

TO: Executive Secretaries of the US-Japan Fusion Research Collaboration
FROM: JIFT Steering Committee
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SUBJECT: JIFT Annual Report of Activities for 1995-96

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3. Status of Current Activities
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US-Japan Joint Institute for Fusion Theory
Annual Report of Activities
April 1, 1995–March 31, 1996

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March 12, 1996

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1. Introduction

The US-Japan Fusion Research Collaboration is organized under three programs: the Fusion Physics Planning Committee (FPPC), the Fusion Technology Planning Committee (FTPC), and the Joint Institute for Fusion Theory (JIFT).

The 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 various types of exchange program activities.

At present the JIFT program every year 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 15 years of successful operation, it has sponsored 84 long-term visits by exchange scientists, 53 topical workshops, and 65 joint computational projects.

The workshops typically have an attendance of 25–35 participants, of whom usually from five 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 three exchange visitors in each direction every year, two (called “Exchange Scientists”) are supported by the sending country, and one (called “JIFT Visiting Professor”) is supported by the host country. The Exchange Scientists’ visits normally last a month or two, whereas the Visiting Professors normally stay for at least three months.

The third category of JIFT exchange activities are joint computational projects. These have generally arisen as continuing collaborations on various problems of interest, as results of the workshops and the 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 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.

A number of general benefits have resulted over the years from the JIFT program, including the following: JIFT has provided efficient communication channels for the latest theoretical research results, techniques, and directions; JIFT activities have attracted serious participation from allied fields such as fluid turbulence, statistical physics, computational science, and space plasma physics, which brings new scientific tools into the fusion program and enhances the stature of fusion physics; JIFT exchanges have contributed to efficient utilization of international research facilities; and JIFT emphasis on large-scale computational studies has reaped significant mutual benefits from the supercomputer resources and code-building expertise of both countries.

A brief description of JIFT administration is given in Sec. 2 of this report. The current status of the various activities in the 1995-96 JIFT program is explained in Sec. 3. Highlights of specific technical accomplishments during the past year are given in Sec. 4. Plans for recommended activities during the upcoming 1996-97 period are described in Sec. 5.

2. Management Structure

JIFT has a Steering Committee with eight members, four from each country, including two co-chairmen. The co-chairman on the Japanese side is the director of the Theory and Computer Simulation Center at The National Institute for Fusion Science (NIFS) in Japan, and the co-chairman on the US side is the director of the Institute for Fusion Studies (IFS) of The University of Texas at Austin. Two other members of the Steering Committee, who are called co-executive secretaries, are responsible for the ongoing oversight of the progress of JIFT activities. Furthermore, on the Japanese side there are two official Advisors, both of whom are from the Japan Atomic Energy Research Institute; and on the US side there is an Advisory Committee comprised of several members. The names of the persons on the Steering Committee and of the Advisors are given below:

JIFT Steering Committee

US Members

R. Hazeltine (IFS)—Co-Chairman
J. Van Dam (IFS)—Co-Exec. Secretary
W. Sadowski (DOE)
J. Dawson (UCLA)

Japanese Members

T. Sato (NIFS)—Co-Chairman
M. Okamoto (NIFS)—Co-Exec. Secretary
M. Wakatani (Kyoto)
K. Mima (Osaka)

Japanese Advisors: M. Azumi (JAERI) and Y. Kishimoto (JAERI)

US Advisory Committee: A. Aydemir (IFS), P. Catto (MIT), B. Carreras (ORNL), V. Chan (GA), J. Johnson (PPPL), W. Horton (IFS), J. Leboeuf (ORNL), T. Tajima (IFS), W. Tang (PPPL), and P. Terry (UWM)

The Steering Committee attempts to schedule workshops to dovetail with other meetings, to continue to involve participation at workshops by interested experimentalists, and to invite 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 behaviour and control, heating and current drive, and new approaches and diagnostics. Although unable to attend the meeting of the FPPC held at General Atomics in San Diego on March 14 and 15, 1996, the US co-exec

utive secretary provided viewgraphs concerning the proposed JIFT schedule of activities for 1996-97, as part of this coordination.

3. Status of Current Activities

All but one of the workshops and all but one of the personnel exchange visits that were scheduled in the 1995-96 annual JIFT program (see Attachment A) either have already occurred or are now taking place or will soon.

To date, two of the four workshops in the 1995-96 program have already been held:

- The workshop on *Transport Barrier in Turbulent Plasmas* was held January 8-11, 1996, at The University of Texas at Austin, in Austin, Texas, attended by 8 Japanese scientists, approximately 30 US scientists, and 4 scientists from other countries (France, Sweden, and UK).
- The workshop on *Interaction of Strong Electromagnetic Waves with Plasmas* was held January 22 and 23, 1996, at the Institute of Laser Engineering, in Osaka, Japan, attended by 3 US scientists, approximately 20 Japanese scientists, and 8 scientists from other countries (China and Yugoslavia).

The workshop on *Computer Simulation for Electron Dynamics* will be held March 20-22 in Philadelphia, Pennsylvania, in conjunction with the annual meeting of the US Numerical Tokamak Project.

The workshop *Current and Shape Control and MHD Phenomena in Toroidal Systems* was withdrawn (due to severe changes in the US fusion budget that occurred around the time scheduled for the workshop).

The annual meeting of the JIFT Steering Committee was held September 11 and 12, 1995, at the National Institute for Fusion Science in Nagoya, Japan. In attendance at this meeting were W. Sadowski, J. Van Dam, P. Catto, B. Carreras, V. Chan, and W. Tang on the US side and T. Sato, M. Fujiwara, M. Okamoto, M. Wakatani, K. Mima, and T. Tamano on the Japanese side. Several Japanese observers were also present.

A follow-up to the Steering Committee meeting took place in November 1995 during the APS Division of Plasma Physics meeting in Louisville. At this meeting, Dr. Sato was able to meet with W. Sadowski, J. Van Dam, W. Tang, V. Chan, and P. Catto. Among other things, several new ideas for workshops were discussed.

Of the six planned scientific personnel exchanges in the 1995-96 program, two of them have taken place, three are currently underway, and one was withdrawn. Dr. Noriyoshi Nakajima is currently spending 10 weeks as JIFT Visiting Professor at the Institute of Fusion Studies. Mr. Masayuki Yokoyama spent 3 months at the University of Wisconsin at Madison, during which time he also visited the Institute for Fusion Studies. Dr. Tomohiko Watanabe is visiting General Atomics and Princeton Plasma Physics Laboratory for two weeks, beginning March 3. Dr. Norman Zabusky is

s currently spending three months as JIFT Visiting Professor at NIFS. Dr. William Dorland visited JAERI as an exchange scientist; however, because his visit ended prematurely due to a family emergency, it will be scheduled again in the 1996-97 program. Dr. Timothy William's visit to the National Institute for Fusion Science as an exchange scientist was withdrawn (for budgetary reasons).

The various joint computational projects have also been active during the past year. Several of these projects involved some limited travel.

4. Technical Progress Highlights

The JIFT workshops during the past year were on topics of timely interest and had stimulating participation by both analytical and numerical theorists, as well as a number of experimentalists.

- One of the workshops focused on the topic of transport and transport barriers, which is currently a very important topic, being relevant, for example, to enhanced confinement in reversed shear operation and the H-mode. Emphasis was concentrated on the mechanisms for the formation of transport barriers, the dynamics of reversed shear transport, the role of self-organized criticality, and the mechanisms for globally connected transport. Scientists representing several large tokamak experiments (TFTR, DIII-D, JET, and JT-60U) reported experimental results on internal transport barriers and reversed shear discharges. The TFTR group showed that particle and ion thermal diffusivities drop by a factor of approximately 40 to the neoclassical level for the particles and to much less than the neoclassical value for ions in the region with reversed magnetic shear. Numerical results obtained from gyrofluid and gyrokinetic simulations were shown to explain the reduction of both the linear instability growth rates and the nonlinear turbulence saturation level by negative magnetic shear. Neoclassical analysis that takes into account the orbit squeezing mechanism predicted the reduction of the transport in the core region. Other experimental and theoretical studies on neoclassical and anomalous transport, shear flow generation, and plasma and neutral-fluid turbulence were also presented.
- The workshop on the subject of the electromagnetic wave interactions with plasmas was a follow-on to a workshop last year, in the US, on a similar topic. Again, it was directed at physics areas of common interest to both rf experts in magnetic fusion and laser experts in inertial confinement, which provided opportunities for cross-field synthesis. Specific topics that were discussed included intense laser development and applications, intense short-pulse laser plasma interactions, nonlinear plasma dynamics, rf heating of plasmas, and implosion physics.

At the JIFT Steering Committee Meeting, the JIFT activities during 1995-96 were reviewed and plans for future activities were discussed. In addition to these programmatic discussions, a number of scientific talks were presented about recent research results. Dr. M. Okamoto and Dr. N. Nakajima described theoretical physics studies for LHD plasmas, Dr. H. Sugama presented his recent work on neoclassical and anomalous transport in axisymmetric and non-axisymmetric toroidal plasmas, and Dr. K. Toi talked about his recent experimental results on the JIPP T-IIU tokamak. The

participants at this meeting discussed plans for how the JIFT exchange activities could contribute to theoretical and computational analysis for the LHD and JT-60U experiments in Japan.

The various JIFT exchange visits during 1995-96 have also been productive, in terms of collaborations established, research accomplished, and papers written.

- Dr. Nakajima (NIFS), who is currently visiting the IFS, is investigating the stability properties of high-mode-number ballooning modes in non-axisymmetric toroidal devices. He has discovered that, under certain conditions, the ballooning modes have unusual characteristics in a heliotron/torsatron helical system (e.g., the Large Helical Device). A paper describing these results is being prepared for publication.¹ His visit is being jointly supported by the IFS and also by the Japan Industry and Management of Technology (JIMT) Program of the IC² Institute of The University of Texas at Austin. He is giving a series of three IFS/JIMT-sponsored lectures entitled “Bootstrap Current in a Helical System,” “Ballooning Stability in a Helical System,” and “Construction of the World’s Largest Helical System,” the last of these for a campus-wide general audience.

- Mr. Yokoyama, an advanced graduate student from Kyoto University, collaborated with University of Wisconsin scientists to study the evolution of toroidal flow during and after mode locking. In particular, they examined analytically and numerically the response of the toroidal flow velocity to its abrupt locking in the vicinity of an MHD tearing mode-induced magnetic island.²

- Dr. Dorland (IFS) initiated discussions with JAERI scientists about analyzing JT-60U experimental data with the use of the IFS/PPPL transport simulation model, which has already been successful in theoretically interpreting the confinement behavior of several other large tokamaks.

- Prof. Zabusky (Rutgers) is studying sophisticated visualization techniques for extracting complex structures from numerical computations, in collaboration with scientists in the Theory and Simulation Center at NIFS. He is also giving a series of lectures about vortex dynamics. The first lecture was entitled “Collapse, Intensification, and Reconnection in Vortex-Dominated Flows: Visualizations, Juxtaposition, and Modeling.”

Also, a number of papers were published this past year by scientists who had participated in various activities of the JIFT program during preceding years.

- A previous exchange scientist visit, which had already resulted in several joint publications, recently led to the writing of a review paper on the properties of Alfvén waves in plasmas.³

- During his stay in US last year, a Japanese exchange scientist presented a paper about the pro

properties of LHD configurations with multi-layer helical coils at the 1995 International Sherwood Fusion Theory Conference," held at Incline Village, Nevada. This work has now been submitted for publication.⁴

- A productive research collaboration on turbulence-generated shear flow was continued, leading to results that have relevance to the L-mode to H-mode transition and also to internal transport barriers, such as have been observed in the PBX-M and JT-60U experiments. Several recent publications have resulted from this and related work on general turbulent transport processes.⁵⁻⁹
- A three-dimensional gyrokinetic particle code developed in a collaboration project was used to simulate the physics of internal kink modes. A paper describing this work was published at the end of last year.¹⁰
- Another continuing JIFT collaboration led to yet another publication, which used theoretical analysis and numerical computations to analyze transport behavior in the JT-60U experiments.¹¹

Incidentally, JIFT program activities are periodically publicized to the wider international fusion community through the *JIFT Newsletter*, which contains longer descriptions of the workshops, exchange visits, etc. It is planned to convert this newsletter from paper to electronic format, with the use of a home page on the WorldWide Web.

5. Plans for Future Activities

The topics and themes of the exchange activities that have been proposed for the next year (April 1, 1996–March 31, 1997) are consistent with the traditional emphasis of JIFT on fundamental theoretical issues, but at the same time have relevance to the fusion science programmatic interests of both countries. These activities are listed in Attachment B.

Several of the various workshops being proposed for the next year have tie-ins with other activities and travel, in order to reduce expenses. One workshop concerns transport and turbulence of plasmas in toroidal systems, in the way of a follow-up to the January 1996 JIFT workshop. Another workshop, on interactions of high power waves with plasma and matter, is the third in a series on this interdisciplinary topic. A workshop is planned on alternate concepts, with emphasis on helical devices, in order to promote connections between the LHD project and US stellarator theory capabilities. A fourth workshop has a computational focus, which has been a JIFT continuing theme. Specifically, it addresses cutting-edge visualization techniques in computer simulations.

The long-term (i.e., one month minimum) visits have in the past been quite effective to establish productive research collaborations that often last for years afterwards. For this reason, and also because on the US side a supplemental funding source can be tapped next year, it is being proposed to send two additional exchange scientists to go to Japan and, correspondingly, two additional sci

entists to come from Japan to the US during 1996-97.

Of the five exchange scientists from the US, one (Monticello) is a world authority on stellarator equilibrium, one (Hegna) will continue a collaboration that was begun with a Japanese exchange scientist who came to the US last year, one (Fitzpatrick) will apply tokamak theories for error fields to nonaxisymmetric helical devices, and one (Reynders) will connect with the strong Japanese effort in particle simulations and parallelization. Also, note that one of the proposed visits from the US (Dorland) is actually a make-up for a visit of last year, which was prematurely ended, after one day in Japan, due to a family medical emergency.

Of the exchange scientists from Japan, three (Ohsawa, Todo, and Takayama) will be concerned with nonlinear wave studies, two (Sato and Murakami) will deal with edge plasma-related fundamental physics, and one (Takamaru) will be a basic plasma physics investigation that may be linked to experimental comparisons.

The joint computational projects, which comprise the third part of the JIFT program, usually arise as outgrowths of earlier workshops or scientific exchanges. Their number is periodically pruned, after their usefulness has been realized. Most of these items being proposed for 1996-97 are active continuations from the previous year. Several projects were completed, and these have been deleted. Some other new ones were added on request. Note that 4 of the proposed 11 joint computational projects for the coming year have JAERI scientists as participants.

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5. H. Sugama and W. Horton, "Entropy production and Onsager symmetry in neoclassical transport process of toroidal plasmas," Phys. Plasmas **3**, 304 (1996).
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8. H. Sugama and W. Horton, "On the saturation of multihelicity modes," IFS Report No. 738 (1996).
9. H. Sugama, M. Okamoto, W. Horton, and M. Wakatani, "Transport processes and entropy production in toroidal plasmas with gyrokinetic electromagnetic turbulence," NIFS Report No. 395 (1996).
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11. W. Horton, T. Tajima, J.Q. Dong, J.-Y. Kim, Y. Kishimoto, and H. Shirai, "Ion transport analysis of a high β_p JT-60U discharge," submitted to Plasma Phys. Control. Fusion.

ATTACHMENT A:
1995-96 JIFT Program

**US-Japan Joint Institute for Fusion Theory
Program for April 1, 1995 to March 31, 1996**

A. 1995-96 Workshops

US to Japan:

- I39** *Current and Shape Control and MHD Phenomena in Toroidal Systems*
Organizers: N. Nakajima (NIFS) and J. Manickam (PPPL)
Nagoya; one week; 5 US delegates—**withdrawn**
Key Persons: T. Sato, N. Nakajima; J. Manickam
- I40** *Interaction of Strong Electromagnetic Waves with Plasmas*
Organizers: K. Mima (ILE) and C. Liu (Maryland)
Osaka; one week; 3 US delegates—**January 22-23, 1996**
Key Persons: T. Sato, K. Mima, C. Liu
- I41** *JIFT Steering Committee Meeting*
Organizers: T. Sato (NIFS) and R. Hazeltine (IFS)
Nagoya; one week; 6 US delegates—**September 11-12, 1995**
Key Persons: T. Sato, R. Hazeltine

Japan to US:

- J38** *Transport Barrier in Turbulent Plasmas*
Organizers: W. Horton (IFS) and M. Wakatani (Kyoto U.)
Austin; one week; 8 Japanese delegates—**January 8-11, 1996**
Key Persons: T. Sato, M. Wakatani, W. Horton
- J39** *Computer Simulations for Electron Dynamics*
Organizers: T. Sato (NIFS) and B. Cohen (LLNL)
Philadelphia; one week; ~6 Japanese delegates—**to be held March 20-21, 1996**
Key Persons: T. Sato, B. Cohen

**US-Japan Joint Institute for Fusion Theory
Program for April 1, 1995 to March 31, 1996**

B. 1995-96 Exchange Visits

From Japan to US:

- JL44** *Kinetic Effects on High-n Ballooning and TAE Modes*
Noriyoshi Nakajima (NIFS), Visiting Professor
IFS; 13 weeks; one person; paid by IFS—**February 1-April 12, 1996**
Key Persons: N. Nakajima, J. Van Dam
- JL45** *Study of Magnetic Structures of Toroidal Plasma*
Masayuki Yokoyama (Kyoto U.), Visiting Scientist
U. Wisc./IFS; 14 weeks; one person; paid by Japan—**August 12-Nov. 11, 1995**
Key Persons: M. Yokoyama, J. Callen
- JL46** *Particle Simulation of Microinstabilities*
Tomohiko Watanabe (NIFS), Visiting Scientist
PPPL/IFS; 13 weeks; one person; paid by Japan—**March 3-17, 1996**
Key Persons: T. Watanabe, W. Lee, J. Van Dam

From US to Japan:

- IL43** *Visiometrics for Plasma Simulations on Massively Parallel Computing Machines*
Norman Zabusky (Rutgers U.), Visiting Professor
NIFS; 14 weeks; one person; paid by Japan—**January 26-April 26, 1996**
Key Persons: T. Sato, N. Zabusky
- IL44** *Plasma Simulations on Parallel Processors*
Timothy Williams (LLNL), Visiting Scientist
NIFS/JAERI; 5 weeks; one person; paid by US—**withdrawn**
Key Persons: T. Sato, T. Williams
- IL45** *Tokamak Energy Confinement Simulations*
William Dorland (IFS), Visiting Scientist
NIFS/Kyoto/JAERI; paid by US—**May 26-28, 1995**
Key Persons: T. Sato, W. Dorland

**US-Japan Joint Institute for Fusion Theory
Program for April 1, 1995 to March 31, 1996**

C. 1995-96 Joint Computational Projects

- JC1** *MHD Stability with Non-Ideal Effects in Tokamaks*
S. Tokuda, S. Kurita, M. Ozeki, and M. Azumi (JAERI)
J. Manickam (PPPL); A. Aydemir (IFS)
1 week; 1 person to US; modified from 1994
- JC2** *Gyrokinetic Transport Simulation*
J. Dawson, V. Decyk, and R. Sydora (UCLA); W. Lee (PPPL)
T. Sato and T. Kamimura (NIFS); H. Naitou (Yamaguchi U.)
2 weeks; 1 person to Japan; continued from 1994
- JC4** *Plasma Rotation, Vortices, and Anomalous Transport*
W. Horton and A. Aydemir (IFS); K. Shaing (ORNL); C. T. Hsu (MIT)
T. Sato and M. Okamoto (NIFS); M. Wakatani (Kyoto U.)
3 weeks; 1 person to Japan; continued from 1994
- JC5** *Numerical Studies of Kinetic Effects on the $m=1$ Modes*
B. Coppi (MIT); W. Park (PPPL); T. Sato and M. Tanaka (NIFS)
2 weeks; 1 person to Japan; continued from 1994
- JC6** *Current Drive in a Torus*
M. Ono, R. White, and C. Cheng (PPPL); V. Chan (GA)
T. Sato, M. Okamoto, and N. Nakajima (NIFS)
3 months; 1 person to Japan; continued from 1994
- JC8** *3-D Codes and Island Formation*
J. Johnson (PPPL); P. Garabedian (NYU); A. Reiman (PPPL); C. Hegna (Wisc.)
J. Todoroki and T. Hayashi (NIFS); M. Wakatani and Y. Nakamura (Kyoto U.)
2 weeks; 1 person to US; continued from 1994
- JC9** *New Simulation Algorithms for Massively Parallel Processing*
J. Dawson and V. Decyk (UCLA)
K. Watanabe, R. Horiuchi, T. Hayashi, M. Tanaka, and T. Sato (NIFS)
S. Ishiguro (Tohoku U.); K. Kusano (Hiroshima U.)
2 weeks; 1 person to US; continued from 1994
- JC10** *Development of Implicit Particle Codes and Their Applications*
J. Brackbill, J. Reynders, and H. Vu (LANL); M. Tanaka and T. Sato (NIFS)
1 weeks; 1 person to US; continued from 1994
- JC12** *Theory-Based Transport Analysis Using Profile Database*
D. Ross (FRC); M. Azumi (JAERI)
2 weeks; 1 person to Japan; continued from 1994

- JC14** *Toroidal Simulation and Plasma Transport Modeling*
M. Lebrun, T. Tajima, and W. Horton (IFS)
Y. Kishimoto, S. Tokuda, and M. Azumi (JAERI)
1 week; 1 person to US; continued from 1994
- JC15** *DOE/Monbuscho Materials Computer Linkage*
F. Garner (PNL), T. Rubia (LLNL)
A. Koyama (Tokyo U.)
1 person; continued from 1994
- JC16** *Atomic and Molecular Processes for Fusion*
D. Schultz (ORNL), R. Clark (LANL), R. More (LLNL)
T. Kato (NIFS), F. Koike (Kitazato U.), K. Sakimoto (ISAS)
2 weeks; 1 person to US; continued from 1994

ATTACHMENT B:
Proposed 1996-97 JIFT Program

**US-Japan Joint Institute for Fusion Theory
Proposals for April 1, 1996—March 31, 1997 Program**

A. 1996-97 Workshops

US to Japan:

Plasma Turbulence and Transport in Toroidal Systems

Organizers: M. Wakatani (Kyoto) and B. Carreras (ORNL)

Interactions of High Power Waves with Plasma and Matter

K. Mima (ILE) and T. Tajima (IFS)

Japan to US:

Large Scale Simulation Study and Visualization

S. Parker (PPPL) and R. Horiuchi (NIFS)

Advanced Confinement Concept and Theory

A. Boozer (Columbia U.) and M. Okamoto (NIFS)

JIFT Steering Committee Meeting

T. Sato (NIFS) and R. Hazeltine (IFS)

**US-Japan Joint Institute for Fusion Theory
Proposals for April 1, 1996—March 31, 1997 Program**

B. 1996-97 Exchange Scientists

US to Japan:

3-D MHD Equilibrium in Tori

D. Monticello (PPPL): Visiting Professor, to NIFS
13 weeks, paid by Japan

Island Formation and Plasma Transport

C. Hegna (Wisconsin): Visiting Scientist, to NIFS

Energy Confinement Simulation for Toroidal Plasmas

W. Dorland (IFS): Visiting Scientist, to NIFS, Kyoto, JAERI

Particle Code Simulation and Parallelization

J. Reynders (LANL): Visiting Scientist, to NIFS, JAERI

Effects of Error Fields on the Plasma Confinement

R. Fitzpatrick (IFS): Visiting Scientist, to NIFS, Kyoto, JAERI

Japan to US:

Theory and Simulation of Nonlinear Plasma Waves

Yukiharu Ohsawa (Nagoya): Visiting Professor, to IFS
10 weeks, paid by IFS

Nonlinear Simulation Study of the TAE Mode

Yasushi Todo (NIFS): Visiting Scientist, to IFS and PPPL

Study of Nonlinear Pressure-Driven Modes

Arimichi Takayama (Kyoto): Visiting Scientist, to UC Irvine

Potential Formation in an Open Field

Kunihiro Sato (Himeji Inst. Technology): Visiting Scientist, to MIT

Electron Acceleration by Ion Acoustic Double Layer

Hisanori Takamaru (NIFS): Visiting Scientist, to UCLA

Simulation Study of Neoclassical Transport in the Edge Plasma

Sadayoshi Murakami (NIFS): Visiting Scientist, to IFS and PPPL [pending]

**US-Japan Joint Institute for Fusion Theory
Proposals for April 1, 1996—March 31, 1997 Program**

C. 1996-97 Joint Computational Projects

- JC1** *MHD Stability in Advanced Tokamaks*
T. Ozeki, S. Tokuda, Y. Ishii, & M. Azumi (JAERI); J. Manickam (PPPL)—continued from 1995-96, but combines previous JC1 and JC20
- JC2** *Gyrokinetic Transport Simulation*
J. Dawson, V. Decyk, & R. Sydora (UCLA); W. Lee (PPPL); T. Sato & T. Kamimura (NIFS); H. Naitou (Yamaguchi)—continued from 1995-96
- JC4** *Plasma Rotation, Vortices, and Anomalous Transport*
W. Horton, A. Aydemir, R. Hazeltine, & K. Shaing (IFS); M. Okamoto & N. Nakajima (NIFS); M. Wakatani (Kyoto)—continued from 1995-96
- JC6** *Current Drive in Toroidal Systems*
M. Ono and W. Tang (PPPL); V. Chan (GA); T. Sato, M. Okamoto, & N. Nakajima (NIFS)—continued from 1995-96
- JC8** *3-D Codes and Island Formation*
J. Johnson (PPPL); P. Garabedian (NYU); C. Hegna (Wisconsin); T. Hayashi (NIFS); M. Wakatani & Y. Nakamura (Kyoto U.)—continued from 1995-96
- JC9** *New Simulation Algorithms for Massively Parallel Processing*
J. Dawson & V. Decyk (UCLA); W. Tang (PPPL); K. Watanabe, R. Horiuchi, & T. Sato (NIFS)—continued from 1995-96
- JC14** *Toroidal Simulations and Plasma Transport Modeling*
T. Tajima & W. Horton (IFS); Y. Kishimoto, S. Tokuda, & M. Azumi (JAERI)—continued from 1995-96
- JC15** *Atomic and Molecular Processes for Fusion*
T. Kato (NIFS); F. Koike (Kitazato); K. Sakimoto (Space Laboratory); D. Schultz (ORNL); R. More (LLNL); R. Clark (LANL)—continued from 1995-96
- JC19** *Numerical Study of High Energy Particle Effect on MHD Stability*
M. Azumi & T. Ozeki (JAERI); C. Z. Cheng (PPPL)—continued from 1995-96
- New** *Turbulent Transport Applications to Tokamaks and Helical Systems*
M. Wakatani & Y. Nakamura (Kyoto); H. Sugama (NIFS); B. Carreras (ORNL); W. Horton (IFS)
- New** *Tokamak Fluid Simulation on Massively Parallel Computers*
M. Azumi, G. Kurita, S. Tokuda, & Y. Ishii (JAERI); B. Carreras, D. Spong, J. Leboeuf, & V. Lynch (ORNL)