Rusinov et al.


Numerical Treatment of Plasma Dynamics in Linear Devices—Impact of Plasma Source Shaping / Dirk Reiser, Abdessamad Mekkaoui

Observation of Plasma Behavior During the ECRH Injection by Using a High-Speed Camera in GAMMA 10 / S. Kigure et al.

Study on the Optimization of Fueling by Using the SMBI Method in GAMMA 10 / K. Hosoi et al.

Evaluation of the Axisymmetricity of the Central-Cell Plasma Using a Segmented Limiter on GAMMA 10 / M. Hirata et al.

MHD Activity in GOL-3 During Injection of Long-Pulse Electron Beam / A. V. Sudnikov et al.

Advances in Confinement Study in the Gas Dynamic Trap Experiment / P. A. Bagryansky et al.

Flow-Driven Drift Instability in a Multiple-Mirror Trap / D. I. Skovorodin, A. D. Beklemishev

Smith-Purcell Radiation Based on Cylindrical Surface Waves / Shinji Hasegawa, Kazuo Ogura, Takayuki Iwasaki, Kiyoyuki Yambe

ICRF Antenna Loading in the Minimum-B Anchor Configuration on GAMMA 10 / T. Yokoyama et al.

Development of 154 GHz 1 MW Gyrotron for ECRH of LHD / T. Kariya et al.

ICRF Experiment with Phase-Controlled Antennas on GAMMA 10 / Y. Ugajin et al.

Axial Transport of High-Energy Ions due to ICRF Heating on GAMMA 10 / T. Iimura et al.

The Improvement of the ECH Antenna System in the GAMMA 10 / K. Nakazawa et al.

ICRF Heating Experiments in Both East and West Anchor Cells on GAMMA 10 / Y. Saito et al.

Development of 28 GHz/35 GHz Dual-Frequency Gyrotron for Fusion Research / T. Eguchi et al.

The Performance Test and the Improved Design of 28 GHz 1 MW Gyrotron / H. Nakabayashi et al.

Microwave Generation During 100 keV Electron Beam Relaxation in GOL-3 / A. V. Burdakov et al.
Auxiliary Electron Heating and Plasma Control in GDT Device with Electron Beam: The Results of Initial Experiments / A. A. Ivanov et al.

Novel Injector of Intense Long Pulse Electron Beam for Linear Plasma Devices / V. V. Kurkuchev et al.


Results of ECH Power Modulation Experimenting High and ELM-Like Heat Flux in GAMMA 10 Tandem Mirror / R. Minami et al.


Studies on Characteristics of a Bias-Type Traveling Wave Direct Energy Converter Installed on GAMMA 10 Tandem Mirror / S. Miyazaki, K. Fujita, S. Harada, H. Takeno, Y. Yasaka, K. Ichimura, Y. Nakashima

Studies on High Density Plasma Production and Neutral Pressure Control for a Cusp-Type Direct Energy Converter Simulator / T. Kawaguchi, K. Nishimura, Y. Munakata, H. Takeno, Y. Yasaka, K. Ichimura, Y. Nakashima

Numerical Analysis of Particle Orbits for Modulation Process in Traveling Wave Direct Energy Converter / K. Nishimura, H. Takeno, Y. Yasaka

Recent Calculation Results for a Fission-Fusion System with Gas Dynamic Trap Neutron Source / D. V. Yurov, S. A. Brednikhin, S. A. Frolov, S. I. Lezhnin, V. V. Prikhodko, Yu. A. Tsidulko

Initial Simulation Results of GAMMA 10 as NBI Driven Neutron Source / H. Ueda et al.

Alfvén Ion-Cyclotron Instability in a Mirror Trap with Skew Injection of Neutral Beams / I. S. Chernoshtanov, Yu. A. Tsidulko

Neutronic Model of a Stellarator-Mirror Fusion-Fission Hybrid / S. V. Chernitskiy, V. E. Moiseenko, K. Noack, O. Ågren

Edge Turbulence/Fluctuation Observation at “High Density Mode” in GAMMA 10 by Fast Camera / N. Nishino et al.

Two-Point Measurement of High-Frequency Density Fluctuations by Reflectometry in GAMMA 10 / T. Sato et al.

Density Fluctuation Measurements of the GAMMA 10 Plasma by Using the Fraunhofer Diffraction Method / Y. Morikawa et al.

Improvement of Measurement Accuracy of the Phase Imaging Interferometer in GAMMA 10 / D. Akita et al.

Radial Electron Density Measurement by Using a Multi-Channel Microwave Interferometer in the Tandem Mirror GAMMA 10 / Y. Hasegawa et al.

Spectroscopic Measurements of Neutral Hydrogen and Impurity Ion Densities with SMBI in GAMMA 10 Central Plasma / S. Kitade, M. Yoshikawa, Y. Nakashima, T. Mizuuchi, S. Kobayashi, K. Hosoi, T. Imai

(Continued)
CONTENTS / MAY 2013—VOL. 63, NO. 1T

(Continued)

343 Measurement of Local Radial Electric Field by Using Gold Neutral Beam Probe in GAMMA 10 / K. Furutachi et al.

346 Magnetic Measurements at the GDT Facility / K. V. Zaytsev et al.

349 Ion Source for 10 sec Diagnostic Neutral Beam / I. A. Prokhorov et al.


355 Helicoidal System for Axial Plasma Pumping in Linear Traps / A. D. Beklemishev

358 A Particle-Fluid Hybrid Modeling of Neutral Gas Flow Generation from a CT Neutralization Fuel-Injector / T. Watanabe, T. Ohshima, T. Takahashi, N. Fukumoto, M. Nagata

361 Hydrogen Plasma-Driven Permeation Through a Reduced Activation Ferritic Steel Alloy F82H / H. Zhou, Y. Hirooka, N. Ashikawa, T. Muroga, A. Sagara

364 Evaluations of Surface Erosions with High Fluence Pulsed Thermal Inflows on to Plasma Facing Materials / Koichi Kasuya

367 Hydrogen Isotopes Retention in Gaps at the JT-60U First Wall Tiles / M. Yoshida et al.

371 Structure of C Deposition Layers Under Various Deposition Conditions / Y. Hamaji et al.

374 2-Dimensional Soft X-Ray Behavior of ECR Heated Plasma in GAMMA 10 / R. Kawarasaki et al.

377 Heating Effects of Background Neutral Particles on a Translated Field-Reversed Configuration / S. Koike, T. Watanabe, T. Mitsui, T. Takahashi, T. Asai


383 Feasibility Study of the Poloidal Current Drive by Axial Neutral Beam Injection into a Field-Reversed Configuration / T. Urano, T. Watanabe, T. Mitsui, T. Takahashi


392 Experimental Simulation of Magnetoplasma Sail for Thrust Measurement / K. Ueno, Y. Oshio, I. Funaki, H. Yamakawa

395 Production of a High Density Helicon Plasma Under an IGBT-Driven Pulsed Strong Magnetic Field / Kazunori Takahashi, Daiki Sato

(Continued)
CONTENTS / MAY 2013—VOL. 63, NO. 1T

(Continued)

398 Large-Diameter Permanent-Magnets-Expanding Plasma Source Applicable to an Electrodeless Plasma Thruster / Tatsuya Suzuki, Kazunori Takahashi

401 Production of a Periodic Plasma Structure by 400 kHz Capacitively Coupled Discharge / Kazuaki Miyamoto, Kazunori Takahashi


411 Modeling of Plasma Transport in the Magnetic Mirror Configuration (GAMMA 10) / T. Furuta et al.

414 Numerical Simulation Study for Background Plasma in the GAMMA 10 End-Mirror Cell / H. Takeda et al.

417 Ion Acceleration by Ion-Cyclotron Resonance in Non-Uniform Magnetic Field Using the TPD-Sheet IV Linear Divertor Simulator / T. Iijima, S. Hagiwara, S. Tanaka, A. Tonegawa, Kazutaka Kawamura, Kohnosuke Sato


423 Volume 63, No. 1T Indexes