

TO: Executive Secretaries of the US-Japan Fusion Research Collaboration
FROM: Steering Committee, US-Japan Joint Institute for Fusion Theory (JIFT)
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SUBJECT: JIFT Annual Report of Activities for 2007-2008

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Annual Report of JIFT Activities



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Annual Report of Activities

US-Japan Joint Institute for Fusion Theory

April 1, 2007–March 31, 2008

JIFT Steering Committee

Co-Chairmen: S. Sudo and J. W. Van Dam

Co-Executive Secretaries: R. Horiuchi and F. L. Waelbroeck

May 16, 2008

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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. Both objectives are pursued through collaborations between U.S. and Japanese scientists by means of three types of exchange program activities—namely, workshops, exchange visitors, and joint computational projects.

Each year the JIFT program usually consists of four topical workshops (two in each country), six exchange scientists (three from each country), and a fluctuating number of joint computational projects (on the order of a dozen). So far, during its 26 years of successful operation, JIFT has sponsored 151 long-term visits by exchange scientists, 95 topical workshops, and 196 joint computational projects.

- 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 three months.
- The third category of JIFT exchange activities consists of *joint computational projects*. In general these are continuing collaborations on various problems of current interest, which initially develop out of interactions at workshops and through individual exchange visits.

The topics and also the participating scientists for the JIFT exchange visits, workshops, and joint computational projects 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 (2007-2008 PROGRAM)

Almost all of the activities in the three categories—workshops, personal exchanges, and joint computational projects—that had been scheduled for the 2007-2008 JIFT program were carried out during the past year. Four of the workshops were successfully held, in addition to the JIFT Steering Committee meeting. In the category of personal exchanges, one Visiting Professor and five Visiting Scientists made exchange visits. The JIFT joint computational projects were also active. Summary reports about JIFT activities for 2007-2008 are given below.

A. 2007-2008 Workshops

US to Japan:

JF1-1 *Gyrokinetic simulation of plasma transport: Physics of anomalous fluxes of momentum and energy*

Organizers: Hideo Sugama (NIFS) and T.S. Hahm (PPPL)

Location: Kashiwa Campus, The University of Tokyo, Japan

Dates: September 24-25, 2007

Summary:

The workshop consisted of four sessions: (I) Recent Progress in Gyrokinetic Simulation, (II) Theory and Experiments on Momentum Transport, (III) Theory and Simulation of Electric Fields and Flows, and (IV) Multi-Scale Physics, New Fluid Simulation. In addition, there was a special lecture titled "Plasma Waves and

Instabilities in Shear Flow – A Frontier of Functional Analysis beyond von Neumann’s Theorem.” In all, 11 scientists from Japan, 2 from the US, and 2 from Europe presented talks. Recent results from theoretical and simulation studies about plasma transport based on gyrokinetic and gyrofluid models were reported. Comparative studies were carried out of theoretical modeling and experimental results of toroidal momentum transport in tokamaks and helical systems. Also, topics such as zonal flows, geodesic acoustic modes, and multi-scale interactions in ion temperature gradient (ITG) turbulence were discussed.

JF1-2 *New Development of Simulation Science*

Organizers: Noriyoshi Nakajima (NIFS) and J. W. Van Dam (IFS)

Location: NIFS, Japan (and by videoconference from Austin, TX)

Dates: March 18-19, 2008

Summary:

This workshop was held to review the simulation projects being carried out in the Department of Simulation Science (NIFS) and to hear reports about specific simulation advances in modeling transport and stability physics in toroidal confinement configurations. The workshop also constituted the first large-scale trial of the use of video-conferencing techniques. The morning session at NIFS (7:30-11:10 a.m. in Japan) coincided with an evening session at the IFS (5:30-9:10 pm in Texas). Eight speakers presented talks during the three-and-a-half-hour joint session by videoconference. The joint session began with an introduction and ended with concluding remarks by the organizers. A total of 15 Japanese scientists at NIFS and 8 US scientists and 2 Japanese scientists at the IFS attended the joint session. After the joint session ended, the workshop at NIFS continued through the afternoon in Japan. The success of the videoconference joint session was encouraging for plans to use this technology on an occasional basis for future JIFT workshops.

JF1-3 *On critical issues of hydrodynamic stability for high gain and fast ignition*

Organizers: Katsunobu Nishihara (Osaka) and Snezhana Abarzhi (Chicago)

Location: Osaka U

Dates: January 15-17, 2008

Summary:

Twelve talks were presented at the workshop by nine scientists from Japan, one from the US, and one from Canada. The presentations covered a range of subjects related to critical issues in hydrodynamics for high-gain laser fusion and the fast ignition scheme, including new self-similar ablation structures and suppression of the ablative Rayleigh-Taylor instability due to double ablation surfaces, characteristics of non-isotropic, non-uniform, non-local gravity turbulence and fully nonlinear evolution of the Richtmyer-Meshkov instability, energy transport, and hydrodynamics in fast-ignition laser fusion.

JF1- *JIFT Steering Committee Meeting*

Organizers: Shigeru Sudo (NIFS) and James W. Van Dam (IFS)

Location: NIFS

Dates: September 6, 2007

Summary:

Participants at the steering committee meeting reviewed the status of JIFT activities for 2007-08 and discussed recommendations for exchange activities during 2008-09.

Japan to US:

JF1-7 *Numerical simulation of complex plasmas*

Organizers: F. L. Waelbroeck and J. W. Van Dam (IFS) and Ritoku Horiuchi (NIFS)

Location: Austin, TX

Dates: –October 8-9, 2007

Summary:

Talks were presented by 14 scientists from the US, 8 from Japan, and 1 from EU. The 23 presentations at the workshop covered a range of subjects related to advanced simulation methods and issues, including particle noise in gyrokinetic PIC simulations, laser-plasma interaction simulations, particle simulations for collisionless driven reconnection, discontinuous Galerkin method, modeling anisotropic 3D drift-Alfven turbulence, burning plasma simulations, wave packet solution for plasma wave equations, lower-hybrid drift instabilities, and

trapped electron mode studies. This Simulation Science Workshop (October 8-9) was held just before the 20th International Conference on Numerical Simulation of Plasmas (October 10-12, <http://workshops.ph.utexas.edu>), which was attended by 6 Japanese scientists, 58 US scientists, 7 European scientists, and 2 Canadian scientists.

Related publications:

Abstracts for all of the presentations were posted on the web site <http://workshops.ph.utexas.edu/ssw/index.php>.

JF1-8 *Multi-scale turbulent dynamics in laboratory and astrophysical plasmas*

Organizers: Patrick Diamond (UCSD) and Yasuaki Kishimoto (Kyoto)

Location: University of California at San Diego, USA

Dates: Cancelled

Summary:

This workshop had been scheduled for December 2007, but was cancelled. It may be rescheduled.

B. 2007-2008 Exchange Visits

Japan to US:

JF1-9 *Nonlinear MHD analysis of pressure driven mode in heliotron plasma*

Exchange Scientist: Katsuji Ichiguchi (NIFS)

Location: BACV Solutions, Oak Ridge, TN

Dates: June 24-July 1, 2007 (two weeks); paid by Japan

Research Summary:

Dr. Ichiguchi visited Oak Ridge to work with Dr. Ben Carreras, with whom he has had a continuing collaboration for a number of years. During this visit they developed a multi-scale nonlinear MHD simulation scheme for studying the behavior of heliotron plasmas in the phase when the plasma beta is increasing. They improved the scheme so that it could be adjusted to a fixed heating profile. They applied the improved scheme to the LHD plasma and obtained local improvement of Mercier stability due to self-organization of the pressure profile. They presented these results at the 17th International Toki Conference and at the 16th International Stellarator/Heliotron Workshop and also wrote a paper to be published. They considered a further extension of the scheme that incorporates a pressure transport equation, and they are now developing a numerical code based on this scheme.

Related publications:

- K. Ichiguchi and B. A. Carreras, "Multi-Scale Simulation of Heliotron Plasma," in *Proceedings of Joint Workshop of NIFS Cooperative Programs 2006 for MHD Theory and Related Topics* (NIFS-PROC-67, August 2007), pp. 16-19.
- K. Ichiguchi and B. A. Carreras, "Mercier Stability Improvement in Nonlinear Development of LHD Plasma," to be published in *Plasma and Fusion Research* (2008).

JF1-10 *Relativistic Fast Electron Transport in Fast Ignition Targets*

Exchange Scientist: T. Johzaki (Osaka U)

Location: University of Nevada, Reno

Dates: November 17-24, 2007 (eight days); paid by Japan

Summary:

During his visit, Dr. Johzaki started a collaborative research project with Prof. Sentoku (University of Nevada, Reno) related to fast ignition laser fusion. In fast ignition with cone-guide targets, the core heating is done by the energy transport of fast electrons generated by an ultra-intense heating laser at the cone's inner surface. In this research, they carried out numerical simulations for fast electron generation and the associated transport processes in a gold cone for the sub-ignition experiment FIREX-I. For investigating the relativistic laser-plasma interactions, a 1-D collisional PIC code developed by Prof. Sentoku was used. The associated transport processes were treated by means of a 1-D relativistic Fokker-Planck code developed by Dr. Johzaki. They found the important discovery that the gold ions reach the nearly fully ionized state at the early stage of laser irradiation. In this situation, due to the collisional damping of the return current and the steepening of the density profile at the laser interaction region, the energy coupling of the heating laser to the fast electrons is significantly decreased in contrast to the low ionization case and the case in which the collisional process is

neglected. As for the transport process, the fast electrons are dragged by collisions with the bulk electrons and the resistive field, and are strongly scattered by highly ionized gold ions even when the propagation distance is 10 microns. As a result, the heated core temperature decreases by half in comparison with the case when the transport inside the cone tip is neglected.

Related presentations:

T. Johzaki, Y. Sentoku, H. Sakagami, H. Nagatomo, K. Mima, and Y. Nakao, "Core Heating Properties in FIREX-I – Influence of Cone Tip," to be presented at 35th European Physical Society Plasma Physics Conference (2008).

JF1-11 *Study of the effect on the transport due to zonal flows in high temperature plasmas*

Visiting Scientist: S. Toda (NIFS)

Location: UCSD

Dates: January 16-February 8 (three weeks); paid by Japan

Summary:

Summary:

During his visit, Dr. Toda began a collaborative research project with Prof. P. Diamond, in which they analyze the role of zonal flows in the formation of transport barriers in helical plasmas with the use of a transport code. They found that the turbulent transport coefficient is suppressed when the plasma state has a strong positive radial electric field. They theoretically demonstrated that the of zonal flow damping rate plays an important role in global confinement in toroidal plasmas. They also studied the physical mechanism for the excitation of zonal flows, in order to improve the modeling of anomalous diffusivities. They are considering to include the dependence of the wave number on the criterion of the heat diffusivity for exciting zonal flows.

Related publications:

S. Toda, K. Itoh, A. Fujisawa, S.-I. Itoh, M. Yagi, A. Fukuyama, P.-H. Diamond, and K. Ida, "Transport analysis of the effect of zonal flows on electron internal transport barriers in toroidal helical plasmas," *Nucl. Fusion* **47**, 914-919 (August 2007).

JF1-12 *Analysis of Fast Ignition Experiments with Integrated Simulations*

Visiting Scientist: Hitoshi Sakagami (NIFS)

Location: Laboratory for Laser Energetics, University of Rochester, Rochester, NY

Dates: Japan pending

Summary:

This exchange activity had been scheduled for September-November 2007 (seven weeks), paid by Japan. However, it has not yet been carried out.

US to Japan:

JF1-4 *Radial transport studies for improving plasma confinement due to potential/E(r) shear control*

Visiting Scientist: Wendell Horton (IFS)

Location: Tsukuba University, Japan

Dates: May 13-21, 2007 (one week); paid by US

Summary:

Dr. Horton and his IFS graduate student continued their collaboration with scientists at the Plasma Research Center at Tsukuba. In particular, they have applied the methodology of sheared flow suppression of turbulence in order to explain the enhanced confinement that has been observed recently in the Gamma-10 tandem mirror, due to the formation of an internal transport barrier, localized within a layer of strongly sheared ExB rotation. This collaboration has resulted in publications and also several talks at conferences. (Dr. Horton's visit, originally scheduled for two weeks, had to be ended early when his wife became seriously ill.)

Related publications:

- J. Pratt, W. Horton, J.-H. Kim, and H. L. Berk, "Drift Wave Fluctuation in Tandem Mirrors with Anchor Cells and Sheared Flows," poster presentation at International Sherwood Fusion Theory Conference (April 23-25, 2007, Annapolis, MD).
- J. Pratt and W. Horton, "Drift Waves and Stability in the GAMMA-10," poster presentation at 49th American Physical Society Division of Plasma Physics Annual Meeting (November 12-16, 2007, Orlando, FL).

JF1-5 *Analysis of plasma rotation and error field effects on resistive wall modes in tokamaks*

Visiting Scientist: L.-J. Zheng (IFS)

Location: Tokyo University, Japan

Dates: August 1-11, 2007 (eleven days); paid by US

Summary:

During a JIFT visit by Dr. M. Furukawa (Tokyo University) to the IFS last year, Dr. Zheng began a collaborative research project with him. They continued this collaboration during Dr. Zheng's subsequent JIFT visit to Japan in 2007. During their research investigations, they developed a theory for error-field-induced magnetic islands in rotating plasmas with the Alfvén resonance effect taken into account. They found the important discovery that the Alfvén resonance, which had hitherto been ignored in existing papers on this subject, is critically important and dramatically changes the MHD perturbation near the singular layer where the magnetic islands are formed. Consequently the so-called forbidden band, used to explain the low-rotation stabilization in the recent DIII-D experiments, is modified significantly.

Related publications:

M. Furukawa and L.-J. Zheng, "Alfvén resonance effect on the error-field-induced magnetic islands in rotating plasmas," submitted to Nuclear Fusion (October 2007).

JF1-6 *Domain Substructuring and Scalability for Peta-scale Simulation of Extended MHD Plasmas*

Visiting Professor: A. H. Glasser (LANL)

Location: National Institute for Fusion Studies, Japan

Dates: June 25-September 29, 2007 (three months); paid by Japan

Summary:

The purpose of Dr. Glasser's technical work at NIFS was to develop and apply the method of FETI-DP domain substructuring for preconditioning and scalability to extended MHD simulation using 2D spectral elements and fully-implicit time steps. He gave two seminars near the beginning of his visit, on "SEL: A Fully-Implicit, Parallel Spectral Element Fluid Simulation Code" and "Domain Substructuring and Scalability for Petascale Simulation of Extended MHD Plasmas." He worked on developing a method of domain substructuring for preconditioning and scalability, using his own SEL 2D spectral element plasma simulation code as a test bed. He worked with N. Nakajima and M. Sato to install this code on a Linux cluster at NIFS and teach them how to use it for a wide variety of fluid applications. Near the end of his visit, he gave private presentations on the results of his work entitled "Massively Parallel Fusion Plasma Simulations" to Director-General Osamu Motojima and Deputy Director-General Shigeru Sudo, and to a plasma physics group at Kyoto University. He attended the NIFS Commemorative Symposium on Simulation Science that was held September 6-7, 2007, in Toki.

Related publications:

A. H. Glasser, "Preconditioning and Scalability of Implicit Extended MHD Plasma Simulation by FEETI-DP Domain Substructuring," invited talk at 20th International Conference on Numerical Simulation of Plasmas (October 10-12, 2008, Austin, TX).

C. 2007-2008 Joint Computational Projects

The following 14 JIFT joint computational projects on various topics were also active during the past year.

JF2-1 *Analysis of Plasma Rotation and Error Field Effects on Resistive Wall Modes in Tokamaks*

M. Furukawa and Z. Yoshida (Tokyo);

L.J. Zheng and J. Van Dam (IFS)

JF2-2 *Particle Simulation in Open Systems*

S. Ishiguro, R. Horiuchi, H. Ohtani (NIFS);

V. K. Decyk (UCLA)

Continued from 2006-2007

JF2-3 *Development of a Numerical Analysis Method of the Drift Kinetic Equation by Monte Carlo Method*

S. Murakami (Kyoto U.);

V. S. Chan, M. Choi, L. Lao (GA)

Continued from 2006-2007

JF2-4 *Simulation Study of Zonal Magnetic Field in Alfvén Eigenmode Nonlinear Evolution*

Y. Todo (NIFS);
H. L. Berk, B. N. Breizman, J. W. Van Dam (IFS)

JF2-5 *Drift Mode Analysis for the Large Helical Device*

N. Nakajima (NIFS);
G. Rewoldt (PPPL)
Continued from 2006-2007

JF2-6 *Gyrokinetic Transport Simulation*

V. Decyk (UCLA); W. Lee (PPPL);
T. Takayama (NIFS); H. Naitou (Yamaguchi)
Continued from 2006-2007

JF2-7 *Plasma Rotation, Vortices, and Anomalous Transport*

W. Horton, A. Aydemir (IFS);
H. Sugama (NIFS); S. Murakami (Kyoto)
Continued from 2006-2007

JF2-8 *Nonlinear MHD Simulation of Heliotron Plasmas*

K. Ichiguchi, N. Nakajima, N. Mizuguchi (NIFS);
D. Spong, V. Lynch (ORNL); B.A. Carreras (BACV Solutions)

JF2-9 *MHD Stability in Advanced Tokamaks*

S. Tokuda, T. Ozeki (JAEA), Y. Tomita (NIFS);
J. Manickam (PPPL); A. Aydemir (IFS)
Continued from 2006-2007

JF2-10 *New Simulation Algorithms for Massively Parallel Processing*

V. Decyk (UCLA); W. Tang (PPPL);
R. Horiuchi, S. Ishiguro (NIFS); K. Watanabe (NIFS)
Continued from 2006-2007

JF2-11 *Toroidal Simulation and Plasma Transport Modeling*

W. Horton (IFS);
Y. Kishimoto (Kyoto); Y. Idomura (JAEA); H. Takamaru (Chubu)
Continued from 2006-2007

JF2-12 *Numerical Study of High Energy Particle Effect on MHD Stability*

J. Van Dam, H. L. Berk, B. N. Breizman (IFS); G. Y. Fu (PPPL); D. A. Spong (ORNL)
Y. Ishii, T. Ozeki (JAEA); Y. Todo (NIFS)
Continued from 2006-2007

JF2-13 *Turbulent Transport Applications to Tokamaks and Helical Systems*

B. Carreras (BACV Solutions); W. Horton (IFS);
Y. Nakamura (Kyoto); M. Yokoyama (NIFS)
Continued from 2006-2007

FP6-14 *Numerical simulation of micro-turbulence in magnetized plasmas using GKV code*

T.H. Watanabe, H. Sugama (NIFS);
W. Horton and J.H. Kim (IFS)

3. 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 a professor 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

J. Van Dam (IFS)—Co-Chairman
F. Waelbroeck (IFS)—Co-Exec. Secretary
J. Leboeuf (UCLA)
M. Crisp (DOE)

Japanese Members

S. Sudo (NIFS)—Co-Chairman
R. Horiuchi (NIFS)—Co-Exec. Secretary
Z. Yoshida (Tokyo)
K. Mima (Osaka)

JIFT Advisors

Japanese Advisory Committee: N. Nakajima (NIFS), S. Ishiguro (NIFS), A. Fukuyama (Kyoto), 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 JIFT web site at <http://peaches.ph.utexas.edu/jift/>.

In April 2007, the Theory and Computer Simulation Center at the National Institute for Fusion Science, which serves as the Japanese host for the activities of JIFT, was combined with the Computer and Information Network Center and re-organized as the Department of Simulation Science. Prof. S. Sudo is the Executive Director of the Department of Simulation Science. In connection with the establishment of this new department, a special Celebratory Symposium on Simulation Science was held at NIFS on September 6-7, 2007 (http://www.dss.nifs.ac.jp/dss_symposium/index.html). The Japanese JIFT co-chairman, S. Sudo, presented an overview invited talk on “Progress in Simulation Science.” The US JIFT co-chairman, J. Van Dam, presented an invited talk about “Simulation Science for Burning Plasmas” and also described the US simulation programs (including the US-Japan JIFT collaboration activities on integrated modeling) during the panel discussion.

A JIFT program discussion meeting was held at NIFS on January 17-18, 2008 in order to summarize the history of the JIFT activities and discuss its future prospects. Thirty-three Japanese researchers attended this meeting and participated in the discussion. Also, written comments from the US co-chairman concerning JIFT activities were presented by the Japanese co-executive secretary at the meeting.

4. PLANS FOR FUTURE ACTIVITIES (PROPOSED 2008-2009 PROGRAM)

The topics and themes of the exchange activities that have been proposed for the next year (April 1, 2008–March 31, 2009) 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 (2008-2009) is listed below.

A. 2008-2009 Proposed Workshops

US to Japan:

Energetic Particle Physics in Toroidal Plasmas

Organizers: Y. Todo (NIFS) and G. Y. Fu (PPPL)

Proposed Place/Time: NIFS; December 15-17, 2008

Japan to US:

Progress of Multi-scale Simulation Models

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

Proposed Place/Time: Dallas, TX; November 21-22, 2008

Theory and Simulation on Ultra-Intense Laser Plasmas

Organizers: G. Shvets (IFS) and K. Mima (Osaka)

Proposed Place/Time: IFS Texas; November 2008

JIFT Steering Committee Meeting

Organizers: Shigeru Sudo (NIFS) and James Van Dam (IFS)

Proposed Place/Time: Dallas, TX; November 18, 2008

B. 2008-2009 Proposed Exchange Visits

Japan to US:

Response of Flowing Plasmas to Externally Given Magnetic Perturbation

M. Furukawa (Tokyo), Visiting Professor

IFS Texas; July 2008 (four weeks); paid by US

Development of Gyrokinetic PIC code for Extended MHD Simulation

Y. Naitou (Yamaguchi), Visiting Scientist

PPPL; September 2008 (two weeks); paid by Japan

Physics Analysis of Fast Electron Generation and Transport Relevant to Fast Ignition Laser Fusion

T. Johzaki (Osaka U), Visiting Scientist

University of Nevada, Reno; November 2008 (two weeks); paid by Japan

Simulation Study of Energetic Particle Transport in Quasi-helical Symmetric Plasma

S. Murakami (Kyoto), Visiting Scientist

University of Wisconsin; July 2008 (four weeks); paid by Japan

Simulation Study of Neoclassical Transport in Non-axisymmetric Plasmas Based on the Delta-f Method

S. Satake (NIFS), Visiting Scientist

PPPL; October 2008 (nine weeks); paid by Japan

US to Japan:

Turbulent Transport Theory and Simulations for Magnetically Confined Plasmas

W. Horton (IFS), Visiting Professor

NIFS; May 6-August 7 (13 weeks); paid by Japan

Theoretical and Computational Study of Alfvén Eigenmodes

G. Y. Fu (PPPL), Visiting Scientist
NIFS; December 2008 (one week); paid by US

Energetic Particle Instabilities

J. W. Van Dam (IFS), Visiting Scientist
NIFS; September 2008 (one week); paid by US

2008-2009 Proposed Joint Computational Projects

- JF2-1** *Analysis of Plasma Rotation and Error Field Effects on Resistive Wall Modes in Tokamaks*
M. Furukawa and Z. Yoshida (Tokyo);
L.J. Zheng and J. Van Dam (IFS)
Continued from 2007-2008
- JF2-2** *Particle Simulation in Open Systems*
S. Ishiguro, R. Horiuchi, H. Ohtani (NIFS);
V. K. Decyk (UCLA)
Continued from 2007-2008
- JF2-3** *Development of a Numerical Analysis Method of the Drift Kinetic Equation by Monte Carlo Method*
S. Murakami (Kyoto U.);
V. S. Chan, M. Choi, L. Lao (GA)
Continued from 2007-2008
- JF2-4** *Zonal Magnetic Field and Zonal Flow Formation in Alfvén Eigenmode Nonlinear Evolution*
Y. Todo (NIFS);
H. L. Berk, B. N. Breizman, J. W. Van Dam (IFS)
Continued from 2007-2008 (with a slight name change)
- JF2-5** *Drift Mode Analysis for the Large Helical Device*
N. Nakajima (NIFS);
G. Rewoldt (PPPL)
Continued from 2007-2008
- JF2-6** *Gyrokinetic Transport Simulation*
V. Decyk (UCLA); W. Lee (PPPL);
T. Takayama (NIFS); H. Naitou (Yamaguchi)
Continued from 2007-2008
- JF2-7** *Plasma Rotation, Vortices, and Anomalous Transport*
W. Horton, A. Aydemir (IFS);
H. Sugama (NIFS); S. Murakami (Kyoto)
Continued from 2007-2008
- JF2-9** *MHD Stability in Advanced Tokamaks*
S. Tokuda, T. Ozeki (JAEA), Y. Tomita (NIFS);
J. Manickam (PPPL); A. Aydemir (IFS)
Continued from 2007-2008
- JF2-10** *New Simulation Algorithms for Massively Parallel Processing*
V. Decyk (UCLA); W. Tang (PPPL);
R. Horiuchi, S. Ishiguro (NIFS); K. Watanabe (ES)
Continued from 2007-2008

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- JF2-11** *Toroidal Simulation and Plasma Transport Modeling*
W. Horton (IFS);
Y. Kishimoto (Kyoto); Y. Idomura (JAEA); H. Takamaru (Chubu)
Continued from 2007-2008
- JF2-12** *Numerical Study of High Energy Particle Effect on MHD Stability*
J. Van Dam, H. L. Berk, B. N. Breizman (IFS); G. Y. Fu (PPPL); D. A. Spong (ORNL)
Y. Ishii, T. Ozeki (JAEA); Y. Todo (NIFS)
Continued from 2007-2008
- JF2-13** *Turbulent Transport Applications to Tokamaks and Helical Systems*
B. Carreras (BACV Solutions); W. Horton (IFS);
Y. Nakamura (Kyoto); M. Yokoyama (NIFS)
Continued from 2007-2008
- JF2-14** *Benchmark Test of the GKV code for Kinetic Plasma Turbulence*
T.H. Watanabe, H. Sugama, Nakata (NIFS);
W. Horton (IFS)
Continued from 2007-2008 (with some personnel change and slight name change)
- JF2-15** *Simulation Study of Neoclassical Transport Based on the Delta-f Method*
S. Satake (NIFS);
W. Wang (PPPL)
New in 2008-2009

Note that JF2-8 (*Nonlinear MHD Simulation of Heliotron Plasmas*) will be deleted in 2008-2009.