

October 3 - 7, 2022 Sendai International Center Sendai, Japan

11th International Conference on Reactive Plasmas / 75th Annual Gaseous Electronics Conference / 40th Symposium on Plasma Processing (SPP-40) / 35th Symposium on Plasma Science for Materials (SPSM35)



Organized by
International Organizing Committee of ICRP-11
GEC Executive Committee
Co-sponsored by
The Japan Society of Applied Physics
Supported by:
American Physical Society
Plasma Electronics Division, The Japan Society of Applied Physics

https://www.ecei.tohoku.ac.jp/plasma/ICRP-11/

Cooperative Societies

Japan Welding Society

Smart Processing Society for Materials, Environment & Energy

The Chemical Society of Japan

The Electrochemical Society of Japan

The Institute of Electrical Engineers of Japan

The Institute of Electronics, Information and Communication Engineers

The Institute of Electrostatics Japan

The Institute of Engineers on Electrical Discharges in Japan

The Japan Society of Mechanical Engineers

The Japan Society of Plasma Science and Nuclear Fusion Research

The Japan Society of Vacuum and Surface Science

The Materials Research Society of Japan

The Physical Society of Japan

The Society of Chemical Engineers, Japan

The Surface Finishing Society of Japan

Contents

Cooperative Societies	1
General Information	2
Scientific Program	3
Contributed Papers	7
Social Events	8
Committees	9
Hotel Accommodation	11
Visas	12
Further Information	12
Calendar of Events	12
Travel Information	13

General Information

The International Conference on Reactive Plasmas (ICRP) has taken place by the initiative of the Division of Plasma Electronics, the Japan Society of Applied Physics since 1991. The 1st ICRP was held in Nagoya, the 2nd in Yokohama (1994), the 3rd in Nara (1997), and the most recent conference (10th ICRP) in Sapporo (2019). Some former ICRPs were held as international joint conferences: the 4th ICRP was with the Gaseous Electronics Conference (GEC) at Maui in 1998, the 5th was with European Conference on the Atomic and Molecular Physics of Ionized Gases (ESCAMPIG) at Grenoble (2002), the 7th was with GEC at Paris in 2010, 9th was with GEC at Honolulu in 2015, and 10th was with International Conference on Phenomena in Ionized Gases (ICPIG) at Sapporo in 2019. The Symposium on Plasma Processing (SPP) is a domestic annual Japanese meeting that has been held by the Division of Plasma Electronics since 1984. The joint ICRP and SPP conference aims to gather researchers and engineers, involved in various aspects of reactive plasmas and their applications. The joint conference also aims to facilitate the exchange of information and ideas among them within an international framework.

The subjects covered in this conference are the entire field of reactive plasmas and their applications to various materials processing such as surface modification, etching and deposition with emphasis on basic phenomena, technologies, and the underlying basic physics and chemistry. Furthermore, the subjects have been extended to bio- and/or medical application of plasmas. This conference particularly encourages papers dealing with basic properties of the plasma itself, its generation and control, fundamental processes in the plasma, and plasma-solid/liquid interactions. Papers dealing with specific results of processing should place emphasis on the related plasma characteristics in obtaining the results.

The 11th ICRP will take place in October 3-7, 2022, in Sendai, Japan, as a joint conference with the 75th GEC. This conference will also be held as a joint conference with the 40th Symposium on Plasma Processing and 35th Symposium on Plasma Science for Materials (SPSM35). The conference site will be at Sendai International Center at Sendai.

The ICRP-11/GEC2022/SPP-40/SPSM35, a four-day conference, will consist of a series of oral sessions (composed of both invited and contributed papers), poster sessions, award lectures, and arranged sessions on selected topics. Sessions will be organized around coherent subjects in order to facilitate useful discussions and focus on appropriate solutions to problems.

The official language of the conference is English, and will be used for all presentations and printed materials.





Scientific Program

Conference Topics

General Sessions:

1 Atomic and molecular collisional and dynamical processes

- 1.1 Electron and photon collisions with atoms and molecules: excitation
- 1.2 Electron and photon collisions with atoms and molecules: ionization
- 1.3 Heavy-particle collisions
- 1.4 Dissociation, recombination and attachment
- 1.5 Distribution functions and transport coefficients for electrons and ions
- 1.6 Other atomic and molecular collision phenomena

2 Plasma science

- 2.1 Nonequilibrium kinetics of low-temperature plasmas
- 2.2 Basic plasma physics phenomena in low-temperature plasmas
- 2.3 Plasma boundaries: sheaths, boundary layers, others
- 2.4 Plasma-surface interactions
- 2.5 Plasma diagnostic techniques
- 2.6 Modeling and simulation: computational methods
- 2.7 Modeling and simulation: validation and verification
- 2.8 Modeling and simulation: plasma sources
- 2.9 Modeling and simulation: chemical reactions
- 2.10 Modeling and simulation: other
- 2.11 Glows: dc, pulsed, microwave, others
- 2.12 Capacitively coupled plasmas
- 2.13 Inductively coupled plasmas
- 2.14 Magnetically-enhanced plasmas: ECR, helicon, magnetron, others
- 2.15 Atmospheric and high pressure plasmas: jets and gliding arcs
- 2.16 Atmospheric and high pressure plasmas: dielectric barrier and corona discharges
- 2.17 Atmospheric and high pressure plasmas: catalysis and chemical conversion
- 2.18 Thermal plasmas: arcs, jets, switches, others
- 2.19 Plasmas in liquids
- 2.20 Plasma on or contacting liquids
- 2.21 Plasmas and aerosols
- 2.22 Negative-ion and dust-particle-containing plasmas
- 2.23 Gas phase plasma chemistry
- 2.24 Other plasma science topics

3 Plasma applications

- 3.1 Plasmas for light production: laser media, glows, arcs, flat panels, and novel sources
- 3.2 Plasma etching
- 3.3 Plasma deposition
- 3.4 Plasma ion implantation
- 3.5 Green plasma technologies: environmental and energy applications
- 3.6 Plasma processing for photovoltaic applications
- 3.7 Biological, medical, and agricultural applications of plasmas
- 3.8 Plasma propulsion and aerodynamics
- 3.9 Plasmas for nanotechnologies, flexible electronics, and other emerging applications
- 3.10 Plasma for other materials processing and synthesis

Workshop:

- 1. Industrial plasma technologies
- 2. Plasma physics for space propulsion technologies
- 3. Functional surfaces in plasma elementary and process-applicable reactions
- 4. Catalytic effects in plasma-liquid interaction

Plenary and Invited Speakers (tentative)

Plenary:

Will Allis Prize Talk



Makabe, Toshiaki (Keio University, Japan)
"40 years with studies on radiofrequency plasma and related transport theory"

The GEC Executive Committee is pleased to recognize Professor Emeritus Makabe as the recipient of the 2022 Will Allis Prize for the Study of Ionized Gases.

Reactive Plasma Award Talk



Hori, Masaru (Nagoya University, Japan)
"Evolution of Reactive Plasma Processes by Radical Control" (tentative)

The International Organizing Committee of ICRP-11 is pleased to recognize Professor Hori as the recipient of the 2022 Reactive Plasma Award.

General Sessions:

Adamovich, Igor
Agarwal, Sumit
Akatsuka, Hiroshi
Barrachina, Raul
Ohio State University, USA
Colorado School of Mines, USA
Tokyo Institute of Technology, Japan
Bariloche Atomic Centre, Argentina

Barret, Steven Massachusetts Institute of Technology, USA

Bourdon, Anne Ecole Polytechnique, France

Camata, Renato University of Alabama at Birmingham, USA
Charles, Christine The Australian National University, Australia
Chang, Bingdong Technical University of Denmark, Denmark

Chiang, Wei-Hung National Taiwan University of Science and Technology, Taiwan

Choe, Wonho Korea Advanced Institute of Science and Technology, Korea

Colgan, James Los Alamos National Laboratory, USA

Cvelbar, Uros Jožef Stefan Institute, Slovenia

Fontes, Christopher Los Alamos National Laboratory, USA

Gans, Timo Dublin City University, Ireland

Gherardi, Matteo University of Bologn, Italy

Gibson, Andrew Ruhr University Bochum, Germany Hamdan, Ahmad Université de Montréal, Canada

Hara, Kentaro Stanford University, USA

Haruyama, Tetsuya Kyushu Institute of Technology, Japan

Helmersson, Ulf Linköping University, Sweden

Hill, Christian Vienna International Centre, Austria

Hoshino, Masamitsu Sophia University, Japan

Iqbal, Muzammil Korea Institute of Machinery and Materials, Korea

Ishikawa, Kenji Nagoya University, Japan Kadyrov, Alisher Curtin University, Australia Kamataki, Kunihiro Kyushu University, Japan Kersten, Holger Kiel University, Germany

Komuro, Atsushi The University of Tokyo, Japan

Lacoste, Deanna King Abdullah University of Science and Technology, Saudi Arabia

Laroussi, Mounir Old Dominion University, USA
Levko, Dmitry Esgee Technologies Inc., USA
Likhanskii, Alexandre Applied Materials, Inc., USA

Lietz, Amanda North Carolina State University, USA

Lim, Yegeon Korea Advanced Institute of Science and Technology, Korea

Liu, Dingxin Xi'an Jiaotong University, China

Maguire, Paul Ulster University, UK

Mesbah, Ali University of California, Berkeley, USA Nagashima, Yasuyuki Tokyo University of Science, Japan

Namba, Shinichi Hiroshima University, Japan

Nunomura, Shota National Institute of Advanced Industrial Science and Technology, Japan

O'Connor, Robert
Oehrlein, Gottlieb
University of Maryland, USA
Ptasinska, Sylwia
University of Notre Dame, USA
University of Physics Belgrade, Serbia
Ren, Xueguang
Xi'an Jiaotong University, China

Scheiner, Brett Los Alamos National Laboratory, USA Schücke, Lars Ruhr-University Bochum, Germany

Shigeta, Masaya Tohoku University, Japan

Shinoda, Kazunori Hitachi, Ltd., Japan

Smolyakov, Andrei University of Saskatchewan, Canada Sun, Jing-Yu Dalian University of Technology, China

Suzuki, Haruka Nagoya University, Japan

Tachikawa, Masanori Yokohama City University, Japan

Takashima, Keisuke Tohoku University, Japan

Trelles, Juan P. University of Massachusetts Lowell, USA

Trieschmann, Jan Brandenburg University of Technology, Germany

Uchida, Giichiro Meijo University, Japan

Veilleux, Jocelyn Universite de Sherbrooke, Canada Zhang, Cheng Chinese Academy of Sciences, China

Zhang, Yuantao Shandong University, China

Zheng, Bocong Fraunhofer USA Center Midwest, Michigan State University, USA

Workshops:

Industrial plasma technologies

Moriya, Tsuyoshi Tokyo Electron Limited, Japan Kim, Jaeho Samsung Electronics, Korea

Lee, Dae Hoon Korea Institute of Machinery and Materials, Korea

Kenney, Jason Applied Materials, USA

Ohtake, Hiroto Hitachi High Technologies America, USA

Tatsumi, Tetsuya Sony Semiconductor Solutions Corporation, Japan

Plasma physics for space propulsion technologies

Boswell, Rod Boswell Technologies, Australia

Merino, Mario Universidad Carlos III de Madrid, Spain

Little, Justin University of Washington, USA

Fruchtman, Amnon Holon Institute of Technology, Israel
Mazouffre, Stéphane CNRS - ICARE laboratory, France
Kawashima, Rei Shibaura Institute of Technology, Japan

Cho, Shinatora Japan Aerospace Exploration Agency, Japan

Functional surfaces in plasma elementary and process-applicable reactions

Kurahashi, Mitsunori National Institute for Material Science, Japan Nakamura, Hiroaki National Institute for Fusion Science, Japan

Ibano, Kenzo Osaka University, Japan

Nozaki, Tomohiro Tokyo Institute of Technology, Japan Kim, June Young Seoul National University, Korea

Stamate, Eugen Technical University of Denmark, Denmark

Catalytic effects in plasma-liquid interaction

Zhou, Renwu University of Sydney, Australia

Murakami, Tomoyuki Seikei University, Japan Shimizu, Naohiro Nagoya University, Japan

Bogaerts, Annemie University of Antwerp, Belgium

Contributed Papers

Call for Contributed Papers

Abstracts:

Those who intend to contribute a paper are requested to submit a GEC abstract through the GEC website (http://www.apsgec.org/gec2022/abstracts.php). The due date for receipt of abstracts is June 10, 4 pm US Central Time (9 pm GMT), 2022. The length for the text of the abstract is limited to 1300 characters. The title, author(s), and their institutional affiliation(s) are needed for the abstract submission. It is essential that abstracts state concisely, but informatively, the objectives, methods, principal findings, and significance of the work to be presented. The abstracts will be refereed by the GEC Committee, and the authors will be notified of the acceptance of their papers for presentation in August, 2022, along with the assignment to specific oral and poster sessions. Post-deadline papers are NOT acceptable.

Proceedings:

The authors are strongly recommended to submit a paper (up to two-page) for the ICRP proceedings volume (a two-column, camera-ready form) by June 10, 4 pm US Central Time (9 pm GMT), 2022, prepared according instructions appear **ICRP** webpage to those in the (https://www.ecei.tohoku.ac.jp/plasma/ICRP-11/submissions_step2.html#page). The conference proceedings containing invited and contributed papers will be available and are included in the registration fee. Please be noted that, before the ICRP proceedings paper submission, completion of GEC abstract submission and acquisition of log number of GEC abstract through the GEC abstract submission are required.

JJAP Special Issue:

Invited speakers

The invited speakers are invited to submit a manuscript for the special issue of Japanese Journal of Applied Physics (JJAP) published by IOP Publishing. JJAP accepts original full papers (regular papers) as well as reviews (progress reviews, recommended). JJAP recognizes speakers in satellite workshops as invited speakers and accepts their manuscripts. All accepted papers in the special issue of JJAP will be freely available to public for one year.

Contributed presenters

The presenters of contributed for oral or poster presentations are invited to submit an original full paper for the special issue of JJAP. All accepted papers in the special issue of JJAP will be freely available to public for one year.

Submission site will be opened at 14 September 2022 (tentative) Deadline for submissions 31 January 2023

Information of the special issue of JJAP

Authors are requested to read the policy on "Submission of original JJAP papers based on contents already published in conference proceedings, extended abstracts, or the likes" carefully before paper submission.

https://journals.jsap.jp/wp-content/uploads/policy.pdf

The link for the template (both for regular paper and progress review): https://journals.jsap.jp/wp-content/uploads/template-RP.docx

Manuscript types in the special issue of JJAP

Progress Reviews: Progress Reviews provide concise, efficient overviews covering the latest progresses in a specific research area of applied physics. It can include or be largely based on the recent results from the author(s). Manuscripts should be written as concisely as possible although no limitation on length is specified. Abstract should be no more than 150 words.

Regular Papers: A Regular Paper is an original paper with comprehensive, detailed descriptions of the research work, presenting a fully developed discussion on the results obtained in relevant fields of applied physics. It must provide sufficient and self-contained information to ensure the repeatability of experiments and analyses by readers. There is no length limit. The expected number of references is approximately more than 30. No upper or lower limit is specified.

Social Events

Welcome Reception:

Monday, October 3, 2022.

Banquet:

Thursday, October 6, 2022.

Closing Ceremony:

Friday, October 7, 2022.

ICRP Committees

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Kanazawa University
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N. Kuboi Sony Corporation

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T. Kaneko (Secretary) Tohoku UniversityS. Baalrud (Secretary elect) University of Michigan

A. Derzsi (Treasurer) Wigner Research Centre for Physics, Hungary

K. Bera Applied Materials Inc.
 M. Koepke West Virginia University
 M. Kushner University of Michigan
 S. Quintanilla University of North Texas

S. Reuter Ecole Polytechnique de Montreal

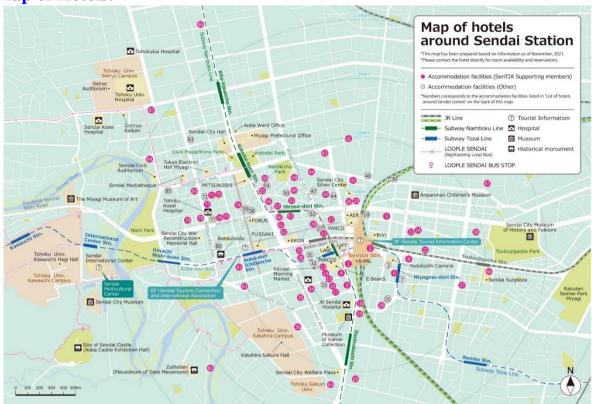
T. Shimizu National Institute of Advanced Industrial Science and Technology

Hotel Accommodation

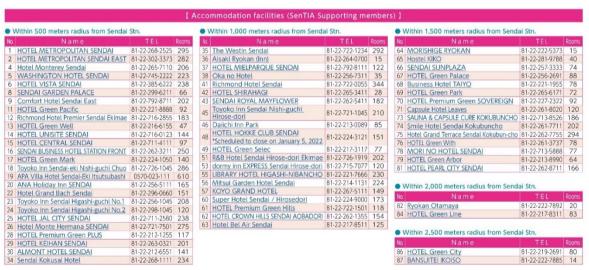
There are many hotels in Sendai. We recommend that you make your own reservations at the hotel reservation websites listed below.

Expedia Booking.com Trivago

Map of Hotels:



List of Hotels:



Printed version of map and list of hotels:

https://www.sentia-sendai.jp/conventionnavi-en/wp-content/themes/theme_convnavi_child/pdf/w2022-sendai_hotels_list-en_202202.pdf

Visas

Firstly, please complete the advanced registration. Check the "Guide to Japanese VISA" through the URL below.

Ministry of Foreign Affairs of Japan (http://www.mofa.go.jp/j_info/visit/visa/index.html)

Please fill in the necessary documents for your VISA application and send by e-mail to the ICRP-11 Congress Secretariat

(E-mail: icrp11@senkyo.co.jp).

We will complete the documents and send back to you by mail.

Further Information

Details of the scientific program and daily schedule will be given in the third announcement, which will be posted on ICRP website around September. All questions for further information regarding this conference should be directed to the Conference Chair.

Also available is the ICRP-11/GEC2022 URL: https://www.ecei.tohoku.ac.jp/plasma/ICRP-11/index.html

If you know of individuals who may have a paper to contribute and have not received this *Second Announcement and Call for Papers*, please bring it to their attention.

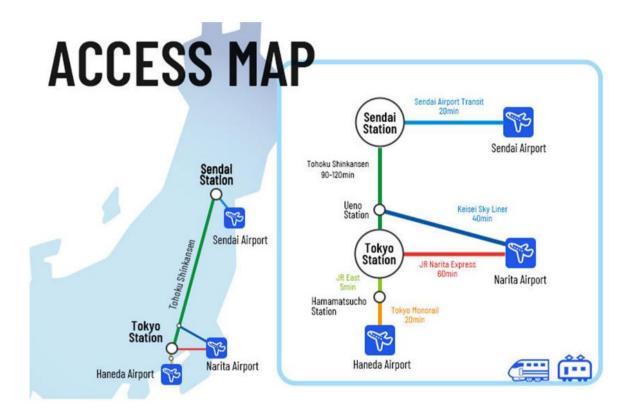
Calendar of Events

GEC abstract deadline	June 10, 2022
Paper deadline for a ICPR proceedings	
(up to two pages, a two-column, camera-ready form)	June 10, 2022
Deadline for student travel support	June 10, 2022
Registration starts	July, 2022
Notification of acceptance	August 2022
Final announcement/program	September 2022
ICRP-11 / GEC 2022	October 3-7, 2022
Papers deadline for JJAP special issue	January, 2023

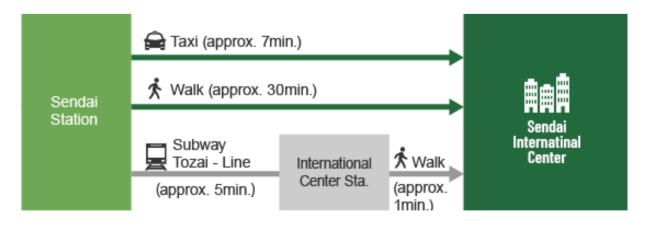
Travel Information

Tokyo has two international airports, Haneda and Narita, with many international flights, making it easy to get to Japan from anywhere in the world. There are two daily direct flights from Narita airport to Sendai. It takes 30 minutes by train from Sendai Airport to downtown Sendai. On the other hand, if you are traveling by train from Narita or Haneda airports, you can take the Shinkansen (bullet train) from the respective airports to Sendai via Tokyo Station. It takes 90 minutes from Tokyo Station to Sendai Station by Shinkansen.

Access 1: form Tokyo Airports (Narita/Haneda) to Sendai Station



Access 2: form Sendai Station to the venue



ICRP-11 Office

Congress Secretariat

 $E\text{-mail}: icrp\text{-}11@grp.tohoku.ac.jp}$

URL: https://www.ecei.tohoku.ac.jp/plasma/ICRP-11/