YEAR 2023
Master and Doctor Courses

Explanatory Leaflet

(April 1, 2022) revised on May 26

東京大学
THE UNIVERSITY OF TOKYO

The latest information is available online.
http://www.ae.k.u-tokyo.ac.jp/admission/

Graduate School of Frontier Sciences

Department of Advanced Energy

Nuclear Fusion Research Education Program

新しい領域の科学技術を創造する意欲を持った
皆さんの挑戦に期待しています

Examination date and time

Master course
August 23 (Tue)，August 24 (Wed)，August 29 (Mon), 2022
Doctor course
August 23 (Tue)，August 24 (Wed)，August 25 (Thu), 2022

Guidance (Online, Pre-registration needed)

April 16 (Sat) 13:00-15:00, 2022
May 11 (Wed) 17:00-19:00, 2022
May 28 (Sat) 13:00-15:00, 2022
https://www.ae.k.u-tokyo.ac.jp/admission/

Contact

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Kiban Bldg. 1F
The University of Tokyo, Graduate school of Frontier Sciences, Student Affairs Team
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Homepage

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* This document is a translation of necessary part of the Japanese version. In the event that any question should arise about this version, the Japanese version is the authoritative version

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Department of Advanced Energy

[1] Preface

ENERGY is the word to describe the potential for work to be done. Any creatures, communities, systems cannot continue to exist without their own mechanism for production, absorption, conversion, transmission and utilization of energy. The mission of the Department of Advanced Energy is to do the educational and research activities on energy-related issues from a wide view point of advanced modern physics, materials, instrumentation, control, system engineering, environmental science and so on. The followings are fields in which we are going to play a leading role:

- Plasma Physics and its Applications,
- High Enthalpy (High Speed and High Temperature) Flow Physics and its Application,
- Structures and Materials for Extremely Severe Environment,
- Energy Production, Conversion and Utilization in Space,
- Advanced Electromagnetic Energy Engineering, Superconductivity Technology,
- High Efficiency Energy Conversion Technology,
- Systems Analysis for Energy Issues.

We are aiming to make a contribution to human prosperity through Advanced Energy, gathering and synthesizing knowledge and technologies that have been studied separately in each academic field. The Department of Advanced Energy will do its best to extend the envelope of existing education & research fields in Energy Technology and Science and to be a pioneer in a new innovative area.

[2] Laboratories

Fusion Science

Fusion Energy Engineering Laboratory

We are aiming to colligate causal chains circulating in ultra-high-temperature fusion plasmas by means of science and technology

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We are proceeding with research based upon magnetic confinement experiments of fusion plasmas. It's not hard to imagine energy issues becoming serious more and more in this century than before. Fusion energy has potential to be a game changer resolving their root cause. Since ultra-high temperature exceeding 100 million degrees Celsius is required to make fusion happen, hydrogen fuels become ionized gas called "plasma". This plasma is an extreme complex system although it's not really like life. The same is also true of the engineering system, meaning a fusion reactor. We mankind have already got plasmas beyond 100 million degrees Celsius, but we still have to pursue deep physical understanding (perspective) and control technology in extreme environments (operation) towards realization of fusion energy. For those, we are tackling development of physical models to predict plasma behavior filled with nonlinearity and research of system dynamics such as fuel cycle control. Here, we make a full use of joint open use facilities such as Large Helical Device (Toki, Gifu).

Plasma and Fusion Engineering

Electromagnetic Energy System Laboratory

Merging plasma? We are creating a low-cost and compact artificial sun together with international COEs

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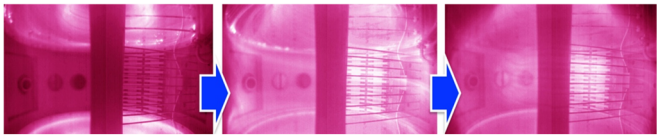
Since the international thermonuclear fusion reactor (ITER) will start within a few years, the next important target for this ultimate energy source is to realize the cost-effective fusion reactor within a order of 10-20 years. Especially, we developed the merging formation/heating of spherical tokamak plasmas (STs) - compact donut-shaped magnetic confinement to increase their plasma beta: plasma thermal pressure/magnetic energy ~ output energy/reactor cost from 5% (ITER) to 50% (TS-6 ST merging device of Univ. Tokyo). The ST merging/reconnection was found to transform the magnetic energy of merging STs into their plasma thermal energy, heating the plasma effectively and economically over 100 million degree - the target temperate for fusion reactors like a solar flare. This idea was first developed in our laboratory and is now used in ST-40 ST experiment of UK, startup company of fusion reactor. Based on our UK-Japan collaboration, ST-40 realizes 23 million degree in 2019 and 80 million degree in 2021. We hope all of our graduate students to develop their own ideas for our experiments and plasma diagnostics and finally that for economical through experience in our UK-Japan and US-Japan collaboration/summer schools.



Applied Superconductivity, Electrical Machinery and Equipment for Energy Technology

Electromagnetic Energy System Laboratory

Research on high-performance electrical machinery and equipment based on applied superconductivity and advanced electromagnetic phenomena

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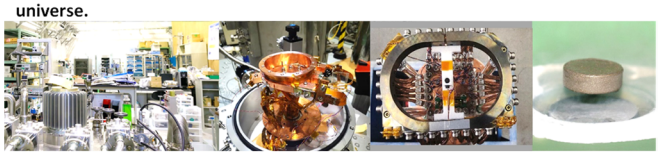
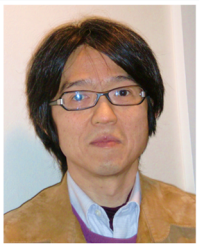
We are conducting research on electrical energy equipment and systems with excellent characteristics with the aim of efficiently using electrical energy and realizing advanced electromagnetic field application systems. In particular, high-temperature superconducting technology is considered to be one of the innovative technologies for aiming for carbon neutrality in 2050 and is expected to be combined with hydrogen utilization. Therefore, we are conducting research on electrified propulsion aircraft, energy conversion equipment that promotes the use of renewable energy such as wind power, low-loss power transmission cables, fault current limiters, and equipment design using advanced materials such as superconductors. Based on science and technology such as electromagnetism, electrical machinery and equipment, applied superconductivity, and power electronics, we are conducting research by making full use of experiments, theoretical analysis and numerical simulations. Research targets range from the electric power field to transportation, industrial applications, and the development of equipment for leading-edge scientific research that explores the origin of the universe.



Fluid Dynamics General, Atmospheric Entry, Hypersonic Flight, Deep Space Exploration



Applied Transdisciplinary Design Laboratory

Pursue our research interest in fluid dynamics, space exploration, and shape of object in flow

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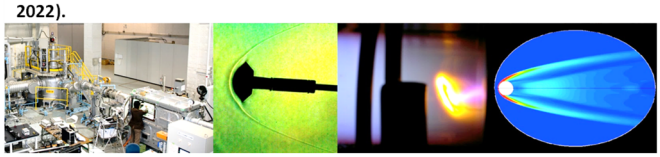
Our research interest spreads over general fluid dynamics and its application to the aerospace engineering and deep space exploration. We are challenging various problems on the aerodynamics from low speed to super/hypersonic speeds, rarefied gas dynamics, granular flow (ex. crater formation) and so on, combining the theoretical, numerical (CFD), and experimental approaches. The hypersonic high-enthalpy wind tunnel in Kashiwa campus is a powerful tool for our studies. In addition, the flight experiment program of the deployable membrane aeroshell for the atmospheric entry is ongoing as a joint project of the laboratories in universities and JAXA/ISAS. A large membrane aeroshell enables us to decelerate a spacecraft efficiently even in thin atmosphere (like Mars), and innovative space transportation system and landing probes for planetary exploration are expected under significantly relaxed aerodynamic heating environment. We are seeking a new paradigm of network-type planetary exploration by a flock of nano-landers distributed over the planetary surface beyond the nano-satellite flight experiments of EGG (4kg, 2017 Jan.-May), and its successor BEAK (ready to go to space in 2022).



Fracture Dynamics of Solid Materials, Impact Engineering

Energy Conversion System Laboratory

We are investigating safe disintegration of solid materials

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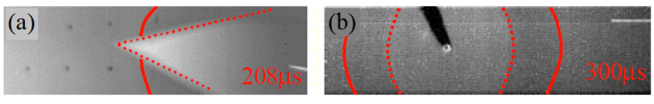
Our laboratory is trying to deepen our essential understanding of the dynamic behavior of solid materials, with a special emphasis on revealing the fundamental physics associated with dynamic fracture. We treat not only fracture dynamics of homogeneous materials, which is relatively easy to analyze, but also complicated dynamic interaction of waves and cracks in inhomogeneous materials with interfaces, etc. Furthermore, we study the influence of dynamic fracture phenomena on the earth and space environments. Using high-speed digital video cameras, we observe dynamic phenomena that cannot be traced with naked eyes and analyze these phenomena at spatiotemporally largely different scales, together with various institutions worldwide.



Plasma Application

Electromagnetic Energy System Laboratory

Application and fundamental researches of plasma used for environment, biomedicine, aerospace, and energy

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Plasma is used for various applications that use the strong chemical reactivity of the plasma. For example, it is used for environmental technologies (gaseous pollution control, water treatment), energy technologies (plasma assisted combustion, ignition, fuel synthesis), material processing (semiconductor processing, thin film synthesis, surface treatment), aerospace technologies, and biomedical applications (gene transfer, cancer treatment). We work on fundamental research to elucidate the reactions in the plasma using laser spectroscopy and simulations and develop some applications of the plasma. In the plasma, electrons accelerated by electric field collide with gaseous molecules such as O_2 and H_2O to cause ionization, dissociation, excitation, and attachment. The resulting neutral reactive species including O atoms and OH molecules are called radicals, which make the plasma quite reactive. Ions and excited species also enhance the reactivity of the plasma. The high reactivity of the reactive species is used for the plasma applications, for example, to remove environmental pollutants and treat material surfaces.

Plasma and Nuclear Fusion Science and Engineering

Fusion Energy Engineering Laboratory

Comprehension of diverse plasma characteristics will lead to novel nuclear fusion power generation

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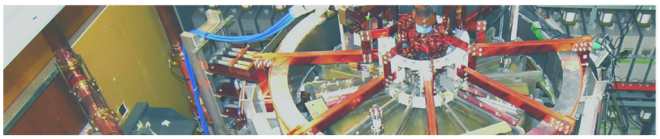
Nuclear fusion reaction, that occurs in the star's core and release energy due to the mass defect, will have the potential for providing a conclusive solution of energy problem. A tokamak type reactor has shown excellent performance to confine high temperature plasma fuel and the world's largest tokamak experiment called ITER will start its operation within 5 years. Present development roadmap expects fusion energy to be commercialized after 2050. In order to accelerate the utilization of fusion energy, improvement of its efficiency is highly required. We investigate advanced plasma confinement to achieve economical fusion core that confines high pressure plasma by weaker magnetic field (i.e. high-beta plasma). Plasma merging method is expected to provide effective start-up scheme of those high-beta plasmas with initial heating effect through magnetic reconnection process.



Control Engineering, Nanoscale Servo, Electric Vehicle Control

Electromagnetic Energy System Laboratory

Let's work on research on near future EV utilizing control engineering, etc. that changes the world!

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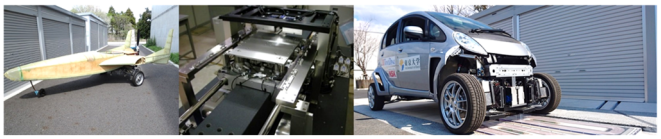
We research jointly with Shimizu Lab and T. Fujita Lab, and its research areas are the following four fields. 1) Control of electric vehicles: We focus on the high response of electric motors, which can realize more safety, comfortability, and cruise range extension, with in-wheel motor or active steering. Vehicle control for autonomous driving is also researched. 2) Wireless in-wheel motor: We are developing dynamic wireless transfer system with in-wheel motor, which can make cruise range infinity and also its applied technologies. 3) Nano scale servo: We research control technology for semiconductor liquid crystal exposure equipment, which is said to be the most precise machine in human history, and next-generation control technology for NC machine tools. 4) Electric air plane: We research control technology for electric air plane jointly with JAXA. Sky-car or human-machine interactive robot are also focused.



Distributed Power Supplies, Smart Grid

Electromagnetic Energy System Laboratory

Let's study about the future energy supply system

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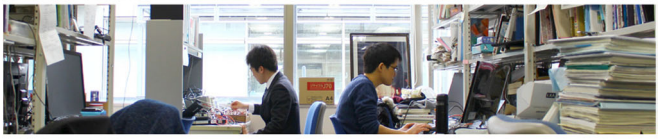
Baba Laboratory studies the application of Power Electronics, Energy Storage System, ICT and other novel technologies for the electric power system to realize the future energy supply system. We study both software-based and hardware-based subjects; for instance, controlling the equipment in the remote island by use of ICT. Photo voltaics and wind turbines, that are the essential power generation systems for carbon neutral society, supply unstable power and use power conversion system, that has quite different characteristics from the conventional rotating machine. Compensation of power fluctuation and low inertia and so on is required in order to the large penetration of those system. We study new control strategy of power conversion system, demand side management and economical power system and so on to realize future energy supply system.



Fusion Science

Plasma Science Laboratory

Plasma diagnostics, plasma-material interaction, and material application researches for solving energy problems

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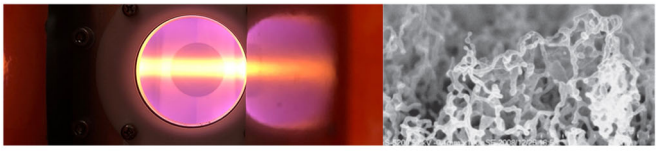
In Kajita Laboratory, we are working on plasma diagnostics, which is essential for plasma control, and plasma interaction research with reactor materials that support plasmas in order to realize nuclear fusion, which is a holy grail for solving energy problems. In addition, the research theme is industrial application using metals and metal oxides that have been modified by plasma treatments. In the field of plasma measurement, we aim to establish a measurement method by learning the characteristics of plasma and plasma emissions through machine learning. In the area of plasma-material-interaction, we will focus on the phenomenon of fuzzy metals formed by plasma irradiation using experimental devices that simulate the environment of a nuclear fusion reactor. We will also conduct experiments on photocatalytic ethylene degradation and artificial photosynthesis using fuzzy metal oxides.



Thermo-Fluid and Energy System Engineering

Energy Conversion System Laboratory

We are working on various ideas and approaches to reduce the fuel consumption and noise of heat engines

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We are conducting experiments and numerical analysis on the thermo-fluid dynamics of heat engines, such as rocket engines, jet engines, and gas turbines. Reducing fuel consumption and noise are two major issues of heat engines, and we are working on researches to improve them. As for the reduction of fuel consumption, we are focusing on small engines. Ideas different from those for large engines are necessary to improve the fuel consumption of small engines, and we are working on researches of Wave Rotors and Tesla turbo machines that are suitable especially for small engines. As for the noise reduction, we are conducting researches especially on jet noise, using Kashiwa Hypersonic and High-Enthalpy Wind Tunnel. In this research topic, we are working on new measurement methods and data analysis methods, as well as clarifying the generation mechanisms of jet noise.

Space Propulsion Engineering: Electric Propulsion, Small Propulsion, Small Satellite

Energy Conversion System Laboratory

Let's change the use of space and exploration with the new space propulsion!

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In Koizumi Laboratory, we are conducting various researches, developments, and projects based on space propulsion engineering and plasma engineering. Our research includes propulsion and demonstration of a new engine for nano- to micro-satellites and improvement of the existing micropropulsion system. In addition, we are conducting basic research for future large-scale electric propulsion. We are also involved in the development of engines and actual applications (projects) in order to proceed these research results to practical use in space. Our goal is to launch new research together with you, and to promote research that will lead the space activities in the future. For this purpose, new and innovative research ideas are always welcome. We believe that basic research and practical applications (projects) are like two wheels of a cart, and it is important to closely link the two.

Advanced Fusion and Antimatter Plasma Science

Plasma Science Laboratory

We investigate plasmas in a dipole magnetic field to realize advanced fusion, antimatter trapping, and space weather experiments

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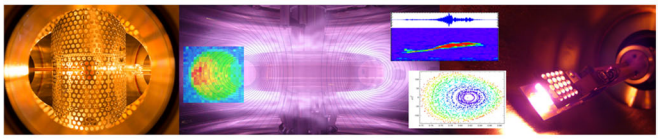
We are conducting experimental research on plasma science and engineering utilizing plasma physics, antimatter science, and superconducting engineering. A dipole magnetic field created by a current loop is the most basic magnetic field configuration observed not only in the laboratory but also in the universe, and has various scientific applications. In our laboratory, we utilize the dipole magnetic field generated by superconducting coils and focusing on the studies on (1) high-beta plasma suitable for advanced nuclear fusion as a future energy source, (2) wave particle interaction common to geospace phenomena in relation to space weather forecast, and (3) the realization and experimental understanding of antimatter plasmas such as electron-positron plasmas. We study both fusion-oriented and basic plasma-oriented experiments in the dipole field configuration of RT-1 and compact levitated dipole systems.



Spherical Tokamak, astrophysics and fusion experiments

Energy Conversion System Laboratory

Our group is working on laboratory astrophysics and fusion plasma physics with our merging spherical tokamak formation experiments.

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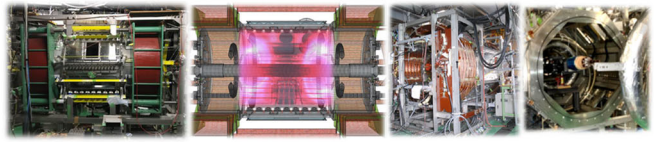
Our group is working on three research topics: laboratory astrophysics, nuclear fusion and development of advanced plasma diagnostics with Ono/Inomoto laboratory. For the first topic, we are investigating the energy conversion mechanism of magnetic reconnection which is associated with explosive energy release such as in solar flare. While we are also exploring its application as an efficient way of high-beta spherical tokamak formation method. To explore the detailed heating/transport mechanism, our group is working on the application study of computer tomography with plasma diagnostics such as ion Doppler tomography. In the research of plasma physics, we need many viewpoints from different background research topics and look forward to your contribution to our advanced energy course.



Lunar and Planetary Landing System, Atmospheric Inrush System, Planetary Protection, Hypersonic Gas Dynamics

Space Energy System Laboratory
(Japan Aerospace Exploration Agency, JAXA)

We conduct a wide range of research, from basic research to the development of space mission equipment

Kazuhisa Fujita, Visiting Professor
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In our laboratory, we are conducting research on new "manufacturing" for future space exploration based on high-temperature thermo-fluid dynamics. Our research covers a wide range of topics, from the development of software that precisely models devices involving high-energy fluid phenomena, to the development of new devices that utilize fluid phenomena for use in future space missions. Why don't you join us in our research?

Aerodynamics, Aerodynamic Design, Flow Control

Space Energy System Laboratory
(Japan Aerospace Exploration Agency, JAXA)

To realize the future aircraft with environmental performance by aerodynamic technologies

Dongyoun Kwak, Visiting Professor
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We research aerodynamic technologies to achieve the environmental and economical performances toward future aircraft. From the fundamental flow mechanism to the aerodynamic design, aerodynamic technologies are researched to reduce the drag and airframe noise using wind-tunnel facilities and numerical analysis techniques. These technologies will be contributed to improve aircraft environmental performance by reduction of fuel consumption and airport noise.

Structural Mechanics of Composite Structures: Structural Design Optimization, Bioinspired Structure, Automated Manufacturing Process

Space Energy System Laboratory
(Japan Aerospace Exploration Agency, JAXA)

Let's change the world by realizing the future aerospace transportation system with optimal design technology and automated manufacturing technology!

Yuichiro Aoki, Visiting Associate Professor
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https://www.aero.jaxa.jp/eng/

We are conducting research and development of ultimate light weight aerospace structures that are integrally optimized from materials to structures. You can conduct a wide range of research, from fundamental to applied research, from design evaluation in cyberspace to manufacturing demonstration in physical space. Let's make an innovative production strategy with optimal design technology and automatic manufacturing technology, and make a revolution in manufacturing process. Our laboratory is located in the JAXA Chofu Aerospace Center Aerodrome branch (Mitaka, Tokyo).

High voltage engineering, Asset management

Advanced Electric Energy System Laboratory
(Central Research Institute of Electric Power Industry, CRIEPI)

The asset management technique is expected to realize optimal maintenance strategies for electric power equipment!

Tsuguhiro Takahashi, Visiting Professor
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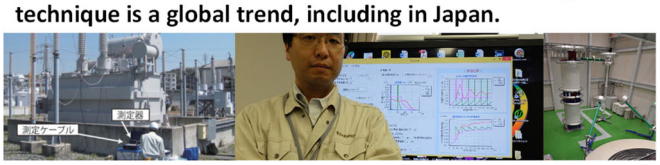
https://criepi.denken.or.jp/

Electric power transmission and distribution equipment is important and indispensable infrastructure that supports our highly electrified modern society. Its operation and maintenance should realize high reliability and low wheeling charge. From technical perspective, mainly from the viewpoint of electrical insulation, we are developing diagnosis techniques for such as underground cables and power transformers. In addition, we are trying to introduce the asset management techniques to find optimal maintenance and renewal strategies from economic perspective by utilizing the diagnosis information. The movement of the introduction of the asset management technique is a global trend, including in Japan.



Electrical Energy Applied Engineering

Advanced Electric Energy System Laboratory

(Central Research Institute of Electric Power Industry, CRIEPI)

As the introduction amount of renewable energy into the power system increases, the phenomena occurring in the system will continue to change. These include voltage deviancy in distribution systems, frequency regulation resource shortages, and surplus generation from solar panels. On the other hand, the lead time for the introduction of new technology cannot be ignored, because the power system is a huge system. A future study challenge is determining the optimal measures in anticipation of the future penetration rate of renewable energy resources.

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Feasibility study on demand response in Japan:
Power systems contain a mechanism to maintain a balance between supply and demand. In the future, a large amount of renewable energy resources such as solar power and wind power generation will be connected to the power system, Thus, it is necessary to prepare additional resources to maintain this balance, such as energy-storage and demand-side resources, because predicting the output of variable generators is very difficult. The demand response should maintain a balance between the supply and demand using the demand-side resources.
My research includes overseas case surveys, the study of technical potential applications in Japan, and a feasibility study from an economic viewpoint.

Power System Engineering

Advanced Electric Energy System Laboratory

(Central Research Institute of Electric Power Industry, CRIEPI)

Let's make together a contribution to realize the the future innovative electric power system!

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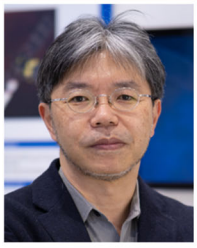
Developments and improvements of various technologies are necessary in the field of power system engineering to transform today's power system into the future innovative electric power system, which is essential for the carbon neutral society. We conduct researches to develop new techniques for power system analysis, power system planning and power system operation.

Space Systems: Mission and Orbital Planning, System Design



Deep Space Exploration Laboratory

(Japan Aerospace Exploration Agency, Institute of Space and Astronautical Science, JAXA/ISAS)

Let's create a new mission at ISAS, the forefront of deep space exploration!

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The Kawakatsu Laboratory, which belongs to the JAXA Institute of Space and Astronautical Science, conducts research focusing on the fields of astrodynamics and orbital mechanics, which discuss the motion of spacecraft, especially the orbital design of deep space exploration missions. In our laboratory, we can proceed with research on the actual exploration plan that is being promoted by JAXA. Mars satellite exploration plan MMX, deep space exploration technology demonstrator DESTINY +, micro spacecraft EQUULEUS, etc.. Our basic policy is to create results and develop excellent doctoral researchers by researchers after obtaining a doctoral degree.

Spacecraft Engineering, Spacecraft Attitude Control, Spacecraft Guidance, Navigation and Control

Deep Space Exploration Laboratory

(Japan Aerospace Exploration Agency, Institute of Space and Astronautical Science, JAXA/ISAS)

Control spacecraft & satellites as you wish, over space environment & dynamics

Shinichiro Sakai, Visiting Professor
E-mail: sakai@isas.jaxa.jp
Tel: +81-(0)70-3117-7065
http://www.isas.jaxa.jp/home/sakai/index.html

Our laboratory researches on spacecraft and satellites attitude control and GNC (guidance, navigation and control). Since our institute, ISAS, develops many scientific satellites, we always keep in minds the needs in actual projects. Current research themes are satellites attitude determination and control, formation flying, electro-magnetic formation flying (EMFF), swam formation flying, magnetic levitation system on satellites, GNC for precise landing on the planets or moon, etc.

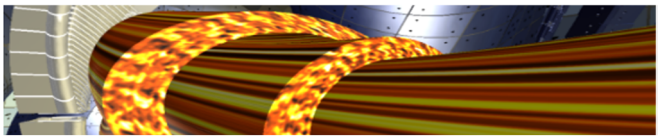
Plasma Physics and Controlled Nuclear Fusion

Fusion Energy Laboratory
(National Institute for Fusion Science, NIFS)

We are conducting theoretical research on magnetic confinement fusion plasmas

Hideo Sugama, Visiting Professor
E-mail: sugama.hideo@nifs.ac.jp
Tel: +81-(0)572-58-2370
https://www-app.nifs.ac.jp/cgi-bin/people/member.cgi?id=sugama_hideo

In a plasma, a large number of charged particles and electromagnetic fields produce diverse and complex physical phenomena through electromagnetic interactions. In order to realize fusion energy, it is necessary to understand and predict such complicated plasma behaviors. For this purpose, we are studying the physics of magnetically confined fusion plasmas, especially using theoretical models called drift kinetics and gyrokinetics to investigate plasma collisional transport, microinstabilities, and turbulent transport.



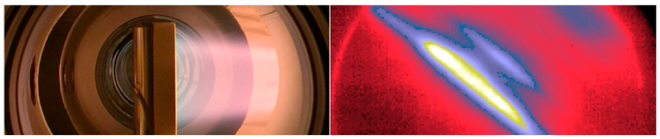
Fusion Science

Fusion Energy Laboratory
(National Institute for Fusion Science, NIFS)

Open the way to the Fusion, through the understanding of the interactions between materials and plasmas

Ryuichi Sakamoto, Visiting Professor
E-mail: sakamoto@nifs.ac.jp
Tel: +81-(0)572-58-2148
https://www-app.nifs.ac.jp/cgi-bin/people/member.cgi?id=sakamoto_ryuichi

We address issues on the interactions between plasma and materials that are inescapable processes for realizing fusion plasma in the finite size device on the earth.
For example, we study plasma and solid hydrogen interactions to understand the fueling processes into fusion plasma.
Furthermore, in the plasma-facing materials, plasma materials interactions are caused by the incident particles from the fusion plasma. To understand the elemental process of the interactions, material analyses using various methods, including a transmission electron microscope, are carried out.



Plasma Physics and Computer Simulation

Fusion Energy Laboratory
(National Institute for Fusion Science, NIFS)

We investigate various physical processes in plasmas by means of simulations on supercomputers

Shunsuke Usami, Visiting Associate Professor
E-mail: usami.shunsuke@nifs.ac.jp
Tel: +81-(0)572-58-2356
https://fps.nifs.ac.jp/index-e.html

We study plasma physics by means of computer simulations. At present, our research goal is the elucidation of the physical processes of magnetic reconnection. Magnetic reconnection is a ubiquitous phenomenon seen in various plasmas such as solar flares and fusion devices. The reconnection mechanism and secondary processes during reconnection, however, have not completely been elucidated. Collaborating with experiment and observation groups, we reproduce phenomena by use of simulations and attempt to clarify the physics behind. Our main tool is a particle simulation. In particle simulations, the motions of individual plasma particles are solved and thus it may be no exaggeration to say that we can investigate everything. We welcome students which devise new methods of simulations, have a preference for writing simulation codes, and take interest in experiment and observation, too.

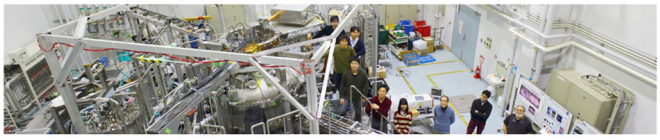
Plasma Science and Advanced Fusion Engineering

Fusion Energy Laboratory
(National Institute for Fusion Science, NIFS)

Keywords is plasma physics and nuclear fusion. Through various experiences with us, you will open up the state of art for research and play an active role as a member of society in the future

Masaki Nishiura, Visiting Associate Professor
E-mail: nishiura@nifs.ac.jp
Tel: +81-(0)4-7136-3991
http://www.ppl.k.u-tokyo.ac.jp/

We are conducting research on plasma physics and advanced nuclear fusion. By making full use of generation, heating, measurements, and simulation of laboratory magnetospheric plasmas, we will understand the essence of high-performance plasma generation and its stable confinement state. As an application, we are conducting research aiming at the ultimate energy development by advanced fusion.



Magnetic Energy System Engineering, Electric Mobility

"Open Innovation of Mobility Technologies for SDGs" Laboratory

We conduct research to realize a world where mobility can be more friendly to people and the environment

Osamu Shimizu, Project Lecturer
E-mail: shimizu.osamu@edu.k.u-tokyo.ac.jp
Tel: +81-(0)4-7136-3881
http://hflab.k.u-tokyo.ac.jp/

We operates social cooperative program "Open Innovation of Mobility Technologies for SDGs". We conduct research on the application of magnetic energy such as dynamic wireless power transfer and high efficiency of motor drive, research on motion control of mobility and combined them. You can realize what you want to do and your interests, because our project team can research in collaboration with mobility technology experts of various companies.

Thermal System Engineering, Integrated Power Control

"EV collaborative Thermal System Engineering" Laboratory

Thinking about a society that can achieve Carbon Neutral in the whole daily life

Toshiyuki Fujita, Project Lecturer
E-mail: t-fujita@edu.k.u-tokyo.ac.jp
Tel: +81-(0)4-7136-3873
http://hflab.k.u-tokyo.ac.jp/

We conduct research on the energy management system to realize CO2 zero emissions on storage parity age. We will consider the ideal way of homes, buildings, and communities that do not depend on the power grid system by combining solar cells and storage batteries, heat pump water heaters, electric vehicles, etc. to store electric energy in various ways. We aim to utilize the surplus electricity generated by introduction of solar cells as a stable consumption by charging electric vehicles whether EVs are stopped or running. Furthermore, we study the development of high efficiency from the viewpoint of power electronics for heat pumps, motors, and power converters, which are the consumptions.

Vibration Suppresion Control Engineering

"Measurement and control of noise and vibration for electric vehicles" Laboratory

We are studying for realization of very comfortable electric vehicles and flying cars

Sakahisa Nagai, Project Lecturer
E-mail: nagai-saka@edu.k.u-tokyo.ac.jp
Tel: +81-(0)4-7136-3881
http://hflab.k.u-tokyo.ac.jp/

We operate social cooperative program “Measurement and control of noise and vibration for electric vehicles”. By using measuring instruments produced by Ono Sokki Co. Ltd. which is a cooperative company of this program, the noise and vibration of electric vehicles and flying car are accurately measured. After that, we propose the vibration suppression control based on the measured data by utilizing the high-responsibility of electric motors. The final target is that we can spend time in a vehicle as in a living room. This study will accelerate the spread of electric vehicles and flying cars which are recently gathering attraction.

【Nuclear Fusion Research Education Program】

For information regarding the Nuclear Fusion Research Education Program, contact the prospective supervising professor first.

Program Home Page

http://www.k.u-tokyo.ac.jp/fusion-pro/

For more information about the entrance examination to the Program, please refer to the following admission guide

http://www.k.u-tokyo.ac.jp/fusion-pro/exam.html

［３］Special Selection for Master course

・Schedule A

１. Basic Academic Examination

(1) English

Submit a TOEFL (including the iBT Home Edition) or TOEIC score sheet (we do not accept TOEFL MyBest Score). Score sheets must be submitted at the application or submitted via the online application system by August 4 (Thu) 2022. Refer instructions in Guidelines for Applicants of GSFS.

(2) Undergraduate grades

Applicants must submit a GPA that is calculated according to the method prescribed by the department in order to be considered for selection. If no GPA is submitted, the applicant will be disqualified. You will receive the details of the calculation method after receiving your admission ticket.

(3) Specialized Subject (Essay)

You will receive the theme of essay and an answer sheet after receiving an admission ticket, prior to the examination. Examinees must submit their essays written on the shee by August 4 (Thu) according to the instruction therein. If the essay is not submitted, the applicant will be disqualified. At the secondary examination, examinees are requested to prepare the original or copy of the essay at hand. In case you do not receive the ticket and answer sheet by July 20 (Wed), make contact with the Department of Advanced Energy (Email : ae-nyushi@apsl.k.u-tokyo.ac.jp).

２. Oral examination (online)

(1) Basic Oral Examination

Examination on the background of applicants by solving undergraduate-level and basic problems etc. at the interview. The scope of the examination is mathematics (linear algebra and calculs) and physics (mechanics, electromagnetics, and themodynamics). The problems are selected according to the studied subjects of applicants.

(2) Essay Oral Examination

Examination on the Special Subject (Essay).

(3) Specialized Subjects Oral Examination

Examination on expert knowledge and basic academic ability.

(4) Final Oral Examination

Interview regarding his/her adaptation to the research fields and motivation.

３. Examination date and time

(1) Primary Examination: Evaluation based on submitted essays and undergraduate grades

(2) Secondary Examination:

Subjects	Date and Time	Room	Bring with	Others
Basic Oral Examination	August 23 (Tue) 9:00～18:00	Online	Admission ticket Several sheets of A4 paper Writing materials	A PC with a camera and a network for online must be prepared for examinations. Test times are subject to change depending on the number of applicants.
Essay and Specialized Subjects Oral Examination	August 24 (Wed) 9:00～18:00	Online		

※ After finishing the written exam on August 23 (Tue), we conduct a questionnaire to ask any change of prospective supervising professor.

※ If the number of applicants exceeds a certain value, the Secondary Examination will be conducted only for those who have passed the primary examination.

(2) Tertiary Examination※

Subjects	Date and Time	Room	Bring with	Others
Final Oral Examination	August 29 (Mon) 11:00 ~ 13:00	Online	Admission ticket	Sama as the Secondary Oral Examination

※ Tertiary Examination will be imposed on the examinees who passed the Secondary Examination.

４. Announcement of successful applicants in the primary examination

Successful applicants of the primary examination will be announced on the web at 12:00 on August 19 (Fri) (the URL will be sent with the examination voucher).

Successful applicants of the Secondary Examination will be announced on the web at 5:00 p.m. on August 26 (Fri) (the URL will be indicated at the time of the Secondary Examination).

５. Declaration of Special Selection for International Student

Declare himself/herself to be applying to the Special Selection in the Inquiry Sheet at online web submission.

6 **. Entrance in October**

Applicants can request to enter the graduate school in October 2022 instead of April 2023 with an eligible visa and other conditions. Refer to the Guidelines for Applicants to Master Course (Boshu-Yoko) for the entrance procedure.

7 **. Precautions for the admission period**

If a student passed the examination as “Entrance in October“ and is not able to graduate from the university by September, he or she will not be admitted in October. If he or she graduates by the following March, he or she will not be admitted in April. Even if a student passes the examination as “Entrance in April“ and graduates from the university by September, he or she will not be admitted in October.

8 . **Application screening fees: 30,000 yen**

- **Schedule B: No applicant is accepted according to Shedule B**
- **Notes:**
  (1) All the documents listed in the Guideline for Applicants must be submitted
  (2) Applicants who graduated from a university in China, must submit verification documents for their Bachelor’s degree certificate in English from the China Academic Degree & Graduate Education Development Center (CDGDC) (http://www.cdgdc.edu.cn/).
  (3) Applicants can consult the prospective supervising professor about the research theme in the master course prior to the entrance exam.
  (4) Check whether all the submitting materials are in an envelope using [5]-6. submission document list.

［4］Special Selection for Doctor course

- **Schedule A:**

1．Selection Process

The examination is composed of the Primary (basic academic ability, oral examination) and the Secondary (master thesis or its equivalent) Examinations.

2．Basic Academic Examination (This exam is waived for those who have finished or are anticipated to finish a master course in the University of Tokyo until March 2023)

(1) English

Submit a TOEFL (including the iBT Home Edition) or TOEIC score sheet (we do not accept TOEFL MyBest Score). Score sheets must be submitted at the application or submitted via the online application system by August 4 (Thu) 2022. Refer instructions in Guidelines for Applicants of GSFS.

(2) Undergraduate and graduate grades

Applicants must submit a GPA that is calculated according to the method prescribed by the department in order to be considered for selection. If no GPA is submitted, the applicant will be disqualified. You will receive the details of the calculation method after receiving your admission ticket.

3．Oral Examination (Online)

Questions about the knowledge of examinees as a doctor candidate student.

(1) Basic Oral Examination

Examination on the background of applicants by solving undergraduate-level and basic problems etc. at the interview. The scope of the examination is mathematics (linear algebra and calculs) and physics (mechanics, electromagnetics, and themodynamics). The problems are selected according to the studied subjects of applicants.

(2) Presentation of the examinees' research in his/her master course (20 min.) and questions (20 min.)

Please prepare your own PC for your presentation and PDF files of your presentation materials (ready for distribution).

A research proposal (see notes on application) must be included in the presentation. Applicants wishing to enter in October 2022 also bring the pdf of master thesis or its equivalent on the oral examination day.

4．Examination date and time

(1) Primary Examination

Subjects	Date and Time	Exam. Style	Bring with	Others
Basic Oral Examination	August 23 (Tue) 9:00～18:00	Online	Admission ticket Several sheets of A4 paper Writing materials	A PC with a camera and a network for online must be prepared for examinations. Test times are subject to change depending on the number of applicants.
Specialized Subjects Oral Examination	August 24 (Wed) 14:00～18:00 August 25 (Thu) 9:00～12:00	Online		

(2) Secondary Examination

The examination regarding the master thesis or its equivalent is conducted around early February 2023 for the applicants wishing to enter in April 2023. Details of this exam will be announced only to the applicants successful in the primary exam. For the applicants wishing to enter in October 2022, the oral exam in the primary exam includes this Secondary Exam.

5．Declaration of Special Selection for International Student

Declare himself/herself to be applying to the Special Selection in the Inquiry Sheet at online web submission.

6．Entrance in October

Applicants can request to enter the graduate school in October 2022 instead of April 2023 with an eligible visa and other conditions. Refer to the Guidelines for Applicants to Doctor Course (Boshu-Yoko) for the entrance procedure.

7．Precautions for the admission period

If a student passed the examination as "Entrance in October" and is not able to graduate from the university by September, he or she will not be admitted in September. If he or she graduates by the following March, he or she will not be admitted in April. Even if a student passes the examination as "Entrance in April" and graduates from the university by September, he or she will not be admitted in September.

8．Application screening fees: 30,000 yen

- **Schedule B: No applicant is accepted according to Shedule B**

- **Notes:**

(1) All the documents listed in the Guideline for Applicants must be submitted.

(2) Applicants who graduated from a university in China, must submit verification documents for their Bachelor's degree certificate in English from the China Academic Degree & Graduate Education

Development Center (CDGDC) (http://www.cdgdc.edu.cn/).

(3) In the "Research Plan", the research plan for the doctor course should be written in about two pages of A4 paper, describing "what kind of research methods, what and to what extent we are going to reveal". The format is not specified, but the name of the applicant should be clearly stated and specifically listed in the following items. They should be about half a page, one page, and half a page on A4 paper, respectively.
   ① Objectives (background, current state of art, etc.)
   ② Method (show annual plan)
   ③ Distinctive aspects, Originality

(4) Applicants can consult the prospective supervising professor about the research theme in the doctor course prior to the entrance exam.

(5) Check whether all the submitting materials are in an envelope using [5]-6. submission document list.

［５］Guidance for Examination

１．**Examination time and date**
Refer to the above information

２．**Examination method**
The applicants will be evaluated by means of pre-submitted materials and an online oral examination.

３．**Items requested for the applicants to bring with**
(1) Admission ticket
(2) Several sheets of A4 paper
(3) Note-taking equipment
(4) A PC with camera and network for online examinations
A connection test will be conducted between 14:00 and 17:00 on Friday, August 19, 2022, for those who wish to take the connection test. The URL for that test will be sent with the admission ticket.

４．**Rules during the examination**
(1) Applicants are not allowed to leave the PC during the oral examination.
(2) Going to lavatory will not be permitted during the examination in principle.
(3) It is not allowed to refer to reference books, notes, etc., or search the web during the oral examination.
(4) The contents of the oral examination must not be communicated to a third party until the examination result has been announced. If you tell them, it will be regarded as cheating.
(5) PC audio and images during the oral examination are not to be recorded.

５．**On English Score Report**
(1) When you need to submit your English Score Report, prepare and submit your documnet accorring to the following instruction (also refer the Guidelines for Applicants of the Graduate School of Frontier Sciences).
(2) English Score Reports must reflect tests taken after September 1, 2020 for Schedule A.
(3) Submit a TOEFL (including the iBT (Special) Home Edition, we do not accept MyB) or TOEIC score sheet. Score sheets must be submitted at the application or submitted via the online application system by August 4 (Thu) 2022.
* We do not accept TOEIC-ITP.
* Please refer the test information and send prepare your score sheet with time spare.

[TOEFL Score Report]
When applying to take the TOEFL-iBT (or TOEFL-iBT® Home Edition), request that your Institutional Score Report is sent to the below address. If you will submit a score of an exam you have already taken, please request ETS to send your Institutional Score Report to the below address.

TOEFL Institutional Score Report address (GSFS will not be able to confirm your score if you use a code other than the below)
DI (Designated Institution) code: “8001” Department code: “99”

Note: The Institutional Score Report from ETS to GSFS will be sent by overseas mail and may take a considerable number of days from the date of the applicant’s request until GSFS receives it. Therefore, we recommend that you make the request to ETS at least two weeks before the submission deadline specified by the department that you are applying to.

Note: If you take the TOEFL-iBT test, and the computer screen of the examination room does not show the DI Code of GSFS 8001, ask the proctor after completing the test for the specific form to request the mailing of the Institutional Score Report to GSFS (Do not request a DI code other than 8001).

Note: Your Appointment Number (16-digit number) is required when you upload your Test Taker Score to the Online Application System.

[TOEIC Score Report]
Only the score report of an Open TOEIC test will be considered valid. (TOEIC Speaking & Writing Tests, TOIEC IP Tests “Institutional Program” are not considered valid.)

Please upload the TOEIC Official Score Certificate at the online submission system.

6．Submission document list

Application Submission（Documents required by the Graduate School (All applicants))

(Contact：Student Affairs Team, GSFS　https://forms.office.com/r/qHAtjRfLW0　)　【Schedule A】

	Document	For	Submission deadline	Submission method	
①	Profile photo data(jpg format)	All applicants	Application Period(June 9-June 15)	Upload to the Online Application Site(https://e-apply.jp/e/gsfs/)	
②	Screening fees	All applicants*	Application Period(June 9-June 15)	Upload to the Online Application Site(https://e-apply.jp/e/gsfs/)	*Refer to Application Guideline P5
③	Academic Transcripts(PDF format)	All applicants	Application Period(June 9-June 15)	Upload to the Online Application Site(https://e-apply.jp/e/gsfs/)	
④	Diploma or certificate of graduation(PDF format)	If you have completed a Bachelar's degree	Application Period(June 9-June 15)	Upload to the Online Application Site(https://e-apply.jp/e/gsfs/)	
⑤	Copy of your residence card(PDF format)	Foreign residents of Japan only	Application Period(June 9-June 15)	Upload to the Online Application Site(https://e-apply.jp/e/gsfs/)	

Application Submission（Documents required by the Department of Advanced Energy） for Master's Course

(Contact：Department of Advanced Energy　ae-nyushi@apsl.k.u-tokyo.ac.jp)

	Document	For	Submission deadline	Submission method	
①	Inquiry Sheet (web submission)	All applicants	24:00 August 4	Submission URL information will be annouced later	
②	English score sheet	All applicants	24:00 August 4	Upload to the Online Application Site(https://e-apply.jp/e/gsfs/)	
③	GPA calculation sheet (Excel file recommended)	All applicants	24:00 August 4	Upload to the Online Application Site(https://e-apply.jp/e/gsfs/)	
④	Essay (Follow the instruction in the Essay document)	All applicants	24:00 August 4	Upload to the Online Application Site(https://e-apply.jp/e/gsfs/)	
⑤	CDGDC certificate (original electric file)	Those who have graduated from Universities in China	Application Period(June 9-June 15)	Upload to the Online Application Site(https://e-apply.jp/e/gsfs/)	
⑥	Research/work balance plan	Those who plan to enroll while being employed by a company, government agency, or other organization	Application Period(June 9-June 15)	Upload to the Online Application Site(https://e-apply.jp/e/gsfs/)	

Application Submission（Documents required by the Department of Advanced Energy） for Doctoral Course

(Contact：Department of Advanced Energy　ae-nyushi@apsl.k.u-tokyo.ac.jp)

	Document	For	Submission deadline	Submission method	
①	Inquiry Sheet (web submission)	All applicants	24:00 August 4	Submission URL information will be annouced later	
②	English score sheet	Except for those graduated or expected to graduate from University of Tokyo by March 2023	24:00 August 4	Upload to the Online Application Site(https://e-apply.jp/e/gsfs/)	
③	GPA calculation sheet (Excel file recommended)	Except for those graduated or expected to graduate from University of Tokyo by March 2023	24:00 August 4	Upload to the Online Application Site(https://e-apply.jp/e/gsfs/)	
④	Master thesis and abstract, or their equ	For Special Selection for Doctor course, those applying for October admission	24:00 August 18	Upload to the Online Application Site(https://e-apply.jp/e/gsfs/)	
⑤	Presentation material	All applicants	24:00 August 18	Upload to the Online Application Site(https://e-apply.jp/e/gsfs/)	
⑥	Research plan	All applicants	24:00 August 18	Upload to the Online Application Site(https://e-apply.jp/e/gsfs/)	
⑦	CDGDC certificate (original electric file)	Those who have graduated from Universities in China	Application Period(June 9-June 15)	Upload to the Online Application Site(https://e-apply.jp/e/gsfs/)	
⑧	Research/work balance plan	Those who plan to enroll while being employed by a company, government agency, or other organization	Application Period(June 9-June 15)	Upload to the Online Application Site(https://e-apply.jp/e/gsfs/)	

For detailes of submission document and deadlines, refer the "Guidelines for Applicants".

Department of Advanced Energy and
Department of Complexity Science and Engineering
Graduate School of Frontier Sciences, The University of Tokyo
FY2023 Master Course and Doctor Course

Guide to Nuclear Fusion Research Education Program

Application period and Examination schedule

Refer to Section [4] of this guide

Orientation for Entrance Examination

Refer to Section [5] of this guide

Contact

Department of Advanced Energy / Department of Complexity Science and Engineering
Tel +81-(0)4-7136-3991 / +81-(0)4-7136-3919
E-mail: saito@ppl.k.u-tokyo.ac.jp/contact@c.k.u-tokyo.ac.jp

Program Website

http://www.k.u-tokyo.ac.jp/fusion-pro/

[1] About the Program

Fusion energy is the ultimate energy source for human beings, which has abundant natural resources and is environmentally friendly. In the field of fusion energy development, we have entered a new development stage for full-blown fusion experiments, as the International Thermonuclear Experimental Reactor (ITER) Project has been started with international collaboration. In particular, Japan has achieved world-class results in the field of nuclear fusion centered on the ITER project. In order for Japan to continue to play a leading role in fusion development, it is essential to continuously nurture excellent human resources who can play an active role internationally.

In order to respond to such demands, The University of Tokyo decided to open the "Nuclear Fusion Research Education Program" in 2008, based on the profound intellectual stock toward interdisciplinary fusion and the state-of-the-art equipment for practical education and research of the Graduate School of Frontier Sciences. This program is implemented by a curriculum system that crosses the Department of Advanced Energy and the Department of Complexity Science and Engineering of the Graduate School of Frontier Sciences. The main two components of the program are a "Curriculum for Integrated Education" that allows you to comprehensively and systematically study a wide range of basic science, and the advanced and exciting "Practical Research and Education Curriculum" based on cutting-edge research projects. In the interdisciplinary education curriculum, you can study a wide range of fields such as plasma science and technology, fusion engineering, and the environmental and social sciences from an interdisciplinary and bird's-eye view. In the practical research and education curriculum, we will provide pioneering and innovative research and education by actively utilizing advanced plasma experimental equipment and directly participating in cutting-edge research projects.

［2］List of Laboratories

■Department of Advanced Energy

Nuclear Fusion Science

Professor Hiroshi Yamada

mail: yamada.hiroshi@k.u-tokyo.ac.jp
tel: +81-(0)4-7136-4342

Plasma Physics and Fusion Engineering

Professor Yasushi Ono

mail: ono@k.u-tokyo.ac.jp
tel: +81-(0)3-5841-6686

Plasma Applied Engineering

Professor Ryo Ono

mail: ryo-ono@k.u-tokyo.ac.jp
tel: +81-(0)3-5841-6663

Plasma Physics and Fusion Engineering

Professor Michiaki Inomoto

mail: inomoto@k.u-tokyo.ac.jp
tel: +81-(0)4-7136-4341

Plasma Material Interaction and Nano Material

Professor Shin Kajita

mail: kajita@edu.k.u-tokyo.ac.jp
tel: +81-(0)4-7136-3993

Plasma Physics and Plasma Science

Associate Professor
Haruhiko Saitoh

mail: saito@ppl.k.u-tokyo.ac.jp
tel: +81-(0)4-7136-3991

Plasma Physics and Fusion Engineering

Associate Professor
Hiroshi Tanabe

mail:
tanabe@edu.k.u-tokyo.ac.jp
tel: +81-(0)3-5841-6690

■Department of Complexity Science and Engineering

Plasma Physics, Nuclear Fusion, and Tokamak

Professor Akira Ejiri

mail: ejiri@k.u-tokyo.ac.jp
tel: +81-(0)4-7136-3926

Plasma Physics, Nuclear Fusion, and Tokamak

Professor Kouji Shinohara

mail:
shinohara@k.u-tokyo.ac.jp
tel: +81-(0)4-7136-4044

Plasma Physics, Nuclear Fusion, and Tokamak

Lecturer Naoto Tsujii

mail: tsujii@k.u-tokyo.ac.jp
tel: +81-(0)4-7136-3994

■Department of Advanced Energy, Cooperative Laboratories

National Institute for Fusion Science (NIFS), National Institutes of Natural Sciences (NINS)

Plasma Physics and Nuclear Fusion

Visiting Professor
Hideo Sugama

mail: sugama.hideo@nifs.ac.jp
tel: +81-(0)572-58-2370

Nuclear Fusion Science

Visiting Professor
Ryuichi Sakamoto

mail: sakamoto@nifs.ac.jp
tel: +81-(0)572-58-2148

Plasma Physics and Numerical Simulation

Visiting Associate professor
Shunsuke Usami

mail: usami.shunsuke@nifs.ac.jp
tel: +81-(0)572-58-2356

Plasma Physics, Fusion Science, and Advanced Instrument Development

Visiting Associate Professor
Masaki Nishiura

mail: nishiura@nifs.ac.jp
tel: +81-(0)572-58-2184

■Department of Complexity Science and Engineering, Cooperative Laboratories

National Institute for Fusion Science (NIFS), National Institutes of Natural Sciences (NINS)

Plasma Physics and Simulation

Visiting Professor
Yasushi Todo

mail: todo@nifs.ac.jp
tel: +81-(0)572-58-2270

Plasma Physics and Image Analysis

Visiting Professor
Satoshi Ohdachi

mail: ohdachi@nifs.ac.jp
tel: +81-(0)572-58-2155

[3] Important Information on Entrance Examination

(Common to Master and Doctor Courses)

The laboratories of the Nuclear Fusion Research Education Program consist of the Department of Advanced Energy and the Department of Complexity Science and Engineering.

On application, select your potential supervisor from [2] List of Laboratories, and submit the Inquiry Sheet attached to the guidebook (Department of Complexity Science and Engineering) or according to the instruction of the guidebook (Department of Advanced Energy). For example, if you wish the surpervision of a Professor of the Department of Advanced Energy, you need to submit the Inquiry Sheet for the Department of Advanced Energy, together with other required documents.

For the entrance examination, take the examination of the Department of your potential supervisor. For details of the entrance examination, refer to the Guidebook/Explanatory Leaflet of each of the departments. For example, if your potential supervisor is a profossor of the Department of Complexity Science and Engineering, refer to the Guidebook of the Department of Complexity Science and Engineering.

Pass / fail judgment is made at each Department according to the examination results of all applicants to the Department including the applicants to the Nuclear Fusion Research Education Program.

After you pass the examination and enroll, you will belong to the Department of Advanced Energy or Department of Complexity Science and Engineering, and take the curriculum of the Nuclear Fusion Research Education Program, which allows you to focus on the subjects required for fusion research. Please make sure to apply for the program at the application for admission, because we basically do not accept application to this program after the entrance examinations.

［4］Application Period and Examination Schedule

As explained in Section [3], applicants for the Nuclear Fusion Research Education Program take the entrance examination for the Department of Advanced Energy or the Department of Complexity Science and Engineering. Therefore, applicants should follow the instructions on application period and examination schedule of each of the Departments. For details of the schedule, refer to the Guidelines for Application of the Graduate School of Frontier Sciences and the Guidebook/Explanatory Leaflet of each of the Departments

［5］Orientation for Entrance Examination

As explained in Section [3], applicants for the Nucler Fusion Research and Education Program take the entrance examination for the Department of Advanced Energy or the Department of Complexity Science and Engineering. Refer to the entrance examination information available at the website of each of the Departments.

［6］Curriculum

Students enrolled in the Nuclear Fusion Research Education Program belong to either the Department of Advanced Energy or the Department of Complexity Science and Engineering, depending on the affiliation of the supervisor. The number of credits required to complete the course and the required courses are determined by each of the Department. Students of the program are expected to take courses including the subjects decited by the Program (marked with ○ in the above figure). Please note that students of the Program can earn the credits of curses of other Department as credits of their own Department.

(1) Master Course

30 or more credits, including the required subjects of the Department and 6 or more credis of the Nuclear Fusion Research Education Program, are needed.

(2) Doctor Course

20 or more credits, including the required subjects of the Department and 2 or more credis of the Nuclear Fusion Research Education Program, are needed.