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 2019-2020

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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, 2019–March 31, 2020

JIFT Steering Committee

Co-Chairmen: H. Sugama and F. L. Waelbroeck

Co-Executive Secretaries: S. Ishiguro and A. Arefiev

February 3, 2020

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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 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), six exchange scientists (three from each country). So far, during its 38 years of successful operation, JIFT has sponsored 245 long-term visits by exchange scientists and 138 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 one to several weeks in duration, whereas the Visiting Professors normally stay for one month.

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 (2019-2020 PROGRAM)*

Most of the activities in the two categories—workshops and personal exchanges—that had been scheduled for the 2019-2020 JIFT program were carried out during the past year. Three workshops were successfully held, in addition to the JIFT Steering Committee meeting. In the category of personal exchanges, two Visiting Professor and eight Visiting Scientists made exchange visits.

Summary reports about JIFT activities for 2019-2020 are given below.

A 2019-2020 Workshops

Japan to US:

JF-1 Progress on advanced optimization concept and modeling in stellarator-heliotrons
Organizers: D. Anderson (Wisconsin) & S. Murakami (Kyoto)
Location: Madison, WI (USA)
Dates: June 19-21, 2019
Summary:

The US and Japan are continuing their consideration of advanced configuration optimizations and new devices. The purpose of this workshop was to promote the activities on the configuration optimization and modeling in stellarator and heliotrons. This workshop was the second JIFT workshop on optimization concept and modeling in stellarator-heliotrons and will continue to support the activities of the related community in the US and Japan. 28 participants attended this workshop, and there were 19 oral presentations (11 from the US, 8 from Japan). The presentations covered a wide range of subjects related to configuration optimization and modeling in stellarator-heliotrons, such as recent experiment results (for example, control of energetic particle instabilities by ECCD), next-step programs and new devices under construction, optimization of plasma edge, turbulent transport optimization, and energetic particle confinement optimization, and discussions on the interactions with the Simons "Hidden Symmetries" program.

US to Japan:

JF-8 US-Japan collaborations on co- designs of fusion simulations for extreme scale computing
Organizers: Masanori Nunami (NIFS) and C. S. Chang (PPPL)
Location: RIKEN R-CCS, Kobe, Japan
Dates: October 28-29, 2019
Summary:

The purpose of this workshop was to promote US-Japan collaborations on co-design of fusion applications and simulations of core and edge plasma physics towards extreme scale computing. Through the collaboration, we shared not only the state of the numerical researches for fusion science, but also the latest technology of the high performance computing, and we discussed the path to the next flagship computers of the US and Japan. This was the fifth in the series of JIFT workshops on the collaboration. The workshop was attended by 26 participants, and there were 25 oral presentations (12 from the US, 13 from Japan) that are covered a wide range of fusion plasma simulations and the high performance computing which include exa-scale fusion simulation codes, data management, GPU computing, machine learning, and new algorithms.
The agenda can be obtained from the workshop web site (https://workshop.nifs.ac.jp/JIFT2019/index.php).

JF-9 US-Japan Workshop on Theory and Simulations of High Energy Density Physics with Extreme Fields
Organizers: Yasuhiko Sentoku (ILE,Osaka U) and Alexey Arefiev (UCSD)
Location: Nakanoshima center, Osaka, Japan
Dates: Sep. 21 - 22, 2019
Summary:

This is a two day US-Japan workshop focused on theory and simulations of high energy density phenomena in laser-plasma interactions. Our focus is on interactions at relativistic and near-relativistic intensities that require a kinetic description. The goal is to highlight new developments and ideas associated with multi-ps beams, pulse shaping, externally driven magnetic fields, plasma generated strong magnetic fields, and photon emission. The priority is to bring together researchers from the US and Japan and to enable an exchange of ideas in an informal setting without significant time constraints. The workshop consisted of oral presentations and a considerable amount of time was allocated for follow-up discussions. This year we had 20 participants (Japan 15, US 5), and we had fruitful discussions on the above topics.

The workshop website is in the following link:
https://cer.ucsd.edu/_news-events-articles/2019/US-Japan-workshop-2019.html

B. 2019-2020 Exchange Visits

Japan to US:

JF-2 Ignition and burn dynamics of magnetized fast ignition laser fusion
Visiting Scientist: Tomoyuki JOHZAKI (Hiroshima University)
Location: CMUXE, Purdue University, West Lafayette, Indiana

Dates: Feb. 27-Mar. 13, 2020 (16 days); paid by Japan
Summary:

Dr. Johzaki has been collaborating for a number of years with Prof. A.Sunahara at Center for Materials Under eXtreme Environment (CMUXE), Purdue University on the simulation study for implosion and fusion burning related to the fast ignition laser fusion. Dr. Johzaki has developed hybrid-type code "FIBMET" for calculating core heating and fusion burning of fast ignition laser fusion. In this code, laser-produced electron and ion beams are treated by particle model, bulk plasma is treated by radiation-hydro model and fusion-produced alpha-particle is treated by multi-group transport model. Prof. Sunahara has developed radiation-hydro code "STAR-1D and -2D" for fuel implosion process. This code includes laser heating by ray-tracing method and detailed atomic data (EOS and radiation Opacity tables). Using both codes, we evaluated core heating properties and proposed the fast electron beam guiding scheme using external magnetic field and self-generated magnetic field for enhancing core heating efficiency.

The present collaboration program just started in previous fiscal year (2018). The purpose of the program is to integrate the two codes for simulating the whole process from implosion to fusion burning excepting heating beam generation. (The generation of heating beam is calculated by PIC code since the kinetic effect should be considered.) In previous fiscal year, we have implemented fusion burning and simple external heating model in STAR-2d code to calculate the process from implosion to fusion burning and evaluate the ignition condition of fast ignition laser fusion.

In this fiscal year, for evaluating the details of core heating properties, we have implemented the external beam transport routine based on the particle method and the related electromagnetic field routine based on the resistive model. During the exchange program period, we have done the following code development:

(1) external beam (relativistic electron beam, non-relativistic ion beam) transport by particle model has been implemented for calculating core heating process. Related to this, the module for calculation of temporal and spatial evolution of resistive fields has been also installed.

After above implementation of beam transport and field calculation routines, the core heating properties by relativistic electron beam has been checked by comparing the obtained results with those obtained by the other hybrid code (FIBMET). The heating properties well agree between the two codes. As examples, the temporal evolution of spatially-integrated heating power and the spatial profile of ion temperature of heated core are shown in Figs.1 and 2. The difference in ion temperature spatial profile due to the filamentation of electron beam may be caused by the difference in EOS table used in the two code. As for the computational features, the 4 times longer CPU time were used for STAR2D code than that for FIBMET. Checking the bottle neck and modification to speed up are indispensable.

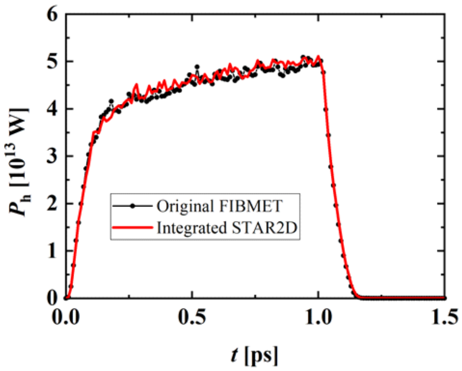

Fig.1 Comparison of temporal evolution of heating power P_d [W] between original FIBMET (black curve with marks) and integrated STAR2D (red curve).

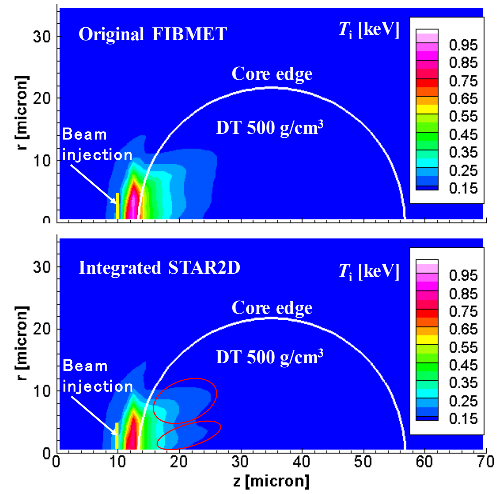

Fig.2 comparison of ion temperature spatial profiles at 2 ps after start of beam injection between original FIBMET (upper) and integrated STAR2D (lower).

JF-3 Asymmetric Implosion of Cone-guided Solid Targets

Visiting Scientist: H. Sakagami (NIFS)
Location: University of Nevada, Reno,
Dates: February 23 - March 7, 2020 (14 days); paid by Japan
Summary:

The implosion of a cone-guided target is essentially asymmetric and has non-uniformity due to the beam irradiation pattern or imbalance of each beam energy. Prof. Sawada, who is the host for this visit to University of Nevada, Reno, is a specialist in implosion measurements by X-ray radiography [1], and has been analyzing fast ignition experiments using cone-guided targets using OMEGA laser facility at the University of Rochester. Therefore, effects of the asymmetric/non-uniformity implosion are investigated by full 3D fluid simulations, and the simulation results are compared with the experimental results.

In the implosion of the cone-guided target in OMEGA, six of the 60 beams are not used and 54 beams are irradiated in order to avoid laser irradiation to the cone. First, three-dimensional non-uniform implosion simulations are performed for 60- and 54-beam irradiation systems using a spherically symmetrical target without the cone, and differences are investigated. The simulation results reproduce the experimentally obtained differences in the core shape between the experimentally obtained implosions with and without the cone, and it is found that these differences strongly depend on the number of beams in the irradiation system, not on the presence or absence of the cone. Next, three-dimensional asymmetric implosion simulations are performed for the presence or absence of the cone in 60-beam uniform irradiation system. It is found that the difference between implosions with and without the cone is small in simulations, and it cannot explain the difference in the X-ray image for self-emission shapes obtained in experiments. Therefore, it is found that the difference in the experiment is not caused by the difference in fluid motions due to the presence or absence of the cone, but the radiation from the cone is likely to have a significant effect.

Related publications:

[1] H Sawada, et al., *Flash Kα radiography of laser-driven solid sphere compression for fast ignition*, Applied Physics Letters **25**, 254101 (2016).

JF-4 Electromagnetic turbulence in fusion plasmas

Visiting Scientist: Akihiro Ishizawa (Kyoto Univ.)

Location: IFS, University of Texas at Austin
Dates: Mar. 8-22, 2020, paid by IFS
This visit was postponed to 2020-2021.

JF-5 Introduction of non-uniform dissipation to a quasi-monochromatic ray tracing
Visiting Scientist: Kota Yanagihara (Nagoya Univ.)
Location: Princeton Plasma Physics Laboratory, Princeton, New Jersey
Dates: May 17 - June 30, 2019 (45 days); paid by Japan
Summary:

This US-Japan collaboration project to develop a new quasi optical ray tracing code began in June, 2017, by inviting Dr. Dodin at PPPL to NIFS in the frame of JIFT program. Dr. Dodin and his Ph.D. student, Ruiz developed the new theory, eXtended Geometrical Optics (XGO), which is useful for the modeling of electron cyclotron waves (ECWs) in Large Helical Device (LHD). Dr. Kubo at NIFS and his Ph.D. student, Yanagihara, who are Japanese-side person in this project, successfully developed the new quasi optical ray tracing code based on their XGO theory in early 2019. The newly developed code named PARADE can simulate the quasi optical propagation of wave beams with an arbitrary beam profiles in inhomogeneous anisotropic media, accounting for refraction, diffraction, mode-conversion, and dissipation simultaneously, in reasonable computational resources, and is applied into LHD ECRH experiment analysis. The purpose of visiting of Yanagihara to PPPL in this time is next step of the project, which is increase of the dissipation modeling. If resonance structure in a plasma is inhomogeneous, wave beams are supposed to dissipate non-uniformly in beam cross-section and those power profiles should be diffused inhomogeneously due to the diffraction. Although such situation is not unique in many typical fusion devices, most of quasi optical codes in the world can not consider this inhomogeneity, which affect to not only the absorption but propagation of ECW. In this visiting, we upgraded our PARADE code so as to consider the inhomogeneity of dissipation. Wave beam passing through the inhomogeneous resonance structure, which is non-uniformly dissipated and additionally bended due to the diffraction, is obtained as one of the test simulation result of upgraded PARADE code.

Related publications:
[1] I. Y. Dodin, D. E. Ruiz, K. Yanagihara, Y. Zhou, and S. Kubo, *Quasioptical modeling of wave beams with and without mode conversion: I. Basic theory*, *Phys. of Plasmas* **26**, 072110 (2019).
[2] K. Yanagihara, I. Y. Dodin, and S. Kubo, *Quasioptical modeling of wave beams with and without mode conversion: II. Numerical simulations of single-mode beams*, *Phys. of Plasmas* **26**, 072111 (2019).
[3] K. Yanagihara, I. Y. Dodin, and S. Kubo, *Quasioptical modeling of wave beams with and without mode conversion: III. Numerical simulations of mode-converting beams*, *Phys. of Plasmas* **26**, 072112 (2019).
[4] K. Yanagihara, S. Kubo, T. I. Tsujimura, and I. Y. Dodin, *Mode purity of electron cyclotron waves after their passage through the peripheral plasma in the Large Helical Device*, *Plasma Fusion Res.* **14**, 3403103 (2019).

JF-6 Simulation Study of Magnetized Fast Ignition Fusion
Visiting Scientist: Toshihiro Taguchi (Setsunan University)
Location: Institute for Research in Electronics and Applied Physics, University of Maryland, College Park, College Park, Maryland
Dates: August 11-September 1, 2019 (22 days); paid by Japan
Summary:

The visiting scientist (Taguchi) has been collaborating for more than a decade with Prof. T. M. Antonsen, Jr. in the University of Maryland on the theoretical and simulation research on strong laser-plasma interaction, which is directly related to the laser fusion scheme. One of recent interesting topics is a magnetized fast ignition, which uses a kilo-tesla class magnetic field produced by an ultra-high intensity laser-plasma interaction as an electron beam guiding in a high density region.

In his JIFT research of this year, he and Prof. Antonsen worked about a competition of a resistive and non-resistive Weibel instability under a strong magnetic field. The Weibel instability is a

transverse two-stream instability for the counter stream of the beam electrons and the background electrons. They carried out many simulation runs using a hybrid code, which includes a collisional term in an equation of motion of the background plasma.
One of the interesting results is that the growth rates of the resistive Weibel instability are larger than of the non-resistive one. In order to obtain the physical interpretation of the enhancement of the Weibel instability by the resistive effect, they solved a dispersion relation derived from the fluid model for the counter streaming two kinds of electrons and found that the solutions of the equation agree well with the simulation results obtained by their hybrid code. They also made a simple theoretical model of the dispersion relation. As a result, it is found that the origin of the enhancement comes from the weakened longitudinal response of the background electrons due to the effect of collisions. For a given longitudinal current density and perturbed magnetic field, reducing the longitudinal response of the background electron results in an increase in longitudinal electric field. Then the electric field makes the growth of magnetic field faster through Faraday's law. The magnetic field deflects the beam electrons causing an increase in the transversely varying current density. This enhances the basic Weibel mechanism.
Related Talk:
[1] T. Taguchi, T. M. Antonsen, Jr., Kunioki Mima, "Electron Beam Propagation and Magnetic Structure Formation in a Strongly Magnetized, Collisional Plasma",

JF-7 Gyrokineitc Particle-in-cell code development for edge plasma dynamics in Large Helical Device
Visiting Scientist: Toseo Moritaka (NIFS)
Location: Princeton Plasma Physics Laboratory
Dates: September 29 - October 26, 2019 (27 days); paid by Japan
Summary:

This exchange activity was Japan pending as a US-Japan fusion program from September 29 to October 26, 2019. In collaboration with X-point Gyrokinetic Code (XGC) group in Princeton Plasma Physics Laboratory (PPPL), Dr. Moritaka has been developing a gyro-kinetic particle-in-cell simulation code for whole-volume modeling of stellarators. So far, we have successfully calculated the particle motion and generated unstructured meshes using numerical field line tracing in extended VMEC equilibrium with the edge region. One important remaining issue is to solve the gyro-kinetic Poisson equation to obtain a self-consistent electrostatic field on the unstructured mesh. First, for the benchmark, we apply the finite-element Poisson solver to two unstructured meshes generated for ITER. One is that employed in the standard version of XGC for Tokamaks. The other is constructed by field line tracing, as in the stellarator edge region. We obtained similar electric field profiles for these two meshes. Second, we developed a new Poisson solver for non-axisymmetric configurations. This scheme takes all combinations among flux-averaged / perturbed components of charge density and electrostatic potential into account to apply general magnetic field configuration. We need to process the finite element solver only a few times during a time step cycle by using a data table of the solutions for flux-average (or field line average) component of charge density. This new scheme would enable us to obtain accurate electrostatic fields in stellarators at a reasonable numerical cost. This scheme has been implemented to the stellarator version of XGC and used for global analyses of ion temperature gradient mode in Large Helical Device.

Related publications:
[1] "Development of a Gyrokinetic Particle-in-Cell Code for Whole-Volume Modeling of Stellarators", Toseo Moritaka, Robert Hager, Michael Cole, Samuel Lazerson, Choong-Seock Chang, Seung-Hoe Ku, Seikichi Matsuoka, Shinsuke Satake, Seiji Ishiguro, Plasma, vol 2, 179 (2019).

US to Japan:

JF-10 Nonlinear MHD effects on energetic particle driven instabilities
Visiting Scientist: Boris Breizman (IFS) (U. TEXAS)

Location: NIFS
Dates: September 11-19, 2019
Summary:

Dr. Breizman visited NIFS from after attending the 16th IAEA Technical Meeting on Energetic Particles in Magnetic Confinement Systems and Theory of Plasma Instabilities in Shizuoka (9/3/19 to 9/6/19) and 23rd ITPA Topical Group Meeting on Energetic Particles at Naka Fusion Institute (9/9/19 to 9/11/19). He discussed two research activities of mutual interest with Dr. Todo and his collaborators: (1) - nonlinear modeling of continuum absorption for energetic particle modes, and (2) - reduced modeling of the long-range frequency chirping as slowly evolving wave-particle resonances.

JF-11 Simulations of energetic particle driven instabilities in toroidal plasmas
Visiting Scientist: D.A. Spong (ORNL)
Location: Shizuoka and Naka, Japan
Dates: September 3 - 11, 2019
Summary:

During this period Dr. Spong attended the 16th IAEA Technical Meeting on Energetic Particle Physics in Shizuoka, Japan and the 23rd ITPA-EP Meeting in Naka, Japan. During this time he made presentations on long time-scale nonlinear gyrofluid modeling of energetic particle driven Alfven instabilities with zonal flows/currents and on stability surveys of low frequency Alfven modes (BAE/BAAE) in the acoustic frequency range. He had detailed discussions with scientists from both the National Institute for Fusion Science and the Naka Fusion Institute on these topics and planned future collaborative code benchmarking activities related to this work.

JF-12 High energy and well-collimated ion beam generation by laser-driven magnetized electron sheath acceleration
Visiting Scientist: A. Arefiev (UCSD)
Location: Osaka University
Dates: September 20-26, 2019
Summary:

Prof. Arefiev visited Osaka to present results of two different projects that are of direct interest to ILE scientists: electron heating in multi-ps laser-plasma interactions and laser-driven ion acceleration in an applied kT-level magnetic field. Prof. Arefiev met with Prof. Fujioka and his group to discuss the results of their joint experimental work at LFEX/GEKKO-XII laser facility aimed at observing laser-driven acceleration with an applied magnetic field. Prof. Arefiev also met with Prof. M.Murakami to continue their collaboration on a project focused on micro-bubble implosions in laser-irradiated targets.

JF-13 Code development for studying MHD equilibrium with dynamically evolved equilibrium profiles
Visiting Scientist: L. Zheng (IFS) (U. TEXAS)
Location: NIFS
Dates: Sept. 30-Oct. 4, 2019
Summary:

Dr. Zheng visited NIFS between Sept. 30-Oct. 4 and collaborated with Professor Miura on the nonlinear extended MHD simulations for a study of transport phenomena at edge-plasma. The extended MHD model with Hall and FLR terms are carried out for studying a growth of the Current Interchange Tearing Modes (CITM) interacting with turbulent drift flow at edge-plasma and SOL. This is a continuation of our earlier collaboration [Hideaki Miura, Linjin Zheng, and Wendell Horton, "Numerical simulations of interchange/tearing instabilities in 2D slab with a numerical model for edge plasma", Physics of Plasmas 24, 092111 (2017)].

JF-14 Extended MHD models for magnetically confined plasmas
Visiting Scientist: L.E. Sugiyama (MIT)
Location: NIFS
Dates: May 13 - July 26, 2019
Summary:

Dr. Sugiyama was the senior NIFS Visiting Professor at NIFS for approximately two months, to collaborate with Dr. Yasushi Todo and other scientists at NIFS and other Japanese institutions on nonlinear 3D MHD and extended MHD models and applications to instabilities in axisymmetric and helical plasmas. She discussed quasi-interchange instabilities for low magnetic shear tokamaks and their relation to resistive interchanges in helical plasmas and other helical effects.

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 a research scientist at the Institute for Fusion Studies (IFS) of The University of Texas at Austin. The Japanese co-chairman is the Leader of the Numerical Simulation Reactor Research Project at the National Institute for Fusion Science, and the Japanese co-executive secretary is the director of the Fundamental Physics Simulation Research Division in the Department of Helical Plasma Research at the National Institute for Fusion Science. Furthermore, on the Japanese side there is an Advisory Committee comprised of five members representing a spectrum of Japanese universities and the National Institutes for Quantum and Radiological Science and Technology; and on the US side there is an Advisory Committee comprised of five 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*
F. Waelbroeck (IFS)—Co-Chairman	H. Sugama (NIFS)—Co-Chairman
A. Arefiev (UCSD)—Co-Exec. Secretary	S. Ishiguro (NIFS)—Co-Exec. Secretary
D. Spong (ORNL)	S. Murakami (Kyoto)
J. Mandrekas (DOE)	Y. Sentoku (Osaka)

JIFT Advisors

Japanese Advisory Committee: Y. Todo (NIFS), Y. Kishimoto (Kyoto), Z. Yoshida (Tokyo), T.-H. Watanabe (Nagoya), M. Yagi (QST)

US Advisory Committee: J. Palastro (LLE/Univ. of Rochester), F. Graziani (LLNL), C. S. Chang (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.

4. *PLANS FOR FUTURE ACTIVITIES (PROPOSED 2020-2021 PROGRAM)*

The topics and themes of the exchange activities that have been proposed for the next year (April 1, 2019–March 31, 2020) 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 (2019-2020) is listed below.

A. 2020-2021 Proposed Workshops

Japan to US:

JF-1 US-Japan collaborations on co-designs of fusion simulations for extreme scale computing
Organizers: C.S. Chang (PPPL) and M. Nunami (NIFS)
Proposed Place/Time: Aug. 2020 at PPPL (US)

JF-2 Theory and simulation on the high field and high energy density physics
Organizers: Alexey Arefiev (UCSD) and Y. Sentoku (Osaka)
Proposed Place/Time: Nov. 2020 at Memphis (US)

US to Japan:

JF-8 Progress on advanced optimization concept and modeling in stellarator-heliotrons
Organizers: S. Murakami (Kyoto) and D. Anderson (Univ. Wisconsin)
Proposed Place/Time: Sep. 2020 at Kyoto (Japan)

B. 2020-2021 Proposed Exchange Visits

Japan to US:

JF-3 Optimization study of heliotron configurations
Visiting Scientist: H. Yamaguchi (NIFS)
Location: Univ. Wisconsin
Dates: July 2020

JF-4 Ignition and burn dynamics of magnetized fast ignition laser fusion
Visiting Scientist: T. Johzaki (Hiroshima Univ)
Location: Purdue Univ
Dates: Sep. 2020

JF-5 Integrated transport simulation of HSX plasma
Visiting Scientist: Y. Morishita (Kyoto)
Location: Univ. Wisconsin
Dates: Sep. 2020

JF-6 Simulation study of interchange mode dynamics
Visiting Scientist: K. Ichiguchi (NIFS)
Location: MIT, Boston
Dates: Oct. 2020

JF-7 Theoretical study related to two-fluid equilibria
Visiting Scientist: A. Ito (NIFS); visiting researcher in IFS
Location: IFS-Univ. Texas, Austin, Paid by IFS
Dates: Jan. 2021

Electromagnetic turbulence in fusion plasmas
Visiting Scientist: Akihiro Ishizawa (Kyoto Univ.)
Location: IFS, University of Texas at Austin
Dates: 2020-2021, paid by IFS

This visit was postponed from 2019-2020.

US to Japan:

JF-9 Theoretical model of WDM regime driven by intense laser
Visiting Scientist: F. Graziani (LLNL)
Location: Y. Sentoku (ILE)
Dates: May 2020

JF-10 Properties of high-energy-density material
Visiting Scientist: T. Ogitsu (LLNL)
Location: Fujioka (ILE)
Dates: June 2020

JF-11 Isochoric heating by fast ion beam driven by intense laser light
Visiting Scientist: A. Pak (LLNL)
Location: Morace (ILE)
Dates: July 2020

JF-12 Novel setups for laser-plasma interactions involving structured targets and applied magnetic fields
Visiting Scientist: A. Arefiev (UCSD)
Location: Y. Sentoku (ILE)
Dates: July 2020

JF-13 Long time simulations of energetic particle driven instabilities
Visiting Scientist: D.A. Spong (ORNL)
Location: Y. Todo (NIFS)
Dates: July 2020

JF-14 Kinetic-MHD hybrid simulations of energetic-particle driven instabilities
Visiting Scientist: Chang Liu (PPPL); recommended as a candidate for a visiting researcher in NIFS
Location: Y. Todo (NIFS) (paid by NIFS)
Dates: Aug. 2020