Conference Program

Online Conference

ITC31
The 31st International Toki Conference on Plasma and Fusion Research
Expanding academic world emerging from fusion science
November 8-11, 2022

ITC31 Timetable

Nov. 8th Tuesday

9:15 - Opening
9:45 - Keynote Session

10:00 - Poster 1
13:00 - Organized Session 1A
   - Structure formation and sustainability
15:00 - Organized Session 1B
   - Safety science and engineering for fusion power complex
18:00 - Organized Session 2A
   - Organized Session 2B

Nov. 9th Wednesday

9:00 - Organized Session 2A
   - Plasma quantum processes
9:30 - Organized Session 2B
   - Applied superconductivity and cryogenics
11:30 - Poster 2
13:00 - Organized Session 3A
   - Phase space turbulence
15:00 - Organized Session 3B
   - Meta-hierarchy dynamics
18:00 - Organized Session 4A
   - Organized Session 4B

Nov. 10th Thursday

9:00 - Organized Session 4A
   - S&I: Sensing and intellectualization
9:30 - Organized Session 4B
   - Ultrahigh-flux concentrating materials
11:00 - IUPAP Session
15:00 - Organized Session 5A
   - Transport in plasma multi-phase matter system
15:15 - Organized Session 5B
   - Plasma apparatus
18:15 - Organized Session 4A cont.

Nov. 11th Friday

9:00 - Organized Session 5A
   - Complex global simulation
13:00 - Summary Session
13:45 - Student Award & Closing
1st day – November 8th, 9:15 – 18:00(JST)

Opening Session (9:15 – 9:45)
Chair: Yasushi Todo (National Institute for Fusion Science)

Keynote Session (10:00 – 12:00)
Chair: Ryuichi Sakamoto (National Institute for Fusion Science)

10:00 – 11:00 PL1: Zensho Yoshida (National Institute for Fusion Science)
Future of fusion science -- perspective of general physics

11:00 – 12:00 PL2: Amitava Bhattacharjee (Princeton Plasma Physics Laboratory, Princeton University)
Current sheets and the plasmoid instability: mediators of fast magnetic reconnection and turbulence

Poster Session 1 (13:00 – 15:00)
cf. “Poster List” in ITC31 web

Organized Session 1A “Structure formation and sustainability”
(15:00 – 18:00)
Chair: Masaki Osakabe (National Institute for Fusion Science)

15:00 – 15:25 1A-1: Hiroyuki Yamaguchi (National Institute for Fusion Science)
Direction and perspectives of “Structure formation and sustainability” unit

Research plan in the “Structure Formation and Sustainability” unit

15:50 – 16:00 Break

16:00 – 17:00 1A-3: Per Helander (Max-Planck Institute for Plasma Physics)
Stellarators optimisation: a brief review

17:00 – 17:30 1A-4: Takuma Sugi (Hiroshima University)
Active matter physics and high-speed single-shot 4D imaging

17:30 – 18:00 1A-5: Takahiko Ban (Osaka University)
Maximum Entropy Production Principle in Spontaneous Structure
Organized Session 1B “Safety science and engineering for fusion power complex” (15:00 – 18:00)
Chair: Yoshitaka Mori (The Graduate School for the Creation of New Photonics Industries)

15:00 – 15:45 1B-1: Naoko Ashikawa (National Institute for Fusion Science)
Safety Science and Engineering for Fusion Power Complex

15:45 – 16:40 1B-2: Ian Chapman (UKAEA, Culham Science Centre)
An overview of the UK fusion programme

16:40 – 16:50 Break

16:50 – 17:10 1B-3: Jumpei Baba (The University of Tokyo)
Current state of electric power systems in Japan and expectations for fusion energies

17:10 – 17:30 1B-4: Hiroko Shoji (Chuo University)
Modeling a sense of security, “Anshin-kan”

17:30 – 18:00 Discussion
2nd day – November 9th, 9:00 – 18:45 (JST)

Organized Session 2A “Plasma quantum processes” (9:00 – 11:30 & 18:15 - 18:45)
Chair: Daiji Kato (National Institute for Fusion Science)

9:00 – 9:25 2A-1: Izumi Murakami (National Institute for Fusion Science)
Research on Plasma Quantum Processes in Various Plasmas

Quantum processes in collisional-radiative modeling of plasmas

10:20 – 10:30  Break

10:30 – 11:00 2A-3: Nobuyuki Nakamura (The University of Electro-Communications)
Plasma atomic processes studied with two complementary electron beam ion traps in Tokyo

11:00 – 11:30 2A-4: Yasuhiro Kuramitsu (Osaka University)
Relativistic ion acceleration by irradiating large area suspended graphene with an ultra-intense laser

18:15 – 18:45 2A-5: Yasushi Kino (Tohoku University)
New kinetics model of muon catalyzed fusion

Organized Session 2B “Applied superconductivity and cryogenics” (9:00 – 11:30 & 18:15 - 18:45)
Chair: Nagato Yanagi (National Institute for Fusion Science)

9:00 – 9:25 2B-1: Naoki Hirano (National Institute for Fusion Science)
Overview of the Applied Superconductivity and Cryogenics Unit

Academic Plan on Cryogenic Engineering (Applied Superconductivity and Cryogenics Unit)

9:35 – 9:45 2B-3: Yuta Onodera (National Institute for Fusion Science)
Research and development of high-temperature superconducting large-current conductors in NIFS

9:45 – 9:50  Break
9:50 – 10:20 2B-4: Wolfgang Stautner (GE Research)
Recent Advances in Cryogenics

10:20 – 10:25 Break

10:25 – 10:55 2B-5: Naoyuki Amemiya (Kyoto University)
High-current assembled conductor technology as a key for innovative applications of high Tc superconductors

10:55 – 11:00 Break

11:00 – 11:30 2B-6: Shirabe Akita (Central Research Institute of Electric Power Industry)
Power Industry in Japan and Expectations for Superconducting Application

18:15 – 18:45 2B-7: Bernhard Holzapfel (Karlsruhe Institute of Technology)
HTSC Coated Conductors for Power and Magnet applications

Poster Session 2 (13:00 – 15:00)
cf. “Poster List” in ITC31 web

Organized Session 3A “Phase space turbulence”
(15:00 – 18:00)
Chair: Yusuke Kosuga (Kyushu University)

15:00 – 15:30 3A-1: Tatsuya Kobayashi (National Institute for Fusion Science)
Research plan of phase-space turbulence unit

15:30 – 16:00 3A-2: Tokihiko Tokuzawa (National Institute for Fusion Science)
Development plan and status of phase-space diagnostics in high temperature plasma

16:00 – 16:20 Break

16:20 – 17:10 3A-3: Maxime Lesur (Université de Lorraine)
Nonlinear kinetics: from isolated hole-clump pairs to phase-space turbulence

17:10 – 18:00 3A-4: Masaki Kando (National Institutes for Quantum Science and Technology, Kansai Photon Science Institute)
Strong plasma wave excitation by an intense, short laser pulse and challenge to high-energy and high-brightness electron beams
15:00 – 15:25 3B-1: Masanori Nunami (National Institute for Fusion Science)
Prospects of Meta-Hierarchy Dynamics

Directions of Meta-Hierarchy Dynamics Unit

15:50 – 16:30 3B-3: Yasuaki Kishimoto (Kyoto University)
Dynamics and structure of plasma due to multi-scale interactions in a global open system

16:30 – 16:40 Break

16:40 – 17:20 3B-4: Yuto Katoh (Tohoku University)
Nonlinear wave-particle interactions in the Earth’s inner magnetosphere: Cross-energy and cross-scale couplings

17:20 – 18:00 3B-5: Ryoichi Yamamoto (Kyoto University)
Direct numerical simulations of active particles with fully resolved hydrodynamics
3rd day – November 10th, 9:00 – 19:15 (JST)

Organized Session 4A “S&I: Sensing and intellectualization”
(9:00 – 11:00 & 18:15 - 19:15)
Chair: Satoru Sakakibara (National Institute for Fusion Science)

9:00 – 9:30 4A-1: Ryo Yasuhara (National Institute for Fusion Science)
Introduction of S&I: Sensing and Intellectualizing Technology Unit

9:30 – 10:00 4A-2: Satoshi Ohdachi (National Institute for Fusion Science)
S&I: Sensing and Intellectualizing Technology Unit, Research Plan

10:00 – 11:00 4A-3: Kwan-Liu Ma (University of California at Davis)
Trends and Challenges of Scientific Visualization

18:15 – 19:15 4A-4: Pär Strand (Chalmers University of Technology)
FAIR and open data exchange for the fusion community

Organized Session 4B “Ultrahigh-flux concerting materials”
(9:00 – 12:00)
Chair: Teruya Tanaka, Sadatsugu Takayama (National Institute for Fusion Science)

9:00 – 9:30 4B-1: Takuya Nagasaka (National Institute for Fusion Science)
Ultrahigh-flux concerting materials

9:30 – 10:00 4B-2: Makoto I. Kobayashi (National Institute for Fusion Science)
Control and application of ultrahigh flux hydrogen in materials

10:00 – 10:10 Break

10:10 – 11:05 4B-3: Lance L. Snead (Stony Brook University)
Development of Irradiation Tolerant Materials

11:05 – 12:00 4B-4: Katsuhisa Tanaka (Kyoto University)
Metastable oxides with magnetic functionalities
IUPAP Session (13:00 – 13:45)
Chair: Hideo Sugama (National Institute for Fusion Science)

13:00 – 13:25  Akihide Fujisawa (Kyusyu University)
Introduction of IUPAP and its Centenary

13:25 – 13:45  Yuko Okamoto (Nagoya University)
IUPAP C20 Commission (Computational Physics) and Conference on Computational Physics 2023 (CCP2023)

Organized Session 5A “Transports in plasma multi-phase matter system” (15:00 – 18:00)
Chair: Masahiro Kobayashi, Hiroaki Nakamura (National Institute for Fusion Science)

15:00 – 15:30 5A-1: Suguru Masuzaki (National Institute for Fusion Science)
Introduction of the Transports in Plasma Multi-Phase Matter System Unit

15:30 – 16:20 5A-2: Sebastijan Brezinsek (Forschungszentrum Jülich)
Plasma-surface interaction in magnetically-confined plasmas: from graphite-based materials to metallic first walls

16:20 – 17:10 5A-3: Masahiro Katoh (Hiroshima University)
Physics and applications of electromagnetic radiation from relativistic electrons

17:10 – 18:00 5A-4: Kensei Kobayashi (Yokohama National University)
Prebiotic Formation of Amino Acids and Their Homochirality: With a Focus on the Roles of Cosmic Rays

Organized Session 5B “Plasma apparatus” (15:00 – 18:00)
Chair: Haruhisa Nakano (National Institute for Fusion Science)

15:00 – 15:20 5B-1: Haruhisa Nakano (National Institute for Fusion Science)
Introduction of “Plasma Apparatus” unit

15:20 – 15:45 5B-2: Katsuyoshi Tsumori (National Institute for Fusion Science)
Physics and Engineering Research of n-NBI at NIFS

15:45 – 16:10 5B-3: Haruhiko Saitoh (The University of Tokyo)
Creation and investigation of antimatter plasmas
16:10 – 16:35 5B-4: Shinji Okada (Chubu University)
_Muon and fusion science collaboration_

16:35 – 16:40  Break

16:40 – 17:20 5B-5: Magdaleno R. Vasquez Jr. (University of the Philippines Diliman)
_Development of Plasma Sources for Surface Modification_

17:20 – 18:00 5B-6: Kazunori Takahashi (Tohoku University)
_Magnetic nozzle radiofrequency plasma systems for space and industry_
Organized Session 6A “Complex global simulation” (9:00 – 12:00)
Chair: Hideaki Miura, Mieko Toida (National Institute for Fusion Science)

9:00 – 9:30 6A-1: Yasushi Todo (National Institute for Fusion Science)
Complex Global Simulation Unit

9:30 – 10:00 6A-2: Susumu Goto (Osaka University)
Data-driven turbulence modeling

10:00 – 11:00 6A-3: Anatoly Spitkovsky (Princeton University)
Simulations of multiscale plasmas in high-energy astrophysics

11:00 – 12:00 6A-4: Kengo Nakajima (The University of Tokyo)
h3-Open-BDEC: Innovative Software Infrastructure for Scientific Computing in the Exascale Era by Integrations of (Simulation + Data + Learning)

Summary Session (13:00 – 15:00)
Chair: Tomohiro Morisaki (National Institute for Fusion Science)

13:00 – 14:00 S1: Hiroshi Yamada (The University of Tokyo)
Some remarks on what is demanded and appearing in “Expanding academic world emerging from fusion science”

14:00 – 15:00 S2: Kanya Kusano (Institute for Space-Earth Environmental Research)
A few topics of plasma physics in solar physics: Eruption, Reconnection, and Dynamo

Student Award & Closing Session (15:15 – 16:00)
Chair: Yasushi Todo (National Institute for Fusion Science)