YEAR 2022
Master course
Doctor course
Explanatory Leaflet (ver.1.07)
http://www.ae.k.u-tokyo.ac.jp/admission/
The latest information is available online

東京大学
THE UNIVERSITY OF TOKYO

Graduate School of Frontier Sciences

Department of Advanced Energy

Nuclear Fusion Research Education Program

Examination date and time

Master course
August 24 (Tue)，August 25 (Wed)，August 30 (Mon), 2021
Doctor course
August 24 (Tue)，August 25 (Wed)，August 26 (Thu), 2021

Guidance (Online, Pre-registration needed)

April 17 (Sat) 13:00-15:00, 2021
May 12 (Wed) 18:00-20:00, 2021
May 29 (Sat) 13:00-15:00, 2021
https://www.ae.k.u-tokyo.ac.jp/admission/

Contact

Kashiwanoha 5-1-5, Kashiwa-shi, Chiba 277-8561
Kiban Bldg. 1F
The University of Tokyo, Graduate school of Frontier Sciences, Student Affairs Team
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or
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Email : saito@ppl.k.u-tokyo.ac.jp

Homepage

http://www.ae.k.u-tokyo.ac.jp

* 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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Now that the start of the international thermonuclear fusion reactor is approaching, the challenge of artificial solar research is to reduce costs and accelerate the practical application of the ultimate energy source. Specifically, we reduce the dependence on high-cost coils, create a magnetic vessel that traps a large amount of plasma with a small magnetic field, and heat it to 100 million degrees Celsius where the fusion reaction starts and sustains at low cost. We confined a large amount of plasma in a donut-shaped magnetic container in the shape of an apple that was compressed tightly, and then came up with the idea of combining them and rapidly heating them like a solar flare. This makes good use of the reconnection phenomenon of magnetic field lines, and is attracting interest as a simple method for realizing nuclear fusion. In the UK, a venture company was established, an ST-40 union experiment was made, and we also cooperated to start a project to realize 100 million degrees. We hope that the graduate students will come up with ideas for economical artificial solar development, through experience in collaboration with foreign countries and 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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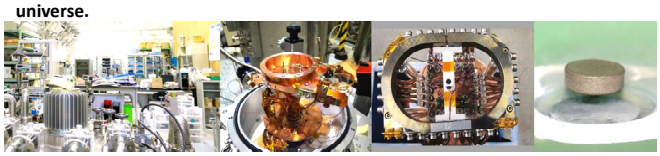
http://www.ohsaki.k.u-tokyo.ac.jp/index_e.html

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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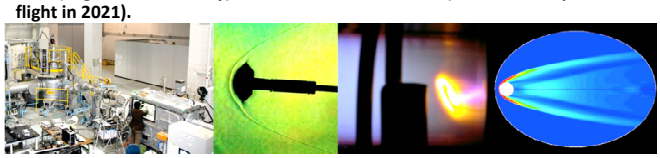
Our research interest spreads over general fluid dynamics and its application to the aerospace engineering and deep space exploration. We are challenging various problems on the aerodynamics from low speed to super/hypersonic speeds, rarefied gas dynamics, granular flow (ex. crater formation) and so 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), 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 (under development for flight in 2021).



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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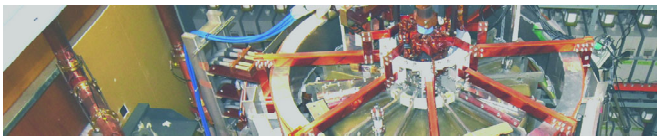
Nuclear fusion reaction, that occurs in the star's core and release energy due to the mass defect, will have the potential for providing a conclusive solution of energy problem. A tokamak type reactor has shown excellent performance to confine high temperature plasma fuel and the world's largest tokamak 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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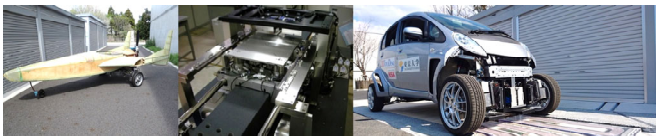
We research jointly with Shimizu Lab and T. Fujita Lab, and its research areas are the following four fields. 1) Control of electric vehicles: We focus on the high response of electric motors, which can realize more safety, comfortability, and cruise range extension, with in-wheel motor or active steering. 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.

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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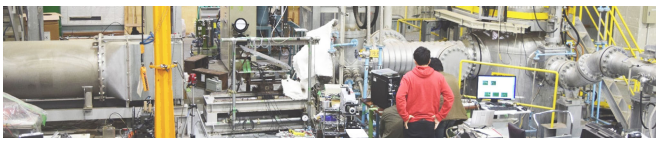
We are conducting experiments and numerical analysis on the thermo-fluid dynamics of heat engines, such as rocket engines, jet engines, and gas turbines. Reducing fuel consumption and noise are two major issues of heat engines, and we are working on researches to improve them. As for the reduction of 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 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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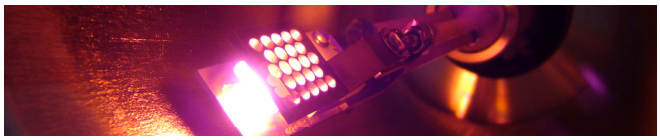
Based on the understanding of plasma physics, antimatter science, and superconducting engineering, we conduct experimental research on plasma science and engineering. Dipole magnetic field created by a circular coil is an excellent confinement geometry for charged particles as observed in planetary magnetospheres. Using this geometry, we aim to realize advanced nuclear fusion power production and novel particle trap for antimatter and various ions. Charged particle motion in a dipole magnetic field is not simple, for example due to the breakdown of adiabatic invariants and the effect of chaos. The collective phenomena of these particles, such as spontaneous structure formation and particle acceleration, are more complicated. We conduct both fusion-oriented and basic plasma experiments in the dipole field configuration of RT-1 and a compact levitated dipole system.



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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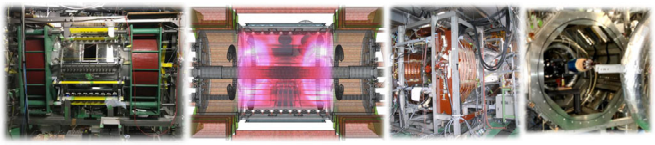
Our group is working on three research topics: laboratory astrophysics, nuclear fusion and development of advanced plasma diagnostics with Ono/Inomoto laboratory. For the first topic, we are investigating the energy conversion mechanism of magnetic reconnection which is associated with explosive energy 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

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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

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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 reduction of aircraft 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, 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).

Electrical Energy Applied Engineering

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

Now "energy" is the key and interesting

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Based on the knowledge gained from research on laser application technology for the production of uranium fuel for nuclear power generation, we have been engaged in research on laser and optical application measurement technology and research on ultra-high intensity field engineering using ultra-high intensity lasers. In recent years, we have also taken on the challenge of next-generation energy supply technology for electric vehicles based on our knowledge of pulse power engineering.

Superconducting Materials Engineering

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

The department of advanced energy studies energy-related research with various approaches

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https://criepi.denken.or.jp/en/electric/index.html

We conduct research on superconducting materials to contribute to the development of high-performance superconducting equipment.

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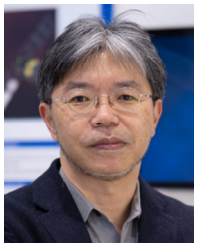
Developments and improvements of various technologies are necessary in the field of power system engineering to transform today's power system into the future innovative electric power system, which is essential for the carbon neutral society. We conduct researches to develop new techniques for power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

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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

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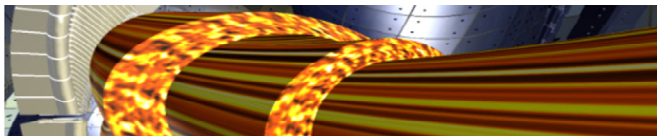
In a plasma, a large number of charged particles and electromagnetic fields produce diverse and complex physical phenomena through electromagnetic interactions. In order to realize fusion energy, it is necessary to understand and predict such complicated plasma behaviors. For this purpose, we are studying 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, Professor
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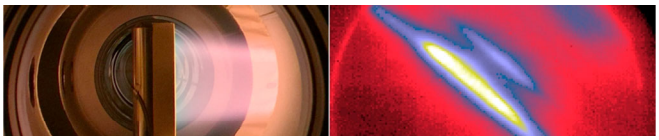
Tel: +81-(0)572-58-2148
https://www-app.nifs.ac.jp/cgi-bin/people/member.cgi?id=sakamoto_ryuichi

We are addressing the interactions between plasma and materials from the viewpoint of the magnetic confinement fusion. The plasma-material interactions are essential processes for realizing fusion plasma on the earth. For example, a solid hydrogen injection is employed to fuel hydrogen isotope into high-temperature fusion plasmas. Plasma and solid hydrogen interactions are studied for understanding the fueling processes which consist of the solid hydrogen ablation and plasmoid homogenization. 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 method 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, Associate Professor
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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 reconection, 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

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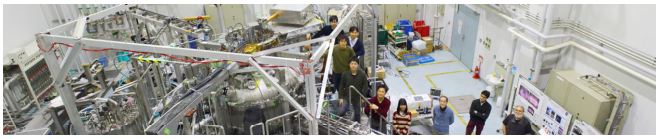
Tel: +81-(0)4-7136-3991
http://www.ppl.k.u-tokyo.ac.jp/

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.



Transportation System Engineering, Safety and Reliability Engineering, Certification Engineering, Risk Management

"Safety Design for Advanced Human Mobility by Land Transportation" Laboratory

Research on evaluation methods for advanced transportation systems, including autonomous driving, is a keyword that will save Japan with a declining birthrate and an aging population

Takeshi Mizuma, Professor
E-mail: mizuma@edu.k.u-tokyo.ac.jp
Tel: +81-(0)4-7136-5554
http://www.l-transport.k.u-tokyo.ac.jp/mizlab/index-e.html

At the Mizuma Laboratory, we are conducting research on safety and reliability evaluation technology and certification engineering for transportation systems.

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, 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, 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.

【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 5 (Wed) 2021. Refer instructions in Guidelines for Applicants of GSFS.

(2) Undergraduate grades.

Applicants must submit a GPA 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. The details of the calculation method will be sent with an admission ticket prior to the examination.

(3) Specialized Subject (Essay)

The theme of essay and an answer sheet will be sent to applicants with an admission ticket prior to the examination. Examinees must submit their essays written on the shee byAugust 5 (Thu) according to the instruction therein. If the essay is not submitted, the examinee will fail. All the examinees are requested to attend the examination with a copy of the essay against a postal failure. In case you do not receive the ticket and answer sheet by July 21 (Wed), make contact with Student Affairs Team, Graduate School of Frontier Sciences.

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 24 (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 25 (Wed) 9:00～18:00	Online		

※ After finishing the written exam on August 24 (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 30 (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 20 (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 27 (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 “Chosa Hyou” information at the application.

6. **Entrance in October**

Applicants can request to enter the graduate school in October 2021 instead of April 2022 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 (however, the Chosa Hyou is not required). International applicants must submit a certificate of expected graduation as well.
  (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 the check sheet.

［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)

(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 5 (Wed) 2021. Refer instructions in Guidelines for Applicants of GSFS.

(2) Undergraduate and graduate grades

Applicants must submit a GPA 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. The details of the calculation method will be sent with an admission ticket prior to the examination.

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 September 2021 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 24 (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 25 (Wed) 14:00～18:00 August 26 (Thu) 9:00～12:00	Online		

(2) Secondary Examination

The examination regarding the master thesis or its equivalent is conducted around the middle of February 2022 for the applicants wishing to enter in April 2022. Details of this exam will be announced only to the applicants successful in the primary exam. For the applicants wishing to enter in September2021, 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 "Chosa Hyou" information at the application.

6．Entrance in October

Applicants can request to enter the graduate school in October 2021 instead of April 2022 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 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 (however, the Chosa Hyou is not required). International applicants must submit a certificate of expected graduation as well.

(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 the check sheet.

［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 20, 2021, 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.

Chosa Hyou

Master

YEAR 2022

Master Cource

Chosa Hyou (no need to submit)

The contents of this Chosa Hyou must be submitted into the web-entry form after receiving instruction.

Name		Ticket number (No entry)	
University Graduated	University: Department:	Faculty: Year Mo. (graduated/expected)	
Laboratory			
Contact Address			
Home address & Tel. No.	Tel : (Cell Phone No. if available :)		

Please write numbers indicating supervisors that you wish to be assigned in order of desire from 1st hope to 6th desire. In addition, faculty members not listed below do not recruit students this year. * Person who wishes nuclear fusion research education program (Hiroshi Yamada, Yasushi Ono, Ryo Ono, Michiaki Inomoto, Hideo Sugama, Ryuichi Sakamoto, Shunsuke Usami, Masaki Nishiura, and Haruhiko Saitoh) should surround the alphabet with circles.

1st	2nd	3rd	4th	5th	6th	e. g. 1	e. g. 2
						1	②

1 Yamada, Hiroshi	8 Fujimoto, Hiroshi	15 Kwak, Dongyoun	22 Sugama, Hideo
2 Ono, Yasushi	9 Baba, Jumpei	16 Aoki, Yuichiro	23 Sakamoto, Ryuichi
3 Ohsaki, Hiroyuki	10 Okamoto, Koji	17 Nemoto, Koshichi	24 Usami, Shunsuke
4 Suzuki, Kojiro	11 Koizumi, Hiroyuki	18 Ichinose, Ataru	25 Nishiura, Masaki
5 Uenishi, Koji	12 Saitoh, Haruhiko	19 Nagata, Masaki	26 Shimizu, Osamu
6 Ono, Ryo	13 Tanabe, Hiroshi	20 Kawakatsu,Yasuhiro	27 Fujita, Yoshiyuki
7 Inomoto, Michiaki	14 Fujita, Kazuo	21 Sakai, Shinichiro	

Descrive your motivation for appling to the department

(For Special Selection for International Student) Applicants who want to apply to the special selection should indicate in the right box.	
(For entrance in September 2020) Applicants who want to enter the graduate school in September 2020 should indicate in the right box. Caution: The applicants who failed to finish the entrance procedure or failed to get a valid visa in designated period cannot enter in April 2021 instead.	

Select one or more options for English exam you wish to take	TOEFL and/or TOEIC score sheet	[encl. in application] [submit by August 5 (Wed)]

Check list of Submitting Materials (Master Course)

□	Form to Attach Payment Certificate	Refer to the Boshu-Yoko for details including exceptions and payment method
□	Transcripts of Academic Records (GPA)	Scores of both special and general education
□	Inquiry Sheet (Chosa Hyou)	Submission at a later date
□	TOEFL/TOEIC score sheet	If you cannot make it in time, you can do it up to the day before the examination.

□	Diploma or graduation certificate from university	Only those who have graduated from a university or a graduate school at the time of application
□	Diploma, graduation certificate or a statement of anticipated graduation from university or from graduate school	Only non-Japanese applicants (If written in a language other than Japanese or English, attach a Japanese or English translation) No need for applicants who have graduated from University of Tokyo, including anticipated graduation by March 31, 2021
□	Certificate of Foreign Resident Registration	Only non-Japanese applicants living in Japan

Doctor

Doctor Cource

Chosa Hyou

YEAR 2022

The contents of this Chosa Hyou must be submitted into the web-entry form after receiving instruction.

Name		Ticket number (No entry)	
University Graduated	University: Department:	Graduate School: Year Mo. (graduated/expected)	
Laboratoy			
Contact Address			
Home address & Tel. No.	Tel : (Cell Phone No. if available :)		
Prospective Supervising Professor	* Do you wish to be admitted in the Nuclear Fusion Research Education Program? (Yes No) Check Yes or No.		
Descrive your motivation for appling to the department			

(For Special Selection for International Student) Applicants who want to apply to the special selection should indicate in the right box.	
(For entrance in September 2021) Applicants who want to enter the graduate school in September 2021 should indicate in the right box. Caution: The applicants who failed to finish the entrance procedure or failed to get a valid visa in designated period cannot enter in April 2022 instead.	

Select one or more options for English exam you wish to take	TOEFL and/or TOEIC score sheet	[encl. in application] [submit by August 5 (Wed)]

Check list of Submitting Materials (Doctor Course)

□ Form to Attach Payment Certificate	Refer to the Boshu-Yoko for details including exceptions and payment method
□ Transcripts of Academic Records of all universities attended	Scores of both special and general education in undergraduate and in master course of graduate school
□ Inquiry Sheet (Chosa Hyou)	Submission at a later date
□ TOEFL/TOEIC score sheet	If you cannot make it in time, you can do it up to the day before the examination.
□ Research plan	Prescribed in the explanatory leaflet

□ Diploma or graduation certificate from graduate school	Only those who have finished a graduate school at the time of application
□ Diploma, graduation certificate or a statement of anticipated graduation from university and from graduate school	Only non-Japanese applicants (If written in a language other than Japanese or English, attach a Japanese or English translation) No need for applicants who have finished the graduate school in University of Tokyo, including anticipated graduation by March 31, 2021
□ Certificate of Foreign Resident Registration	Only non-Japanese applicants living in Japan