TO: Executive Secretaries of the US-Japan Fusion Research Collaboration

FROM: Steering Committee, US-Japan Joint Institute for Fusion Theory (JIFT)

DATE: March 31, 2010

SUBJECT: JIFT Annual Report of Activities for 2009-2010

CONTENTS:

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Annual Report of Activities

US-Japan Joint Institute for Fusion Theory

April 1, 2009–March 31, 2010

JIFT Steering Committee

Co-Chairmen: R. Horiuchi and J. W. Van Dam

Co-Executive Secretaries: H. Sugama and F. L. Waelbroeck

March 31, 2010

TABLE OF CONTENTS

1. *INTRODUCTION*

The Joint Institute for Fusion Theory (JIFT) is one of the three programs through which the US-Japan Fusion Research Collaboration is organized. The other two programs are the Fusion Physics Planning Committee (FPPC) and the Fusion Technology Planning Committee (FTPC).

The distinctive objectives of the JIFT program are (1) to advance the theoretical understanding of plasmas, with special emphasis on stability, equilibrium, heating, and transport in magnetic fusion systems; and (2) to develop fundamental theoretical and computational tools and concepts for understanding nonlinear plasma phenomena. These objectives are pursued through collaborations between U.S. and Japanese scientists by means of two types of exchange program activities—namely, workshops and exchange visitors.

Each year the JIFT program usually consists of four topical workshops (two in each country) and six exchange scientists (three from each country). So far, during its 28 years of successful operation, JIFT has sponsored 166 long-term visits by exchange scientists and 102 topical workshops.

- The *workshops* typically have an attendance of 15–30 participants, of whom usually three to seven scientists (depending on the particular workshop) travel to the workshop from the non-host country. Scientists from countries other than the U.S. and Japan are also often invited to participate in JIFT workshops, either as observers or multi-laterals.
- Of the approximately three *exchange visitors* in each direction every year, one—called the "JIFT Visiting Professor"—is supported by the host country, while the others—called "Exchange Scientists"—are supported by the sending country. The visits of the Exchange Scientists usually last from several weeks to two or three months in duration, whereas the Visiting Professors normally stay for the period of three months.

Until last year, the JIFT program also involved a type of collaboration activity called Joint Computational Projects. By mutual agreement of Japan and the US, this category of JIFT activities was terminated after Japanese Fiscal Year 2008, as reported in last year's JIFT Annual Report.

The topics and also the participating scientists for the JIFT exchange visits and workshops are selected so as to have a balanced representation of critical issues in magnetic fusion research, including both fundamental problems as well as questions of near-term significance, and also to take into account the specific capabilities and interests of both countries. The Japanese and US members of the JIFT Steering Committee agree together on the appropriateness of proposed topics before recommending them.

2. *SUMMARY OF COMPLETED ACTIVITIES (2009-2010 PROGRAM)*

All of the activities in the two categories—workshops and personal exchanges—that had been scheduled for the 2009-2010 JIFT program were carried out during the past year. Four workshops were successfully held, in addition to the JIFT Steering Committee meeting. In the category of personal exchanges, two Visiting Professors and six Visiting Scientists made exchange visits. Summary reports about JIFT activities for 2009-2010 are given below.

A. 2009-2010 Workshops

Japan to US:

JF-1 ***Integrated Modeling and Simulation in Toroidal Plasmas***
Organizers: Paul Bonoli (MIT) and Atsushi Fukuyama (Kyoto)
Location: MIT PSFC, Cambridge, Massachusetts
Dates: February 23-25, 2010
Summary:

This workshop is the first in a new series of JIFT workshops on integrated modeling and simulation of fusion plasmas, following the previous series that had been held from 2003 to 2006. The scope of the present workshop included progress in integrated modeling, framework development for integrated modeling, and associated physics issues (core transport, edge transport, extended MHD and wave-particle interactions). During the

workshop, 12 scientists from the US, seven from Japan, and one from EU presented a total of 23 talks. The US reported about the Fusion Simulation Program (FSP), which is under planning study, and three proto-FSP projects in the SciDAC program; Europe reported about Integrated Tokamak Modeling Task Force (ITM-TF) and EUFORIA; and Japan reported about three integrated codes—TASK, TOPICS-IB, and TASK3D—being developed under the Burning Plasma Simulation Initiative (BPSI). Two talks described the framework for earth system modeling. There were presentations and discussions about integrated modeling for both tokamaks and helical systems.

Related publications:

All of the presentation materials were posted on the web site at http://www.psfc.mit.edu/JIFT09/JIFT09.html.

JF-2 ***Hierarchical Self-Organization of Flows and Turbulence in Plasmas, Oceans and Atmospheres***

Organizers: P. Diamond (UCSD) and Y. Kishimoto (Kyoto)
Location: UCSD, La Jolla, California
Dates: March 23-25, 2010
Summary:

This workshop was aimed at sharing interdisciplinary aspects related to turbulence and flows among different research fields. The participants were 11 scientists from the US and 5 scientists from Japan. A total of 14 talks (6 from Japan and 8 from the US) were presented. The talks covered a wide range of theory and simulation topics in turbulent transport and related structure formation in magnetically confined fusion plasmas, space and astrophysical plasmas, fluids, oceans and atmospheres, etc. The latest experimental results identifying detailed turbulent structures in the linear magnetic confinement machine at UCSD were also presented. In the workshop, the physical origin of large-scale structures such as zonal flows and vortices generated from micro-scale turbulence and their impacts on self-organization and structure formation were intensively discussed. The universality and generality of the phenomena across different fields were stressed. This workshop was arranged as a discussion-oriented meeting with a new style, in which each speaker was assigned one hour, with additional time for discussion, and was requested to emphasize the background and status of his respective research field. This new style was successful in leading to intensive discussions and deep understanding across the fields and also in encouraging further collaborations. A follow-up workshop will be held next year at Kyoto University.

US to Japan:

JF-7 ***Theory and Simulation on Ultra-Intense Laser Plasmas***

Organizers: H. Nagatomo (Osaka) and V. Khudik (IFS)
Location: Osaka University, Osaka
Dates: March 14-15, 2010
Summary:

Six scientists from Japan, one from US, and one from China presented talks at this workshop, which covered several topics related to ultra-intense laser-plasma and beam-plasma interactions. Hot electron beam transport was one of the most significant topics. Japanese and US scientists described three different numerical approaches. Weibel instability and beam filamentation of a relativistic electron beam propagating through plasma have been clearly simulated with the use of hybrid simulation codes. A new collision model was introduced to improve the particle-in-cell simulation, which was found to be important for predicting the divergence angle and the energy spectrum of hot electrons. Radiation hydrodynamics simulations were also necessary to evaluate the pre-plasma produced by the pre-pulse of an ultra-intense laser. Interesting results were reported concerning the interaction of two short laser pulses with a target whose radius is only a few times less than the pulse width. (Note that Dr. Khudik replaced Dr. Shvets (IFS) as the US organizer when Dr. Shvets was unable to travel to Japan for family reasons.)

Related publications:

H. B. Cai, K. Mima, W. M. Zhou, T. Jozaki, H. Nagatomo, A. Sunahara, and R. J. Mason, “Enhancing the Number of High-Energy Electrons Deposited to a Compressed Pellet via Double Cones in Fast Ignition,” Phys. Rev. Lett. **102**, 245001 (2009).

JF-8 ***Advanced Simulation Methods in Plasmas***

Organizers: H. Ohtani (NIFS) and A. Arefiev (IFS)

Location: NIFS, Toki
Dates: December 14-16, 2009
Summary:

Participants at the workshops included 11 Japanese scientists and six US scientists. The 17 presentations at the workshop covered a range of subjects related to advanced simulation methods and issues about fusion plasmas, laser-plasma interaction, and solar and space plasmas. These research problems were investigated by means of reduced MHD model, hybrid simulation of MHD fluid with energetic particles, gyrokinetic PIC simulation, gyrokinetic Vlasov simulation, PIC simulation with a collision effect, gyro-Landau fluid model, multi-scale simulation model, MHD simulation with collision and radiation effects, and adaptive mesh refinement methods. One of the reports described how virtual-reality technology is a useful method for analyzing simulation data. This workshop was a follow-up to the JIFT workshop "Progress of Multi-Scale Simulation Models" that had been held November 21-22,22 2008, in Dallas, TX.

Related publications:

Abstracts and presentation files by all of the speakers were posted on the web site http://www.dss.nifs.ac.jp/ohtani/JIFT2009/.

Participants at the JIFT Workshop on Advanced Simulation Methods in Plasmas (December 2009, National Institute for Fusion Science).

JF- ***JIFT Steering Committee Meeting***
Organizers: Ritoku Horiuchi (NIFS) and James W. Van Dam (IFS)
Location: NIFS, Toki
Dates: December 10, 2009
Summary:

Participants at the Steering Committee meeting reviewed the status of JIFT activities for 2009-2010 and discussed recommendations for exchange activities during 2010-2011.

B. 2009-2010 Exchange Visits

Japan to US:

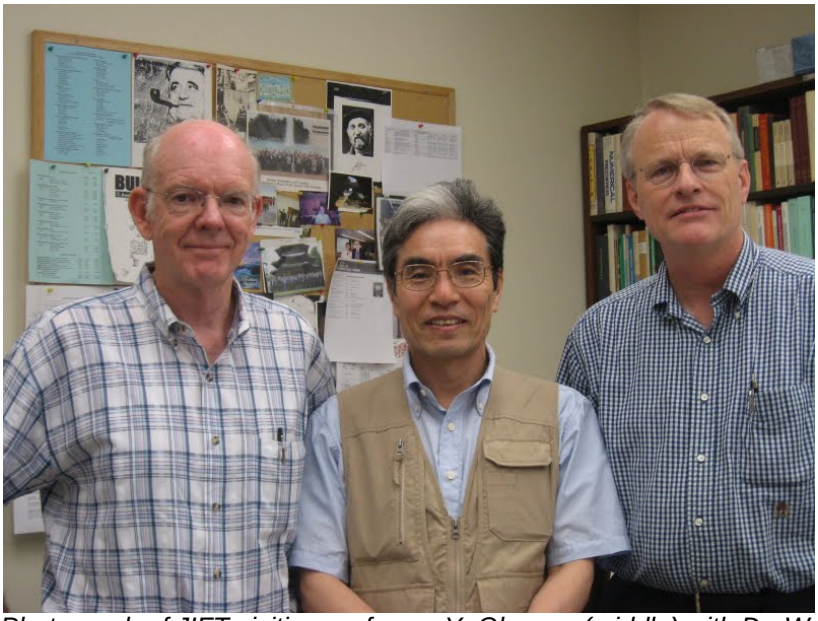
JF-3 ***Theoretical and Numerical Studies of the Parallel Electric Field in Shock Waves***
*Visiting Professor***:** Yukiharu Ohsawa (Nagoya University)

Location: IFS, University of Texas at Austin
Dates: August 6-23, 2009 (18 days); paid by US
Summary:

Recently, Dr. Ohsawa's group at Nagoya University has shown that the electric field parallel to the magnetic field can be strong in large-amplitude magnetosonic waves. Then, in collaboration with Wendell Horton and Charles Chiu at the IFS, they began to investigate the effect of the parallel electric field on particle acceleration in shock waves. They examined three different acceleration mechanisms: incessant acceleration of relativistic ions, acceleration of trapped electrons, and positron acceleration along the magnetic field. The main purpose of Dr. Ohsawa's visit to the IFS was to complete the paper of the above study, and they did it during his stay. Their paper, which was submitted right after his returning to Japan, appeared in Physics of Plasmas in November 2009. During his stay, Dr. Ohsawa gave a seminar related to this subject entitled "Parallel electric field and particle acceleration in shock waves."

Related publications:

- S. Takahashi, H. Kawai, Y. Ohsawa, S. Usami, C. Chiu, and W. Horton, "The effect of parallel electric fiel d in shock waves on the acceleration of relativistic ions, electrons, and positrons," accepted for publication in Physics of Plasmas (November 2009).



Photograph of JIFT visiting professor Y. Ohsawa (middle) with Dr. W. Horton and Dr. J. Van Dam at the Institute for Fusion Studies (Texas).

JF-4 ***Structure Formations in Electric and Velocity Fields by Dust in Swirling Vortices***
*Visiting Scientist***:** H. Miura (NIFS),
Location: IFS, University of Texas at Austin
Dates: March 8-17, 2010 (10 days); paid by Japan
Summary:

This collaborative research started in 2008, when Prof. Horton of IFS stayed at NIFS for three month. In this research, the intention is to study numerically the particle influences in local velocity and electric field structures. This study provides important and basic information to construct advanced numerical codes for numerical experiments of toroidal systems, since the contributions of particles such as dust and energetic particles acquire more importance than the current, fluid-based simulations In this study, Prof. Horton provides the theoretical framework of swirling vortices by applying the theoretical framework of the stability theory, while Dr. Miura develops a numerical codes for high performance computing purposes. So far the basic functions required for the dust simulations are completed, and some test simulations will be carried out. During his visit, Dr. Miura presented a seminar on ""MHD simulations of the Large Helical Device and Hall MHD simulations of Whistlers."

JF-5 ***Simulation Study on Core Heating Process in Fast Ignition Laser Fusion***
Visiting Scientist: Tomoyuki Johzaki (Osaka U)
Location: University of Nevada, Reno, Nevada
Dates: January 31-February 7, 2010 (8 days); paid by Japan
Summary:

During an earlier JIFT visit to the University of Nevada, Reno, in 2007, Dr. Johzaki had initiated a collaborative research project with Prof. Sentoku. During that first visit, they had discussed the simulation method for fast electron generation and transport and found the importance of collision and target ionization in fast electron generation and its transport using 1D collisional PIC and Fokker-Planck codes. During the present visit, they discussed and modified the model for collisions between fast electrons and bulk particles. In the collisional PIC and Fokker-Planck code, they added the effects of collisions between fast electron and bounded electrons in partially ionized plasmas. In addition, they modified the model of scattering by ions so as to include the interaction with the un-shielded nucleus potential by bounded electrons, since the impact parameter becomes smaller than the ion sphere size. As a result of these modifications, they found that the collisional effect becomes large.

Related publications:

T. Johzaki, Y. Sentoku, et al., "Core heating properties in FIREX-I - influence of cone tip", Plasma Phys. Control. Fusion **51**, 014002 (2009).

JF-6 ***Systematic Statistical Analysis of Numerical Turbulence in Magnetized Plasmas***
Visiting Scientist: O. Yamagishi (NIFS)
Location: IFS, University of Texas at Austin
Dates: January 15-February 28, 2010 (45 days); paid by Japan
Summary:

Dr. Yamagishi visited to the Institute for Fusion Studies (IFS), University of Texas at Austin. His host was Dr. W. Horton. He collaborated with Dr. F. L. Waelbroeck, Dr. P. J. Morrison, and graduate student C. Correa. He carried out 2D simulations based on the classic drift wave model, which includes drift wave (DW), zonal flow (ZF), and geodesic acoustic mode (GAM). They discussed the relationship of the steady state and the excited modes in the system. The simulation results were compared with existing predictive linear theories such as those involving quasi-linear flux, the Green-Kubo formula, and shearing rate prediction.

Related publications:

- W. Horton, O. Yamagishi, and A. Sen, “Electron temperature gradient drift mode in the Columbia Linear Mirror,” to be presented at the International Sherwood Fusion Theory Conference (April 19-21, 2010, Seattle, Washington).
- O. Yamagishi, W. Horton, F. L. Waelbroeck, P. J. Morrison, and C. Correa, “Numerical study of zonal flow generation with the Hasegawa-Wakatani model and comparison with linear predictions,” to be presented at U.S. Transport Task Force Workshop (April 13-16, 2010, Annapolis, Maryland).

US to Japan:

JF-9 ***Heat Transport and Pressure Gradient in Chaotic Field of LHD***
Visiting Professor: Stuart R. Hudson (PPPL)
Location: National Institute for Fusion Science (Japan)
Dates: July 17-September 17, 2009 (three months); paid by Japan
Summary:

Since 2005, Dr. Hudson has been collaborating with Dr. N. Nakajima on MHD stabilities, and they have written several joint papers. During his visit to Japan, the target of their joint research was the MHD equilibrium with a chaotic field. They have argued that $\nabla p = J \times B$, with a continuous pressure, only has solutions with an uncountable infinity of singularities in both the pressure gradient and the current when the field is chaotic. Such solutions are not suited to numerical approximation. By including non-ideal terms, they have eliminated the pathological singularities. By including an anisotropic diffusion equation for the pressure, it is no longer necessary to specify the pressure a priori as a boundary condition. Their work demonstrated that the addition of these terms is required for computational tractability. They have a complete mathematical

model that can consistently treat pressure gradients in chaotic fields. In future work they hope to investigate the so-called soft-beta limit, where transport is linked to the breaking of magnetic surfaces.

Related publications:

S. R. Hudson and N. Nakajima, "Pressure, chaotic magnetic fields and MHD equilibria"," submitted to Physics of Plasmas (January 2010).

JF-10 ***Investigation of Multi-Scale Simulation Models in Plasma Physics***

Visiting Scientist: Alex Arefiev (IFS)
Location: Osaka University and National Institute for Fusion Studies
Dates: November 21-December 17, 2009 (27 days); paid by US
Summary:

During his visit to Japan, Dr. Arefiev presented his recent research on two relevant topics: determining microcluster size distribution, and stochastic collisionless electron heating in laser-irradiated microclusters. He discussed these topics with a number of researchers in Japan and wrote a paper covering these topics that will be published in the journal *Plasma and Fusion Research*. He spent his first week at the Institute of Laser Engineering at the University of Osaka (Suita), where his host was Dr. Hideo Nagatomo. He gave a talk about a recently developed diagnostic technique for determining the size distribution of microclusters. This is a collaborative project that involves experiment and simulations. The knowledge of the size distribution is crucial for calculating the neutron yield produced by laser-irradiated microclusters. He discussed this work, as well as his other microcluster related research, with Dr. Masakatsu Murakami. He also discussed a possible collaboration with Dr. Toshihiro Taguchi of Setsunan University, who has done extensive modeling of laser-cluster interactions. The goal would be to identify the proposed collisionless mechanism in three-dimensional simulation, using the existing code of Dr. Taguchi. The second part of his trip was spent at NIFS, where his host was Dr. Ohtani. He had discussions with Dr. Ohtani and Dr. Usami about his recent research on collisionless electron heating in microclusters, with the main emphasis on reducing the problem to a one-dimensional model and the corresponding PIC simulation of electron dynamics. He and Dr. Ohtani discussed collaborating on a full three-dimensional model for electron heating. He also gave a talk at NIFS about a technique for recovering the cluster size distribution. Several ideas were proposed for improving the model by the inclusion of several effects that are currently neglected.

Related publications:

A. Arefiev, "Generation of fast ions by microclusters," submitted for publication to Plasma and Fusion Research

JF-11 ***Simulation Study of Toroidal Flow Generation by ICRF Heating***

Visiting Scientist: Linjin Zheng (IFS)
Location: Kyoto University
Dates: December 17-26, 2009 (10 days), paid by US
Summary:

Dr. Zheng first participated in the JIFT workshop on Advanced Simulation Methods in Plasmas (December 13-16), where he gave a talk about his research on current-interchange tearing modes. Then he visited Kyoto University (December 17-23), where his host was Dr. Murakami. They discussed theoretical and computational studies of direct rotation drive due to ICRF heating. In order to prove this conjecture, they will try to extend the GNET code of Murakami to simulate numerically the momentum input from the ICRF heating. For this purpose, they worked on extending the gyrokinetic theory to construct the Monte Carlo collisional operator that can account for the momentum input and implement it in the GNET code. In the long term they are also considering to couple the GNET and TASK/VM codes to the energetic particle physics studies conducted at the Institute for Fusion Studies. The last part of his visit was spent at the University of Tokyo, Kashiwa campus (December 24-26), where his host was Dr. Furukawa. They discussed the conversion from interchange modes to tearing modes due to a gradient in the plasma of the current (or resistivity).

Related publications:

- S. Murakami, K. Itoh, L. Zheng, J. W. Van Dam, and A. Fukuyama, "Simulation Study of Toroidal Flow Generation by the ICRF Minority Heating," abstract and synopsis submitted to IAEA Fusion Energy Conference (Daejeon, Korea, October 11-16, 2010).

- L. Zheng and M. Furukawa, "Current-interchange Tearing Modes: Conversion from Interchange-type Modes to Tearing Modes," abstract and synopsis submitted to IAEA Fusion Energy Conference (Daejeon, Korea, October 11-16, 2010).

JF-12 ***Theory on Ultra-Intense Laser Plasmas***
Visiting Scientist: Vladimir Khudik (IFS)
Location: Osaka University
Dates: March 16-20, 2010 (5 days); paid by US
Summary:
Dr. Khudik replaced Dr. Shvets (IFS) as visiting scientist when Dr. Shvets was unable to travel to Japan for family reasons. His host was Dr. Nagatomo and Dr. Azechi of Osaka University. He discussed with them his research work on ultra-intense laser plasma and beam-plasma interactions and potential application. They also discussed hybrid simulations and analytical studies of strong filamentation of a relativistic electron beam propagating through plasma. Dr. Khudik also had discussions with Dr. Johzaki about modeling of Coulomb collisions by using the Monte-Carlo technique (i.e., solving the Langevin equation) and by directly solving Fokker-Planck equation. Dr. Johzaki uses the latter approach in his work on core heating simulations for cone-guiding fast ignition. Dr. Khudik also had talks with Dr. Taguchi in which they compared the description of cold electron plasma in their respective simulations of beam filamentation and discussed possible extension of the models from two dimensions to three. He briefly visited the Kansai Photon Science Institute in Kyoto, where he gave a seminar and had discussions with Dr. Bulanov about the applicability of different models for beam-plasma systems.

3. *OTHER JIFT-RELATED PUBLICATIONS*

Several papers on work that was done in connection with JIFT exchange activities were recently published. For the sake of reference, we list them below:

- Y. Nagashima, S.-I. Itoh, K. Itoh, A. Fujisawa, S. Inagaki, Y. Kawai, S. Shinohara, M. Fukao, T. Yamada, K. Terasaka, T. Maruta, K. Kamatak, H. Arakawa, M. Yagi,N. Kasuya, G. Tynan, P. H. Diamond, and Y. Takase, "Reynolds Stress Measurements for Investigation of Nonlinear Processes of Turbulence in the Large Mirror Device and in the Large Mirror Device-Upgrade," J. Plasma Fusion Res. SERIES, vol. 8, pp. 50-54 (2009).

- H. Ohtani, W. Horton, T. Petrosky, and R. Horiuchi, "Energy Conversion in Magnetic Reconnection with Chaos Diffusion," J. Plasma Fusion Res. SERIES, vol. 8, pp. 203-207 (2009).

- K. Ichiguchi and B. A Carreras, "Multi-Scale MHD Simulation Incorporating Pressure Transport Equation for LHD Plasmas," J. Plasma Fusion Res. SERIES, vol. 8, pp. 1171-1175 (2009).

- M. Furukawa and L. J. Zheng, "Suppression of error-field-induced magnetic islands by Alfvén resonance effect in rotating plasmas", Nuclear Fusion 49, 075018 (2009) (6 pp)

- M. Furukawa, S. Tokuda, and L. J. Zheng, "A numerical matching technique for resistive magnetohydrodynamics modes," submitted to IOP Publishing, 22 June 2009.

- Y. Todo, N. Nakajima, M. Osakabe, S. Yamamoto, and D. A. Spong, "Simulation Study of Energetic Ion Transport due to Alfven Eigenmodes in LHD Plasma," Plasma and Fusion Research, vol. 3, S1074 (2008).

4. *PROGRAM ADMINISTRATION*

JIFT has a Steering Committee consisting of eight members, four from each country. Two of these members are the Japanese and US co-chairmen. Two other members of the Steering Committee, the US and Japanese co-executive secretaries, are responsible for the ongoing daily oversight of the progress of JIFT activities. The co-chairman and

co-executive secretary on the US side are, respectively, the director and associate director of the Institute for Fusion Studies (IFS) of The University of Texas at Austin. The Japanese co-chairman is the executive director of the Department of Simulation Science at the National Institute for Fusion Science, and the Japanese co-executive secretary is the director of the LHD and Magnetic Confinement Simulation Division in the Department of Simulation Science at the National Institute for Fusion Science. Furthermore, on the Japanese side there is an Advisory Committee comprised of several members representing a spectrum of Japanese universities and the Japan Atomic Energy Agency; and on the US side there is an Advisory Committee comprised of several members representing a spectrum of US universities and national laboratories. The names of the persons on the Steering Committee and the names of the Advisors are listed below.

JIFT Steering Committee

US Members	*Japanese Members*
J. Van Dam (IFS)—Co-Chairman	R. Horiuchi (NIFS)—Co-Chairman
F. Waelbroeck (IFS)—Co-Exec. Secretary	H. Sugama (NIFS)—Co-Exec. Secretary
J. Leboeuf (UCLA)	Z. Yoshida (Tokyo)
M. Crisp (DOE)	A. Fukuyama (Kyoto)

JIFT Advisors

Japanese Advisory Committee: N. Nakajima (NIFS), S. Ishiguro (NIFS), Y. Kishimoto (Kyoto), H. Naito (Yamaguchi), M. Yagi (Kyusyu), T. Ozeki (JAEA)

*US Advisory Committee***:** A. Aydemir (IFS), P. Catto (MIT), B. Carreras (BACV Solutions), V. Chan (GA), B. Cohen (LLNL), W. Horton (IFS), W. Tang (PPPL), and P. Terry (UWM)

The JIFT Steering Committee attempts to schedule workshops in such a way as to dovetail with other meetings. It also encourages participation at workshops by interested experimentalists and invites relevant available scientists from other countries to attend workshops.

As the principal program for fundamental theoretical exchanges in the US-Japan Fusion Research Collaboration, JIFT operates alongside the Fusion Physics Planning Committee (FPPC) and the Fusion Technology Planning Committee (FTPC). In particular, the JIFT activities are coordinated with the four FPPC areas of activity, viz., core plasma phenomena, edge behavior and control, heating and current drive, and new approaches and diagnostics.

Note that information about the JIFT program, including annual schedules of exchange activities, can be found on the US JIFT web site at http://w3fusion.ph.utexas.edu/ifs/jift/index.html on the US side. A corresponding Japanese JIFT web site at http://www.dss.nifs.ac.jp/JIFT/ was set up in 2008, with information such as previous JIFT annual reports and JIFT meetings in Japan.

5. *PLANS FOR FUTURE ACTIVITIES (PROPOSED 2010-2011 PROGRAM)*

The topics and themes of the exchange activities that have been proposed for JFY 2010 (April 1, 2010–March 31, 2011) are consistent with the traditional emphasis of JIFT on fundamental theoretical plasma physics issues. At the same time the proposed activities have direct relevance to the fusion science programmatic interests of both countries. The schedule of proposed activities for the coming year (2010-2011) is listed below.

A. 2010-2011 Proposed Workshops

US to Japan:

Integrated Modeling and Simulation in Toroidal Plasmas
Organizers: A. Fukuyama (Kyoto) and P. Bonoli (MIT)
Proposed Place/Time: Kyoto; Feb-March 2011

Hierarchical Self-Organization of Turbulence and flows in Plasmas, Oceans, and Atmospheres
Organizers: Y. Kishimoto (Kyoto) and P. H. Diamond (UCSD)

Proposed Place/Time: Kyoto University; January 2011

Japan to US:

Development of Simulation Science in Plasma Physics
Organizers: A. Arefiev (IFS) and H. Ohtani (NIFS)
Proposed Place/Time: Chicago, Illinois; November 2010

Theory and Simulation on Short-Pulse Laser-Plasma
Organizers: R. Town (LLNL) and H. Sakagami (NIFS)
Proposed Place/Time: Chicago, Illinois; November 2010

JIFT Steering Committee Meeting
Organizers: R. Horiuchi (NIFS) and James Van Dam (IFS)
Proposed Place/Time: Chicago; November 2010

B. 2010-2011 Proposed Exchange Visits

Japan to US:

Simulation study of toroidal flow generation by ICRF heating
S. Murakami (Kyoto), Visiting Professor
IFS Texas; July 2010 (2 weeks); paid by US

Theoretical and computational study of reversed-shear Alfven eigenmode
Y. Todo (NIFS), Visiting Scientist
IFS; July 2010 (2 weeks); paid by Japan

Three-dimensional effects on transport in toroidal magnetic configurations
T. Watanabe (NIFS), Visiting Scientist
PPPL; June 2010 (1 week), paid by Japan

Nonlinear MHD Analysis of Pressure Driven Modes in Heliotron Plasmas
K. Ichiguchi (NIFS), Visiting Scientist
BACV Solutions, Oak Ridge, TN; June-July 2010 (2 weeks); paid by Japan

US to Japan:

Study of Energetic Particle Effects by Extended MHD Simulation
Charlson Kim (U. Washington), Visiting Professor
NIFS; August-November 2010 (13 weeks); paid by Japan

Flow-Field Coupling in Magnetospheric High-beta Plasmas
Swadesh Mahajan (IFS), Visiting Scientist
Tokyo; December 2010 (two weeks); paid by US

Theoretical and computational study of reversed-shear Alfven eigenmode
Boris Breizman (IFS), Visiting Scientist
NIFS; October 2010 (1 week); paid by US

Note that the Joint Computational Projects category of JIFT activities was terminated at the end of JFY 2008.