



FINAL PROGRAM

International Forum on

Applied Superconductivity and Magnetism IFASM 2022

Gold Coast Convention and Exhibition Centre

December 06-07, 2022 | Australia December 08, 2022 | Virtual

THE UNIVERSITY OF QUEENSLAND AUSTRALIA CREATE CHANGE SUPPORTERS UNIVERSITY OF WOLLONGONG AUSTRALIA ERAFTO

INSTRUCTIONS FOR SPEAKERS

- Plenary talks: Authors will be allotted 35 minutes to present their results, followed by a 5 minute discussion period.
- 2. Keynote talks: Authors will be allotted 35 minutes to present their results, followed by a 5 minute discussion period.
- 3. Invited talks: Authors will be allotted 17 minutes to present their results, followed by a 3 minutes discussion period.
- 4. Oral talks: Authors will be allotted 12 minutes to present their results, followed by a 3 minute discussion period.
- 5. Please do not exceed the allotted time slot
- 6. Speakers should have their presentations saved on a USB memory stick.
- 7. It is suggested to email a copy of the presentations to us as back up.
- 8. Please prepare the presentation in PPT files, PDF is not recommended.
- 9. Basic AV setup will be provided: laser pointer, cordless mike, desktop mike, sound system.
- 10. Laptops equipped with Windows 10, Office 2010 Pro English (Word, Powerpoint, Excel) and Adobe Reader are provided.
- 11. If your presentation files contain movies, please make sure that they are well formatted and connected to the main files. You may check your slides during the breaks.
- 12. Projectors are equipped with standard VGA connection ports. Mac users should bring their own adapter cord.
- 13. Please re-check this program prior to the conference to confirm if any changes have been made to your session.
- 14. Conference volunteers will move the mic during Q&A. Audience with questions may raise hand to receive the mic.

INSTRUCTIONS FOR POSTER PRESENTATION

- 1. Maximum poster size is A0
- 2. Push pins for attaching the poster to the board will be provided.
- 3. Poster presenters will be directed to the designated board at the start of the poster session.
- 4. Author must be present to provide details and answer questions during the selected poster session times.

SPEAKER ZOOM GUIDELINES

How to Participate in a Zoom Meeting?

If you have trouble logging in to Zoom or any technical issues, please write to us at chair@ifasmoceania.org or call us +61 0416 000 202 (Direct phone and WhatsApp).

Join a Meeting

- \cdot Join a meeting by clicking on a Zoom link provided on the program
- · Follow the prompts to download and run Zoom application
- · Enter the meeting ID if prompted
- · Click to join the audio.
- · When you are in the meeting, click on the Start Video button to start your video.

If you already have Zoom software installed: Open the Zoom platform, click 'join' and enter the meeting ID and password.

Mute/Unmute & Audio Settings

You can mute and unmute your microphone. The host also can mute you. We recommend using a headset and/or microphone as it will lead to better sound quality than using your computer audio. Turn off all sound notifications on your device. Note: During the presentation we will unmute everyone except the speaker and the chairs.

Screen Share

You will be allowed to share your screen during your presentation. Your computer screen will become visible to all the participants once you start sharing your screen. Please close all other applications on your computer so that notifications do not appear during your presentation. Keep the PowerPoint slide open on your system before you click the 'Share Screen' button. You are recommended to share the specific PowerPoint slide and not your desktop.

Q&A

The participants should use the "Raise Hand" function and the moderator will allow the participants to unmute themselves and ask questions.

Presentation Timings

Please note that all the timings mentioned in the program are as per the Brisbane time zone. Do ensure that you check the time difference well in advance and join the meeting at least 30 minutes prior to your scheduled presentation time. If you need us to tell the specific time slot for your presentation (in local time zone), do let us know.



DECEMBER 06, 2022

Time Zone: Brisbane Time (AEST)

Meeting ID: 828 2989 1253 **Join Zoom Meeting: Passcode:** 961593

https://us06web.zoom.us/j/82829891253?pwd=L1laazZ1L3lYemdFZHNHb3dmOVNydz09

8:45-9:20 Registration and Arrival Tea Meeting Room: 3

9:20-9:30 Introduction and Opening Remark

Plenary Talks (Each Talk 35 Minutes+5 Minutes Q&A)

Moderators: Shahriar Hossain, The University of Queensland, Australia

S X Dou, University of Wollongong, Australia

Online 9:30-10:10

Superconducting Magnet Design

Kathleen Amm, Brookhaven National Laboratory, USA

10:10-10:50 Online

> Recent Progress on Iron-based Superconductors Hideo Hosono, Tokyo Institute of Technology, Japan

10:50-11:20 **COFFEE BREAK** @Foyer Area

Session: Large Scale Applications of Superconductors-1

Moderator: Richard Taylor, Queensland University of Technology, Australia

11:20-11:40 Inperson (Invited)

> Superconducting Power Cable Networks for Electric Aircraft Peter Cheetham, FAMU-FSU College of Engineering, United States

11:40-12:00 Online (Invited)

Research on the Bi2212 Degradation Phenomenon of Irradiation and Stress for Magnetic

Confinement Nuclear Fusion Application

Zhenchuang Zhang, Chinese Academy of Sciences, China

12:00-12:20 Online (Invited)

Development of a New S-shaped Superconducting Hexapole Magnet

Shaoqing Wei, Chinese Academy of Sciences, China

12:20-12:40 Inperson (Invited)

Development of A 1.5T Extremity Superconducting Magnet

Riyu Wei, Magneticia Ltd, Australia

12:40-13:30 **LUNCH BREAK**

@Foyer Area

Session: Large Scale Applications of Superconductors-2

Moderator: Peter Cheetham, FAMU-FSU College of Engineering, United States

13:30-13:50 Inperson (Invited)

Nanodroplets of Liquid Metal for Flexible Printed Superconducting Circuit

Xun Xu, University of Wollongong, Australia

13:50-14:10 Online (Invited)

Development of Superconducting Magnets for Future Heavy Ion Accelerators

Wei Wu, Chinese Academy of Sciences, China

14:10-14:30 Online (Invited)

Development of On-board Magnets for the First HTS Based EDS-Maglev Test Track in China

Wei Wu, Shanghai Jiao Tong University, China

14:30-14:50 Inperson (Invited) **Superconducting our Energy Transition** Richard Taylor, Queensland University of Technology, Australia 14:50-15:10 On the Passive Shimming of A 7T Whole-body MRI Superconducting Magnet: Implementation with Minimized Ferromagnetic Materials Usage and Operable Magnetic **Force Control** Feng Liu, The Univeristy of Queensland, Australia 15:10-15:25 Online (Oral) On Refined Modelling of HTS Pinning Maglev System: Considering the Non-Uniform Electromagnetic Properties of HTS Bulk and the Irregularity Characteristics of Magnet Track Jun Zheng, Southwest Jiaotong University, China 15:25-15:40 Inperson (Oral) Design and Analysis of a Novel Fast Starting Control Method for High-temperature Superconducting Induction/Synchronous Motor with Pulse Injection Technique **Equipped in Transportation Applications** Yunfei Gao, Kyoto University, Japan 15:40-15:55 Online (Oral) pT-level Highly Sensitive TMR-superconducting Mixed Magnetic Sensor Yue Wu, Chinese Academy of Sciences, China

15:55-16:05	Coffee Break @F	oyer Area
	Session: Superconducting Materials, their Properties and Performance	
	Moderator: Xun Xu, University of Wollongong, Australia	
16:05-16:25	Online (Invited) New Binary Rare Earth Oxides as Magnetic and Superconducting Materials Tomoteru Fukumura, Tohoku University, Japan	
16:25-16:45	Online (Invited) New Strategy for High Critical Current Density: Heavily Electron Doping NdFeAs Kazumasa Iida, Nihon University, Japan	0
16:45-17:00	Inperson (Oral) Reaction Proliferation and Microstructure Characterisation of Multifilament MgE Motasim Billah, The University of Queensland, Australia	3 ₂ Wires
17:00-17:15	Inperson (Oral) Effect of Gd Addition on the Superconducting Properties of Nb _{0.6} Ti _{0.4} and Ta _{0.4} Ti _{0.5} SK Ramjan , Raja Ramanna Centre of Advanced Technology, India	₆ Alloys
17:15-17:30	Poster Presentations	
P-1	Improved DC Fault Current Limiting Characteristics of Flux-Lock Type SFCL with connection of Two Coils using Twice Quench Sung-Hun Lim, Soongsil University, Korea (South)	Series
P-2	Liquid Metal-based Tunable Resistance Electrical Insulation Layers Guyue Bo , University of Wollongong, Australia	
18:00-19:00	© Cocktails	oyer Area



13:55-14:15

DECEMBER 07, 2022

Time Zone: Brisbane Time (AEST)

Join Zoom Meeting:

https://us06web.zoom.us/j/82829891253?pwd=L1laazZ1L3lYemdFZHNHb3dmOVNydz09

Meeting ID: 828 2989 1253

09:20-09:30 Introduction & Day 2 Opening Remarks

Meeting Room:3

Passcode: 961593

03.20 03.30	introduction & Day 2 Opening Nemarks	
	Plenary Talk (Each Talk 35 Minutes+5 Minutes Q&A)	
	Moderator: Kathleen Amm , Brookhaven National Laboratory, USA	
09:30-10:10	Online Materials Challenges for High Field Cuprate Magnets David Larbalestier, Florida State University, USA	
10:10-10:50	Online Topological Superconductors by Proximity Effects Jinfeng Jia, Southern University of Science and Technology, China	
10:50-11:15	COFFEE BREAK @Foyer Area	
	Session: Advanced Property Characterisation of Superconductors	
	Moderator: Arend Nijhuis , University of Twente, Netherlands	
11:15-11:35	Inperson (Invited) Scanning Hall Probe Microscopy on Magnetically Ordered and Superconducting EuRb-1144 Single Crystals Michael Eisterer, Atominstitut, TU Wien, Austria	
11:35-11:55	Online (Invited) Nuclear Techniques to Measure and Modify Magnetic and Superconducting Films with Nanoscale Precision David Cortie, Australian Nuclear Science and Technology Organisation, Australia	
11:55-12:15	Online (Invited) Development of Iron-based Superconducting Wires for High-field Applications Yanwei MA, Chinese Academy of Sciences, China	
12:15-12:35	Inperson (Invited) Enhanced Superconducting and Electronic Properties of Low Activation MgB ₂ Superconductor for Fusion Application Mahboobeh Shahbazi, Queensland University of Technology, Australia	
12:35-13:15	LUNCH BREAK @Foyer Area	
	Session: Superconducting Wire/Tape/Bulk/Coil	
	Moderator: Mahboobeh Shahbazi, Queensland University of Technology, Australia	
13:15-13:35	Inperson (Invited) Characterization of Bi-2223 Superconducting Coils for Compact Cyclotrons in Proton Therapy Arend Nijhuis, University of Twente, Netherlands	
13:35-13:55	Online (Invited) The Development and Research Status of HTS CICC for Future Fusion Reactor	

Development of Superconducting Homopolar Electrodynamical Devices Using Sp² Carbon Allotropes-Copper Composites and Their Frictionless Modeling and Simulation in the

Presence of up to 20k Amps Direct Current

Inperson (Invited)

Jinggang Qin, Institute of Plasma Physics, China

Cesimiro Fabian, Electron Implosion Power Pty Ltd., Australia

14:15-14:35 Online (Invited) The Development of High Temperature Superconducting Maglev Transportation in **Zigang Deng**, Southwest Jiaotong University, China 14:35-14:50 Online (Oral) Structural Design of a Large-gap Superconducting Spectrometer Magnet for CEE Lu Jiaqi, Institute of Modern Physics, Chinese Academy of Sciences, China 14:50-15:05 Online (Oral) Origin of Cracks in YBCO Coated Conductors Under Axial Loading and their Interaction with Non-superconducting Phase Particles Lei Shen, Lanzhou University, China 15:05-15:20 Online (Oral) Charge Density Wave and Superconductivity in the Kagome Metal CsV, Sb, Around a **Pressure-induced Quantum Critical Point** Chongze Wang, Hanyang University, Korea (South) 15:20-15:35 Online (Oral) Degradation Characteristics of No-insulation REBCO Coils in 20-T HTS Magnet Testing Liangjun Shao, Tsinghua University, China 15:35-15:55 Coffee Break @Foyer Area Session: Magnetic and Superconducting Properties for Electronic Devices-1 Moderator: Michael Eisterer, Atominstitut, TU Wien, Austria 15:55-16:15 Inperson (Invited) Superlattices, Orbital Character and the Mechanism for Superconductivity Jose Alarco, Queensland University of Technology, Australia 16:15-16:35 Inperson (Invited) A Compact Giant Inductance Device Based on the Negative Flowing Current Across the Ferromagnetic Josephson Junction for Superconducting Electronics Feng Li, Nagoya University, Japan Inperson (Invited) 16:35-16:55 Magnetic Nanocellulose for Waste Water Treatment Nasim Amiralian, The University of Queensland, Australia 16:55-17:15 Inperson (Invited) Spin Dynamics and Magnetoelectric Coupling Mechanisms in Mn, Nb, O, Guochu Deng, Australian Nuclear Science and Technology Organisation, Australia 17:15-17:30 Online (Oral) Interrelations Among Critical Current Density, Irreversibility Field and pseudogap in Hole Doped High-T₂ Cuprates Saleh Hasan Naqib, University of Rajshahi, Bangladesh 17:30-17:45 Inperson (Oral) **Nucleation and Dynamics of Magnetic Solitons in Topological Materials** Oleg A. Tretiakov, University of New South Wales, Australia 17:45-18:05 Online (Invited) Voltage-controlled Magnetic Tunnel Junctions for High-Speed Embedded Memory and **Probabilistic Computing** Pedram Khalili, Northwestern University, USA Session: Magnetic and Superconducting Properties for Electronic Devices-2 Moderator: Kazumasa lida, Nihon University, Japan 18:05-18:25 Online (Invited) **Quantum Anomalous Semimetals** Shun-Qing Shen, The University of Hong Kong, China

18:25-18:40 Online (Oral)

Shubnikov de-Haas Oscillations and ARPES Study in Transition Metal Doped Topological

Insulators

C S Yadav, Indian Institute of Technology Mandi, India

18:40-18:55 Online (Oral)

Magnetic Moment Compensated Spin Polarized Semi-metal N. Harish Kumar, Indian Institute of Technology Madras, India

18:55-19:10 Online (Oral)

Magnetic Field-induced Peculiar Multiferroic Behavior in L-type Ferrimagnetic

 $Fe_2(MoO_4)_3$

Hung-Duen Yang, National Sun Yat-Sen University, Taiwan

Plenary Session (Online) (Each Talk 35 Minutes+5 Minutes Q&A)

Moderator: Jose Alarco, Queensland University of Technology, Australia

19:10-19:50 Online

(RE)-Ba-Cu-O Single Grain Bulk Superconductors with Improved Superconducting and

Mechanical Properties

David Cardwell, University of Cambridge, UK

19:50-20:30 Online

Climate Change and the Need For Emerging Materials and Technologies Geoffrey Levermore, Emeritus Professor, The University of Manchester, UK



ONLINE SESSIONS - ZOOM

DECEMBER 08, 2022

Time Zone: Brisbane Time (AEST)

Join Zoom Meeting:

https://us06web.zoom.us/j/82829891253?pwd=L1laazZ1L3lYemdFZHNHb3dmOVNydz09

Meeting ID: 828 2989 1253

Passcode: 961593

	Online Session: Superconductors for Industry
	Moderator: Riyu We , Magneticia Ltd, Australia
9:00-9:20	Invited Commercial Superconductors and Application Business Opportunities Michael Tomsic, Hyper Tech Research Inc., USA
9:20-9:40	Invited Development of Industrial Grade MgB ₂ Superconducting Wires and Magnet at Hyper Tech Research Matt Rindfleisch, Hyper Tech Research, USA
9:40-10:00	Invited Development of Industrial Scale Nb ₃ Sn Strands at Hyper Tech Research Xuan Peng, Hyper Tech Research, USA
10:00-10:20	Invited Recent Progress on 2G HTS Tape Development in China Yue Zhao, Shanghai Jiao Tong University, China
10:20-10:40	Invited Development of Superconducting MRI Magnet System at Ningbo Jansen Jianyi Xu & Jie Zheng, Ningbo Jansen Superconducting Technologies Co., Ltd, China
	Online Session: Superconductors: From Fundamentals to Applications-1
	Moderator: David Cortie, Australian Nuclear Science and Technology Organisation, Australia
10:40-11:00	Invited Recent Developments on Nb ₃ Sn Superconducting Undulators Ibrahim Kesgin, Argonne National Laboratory, United States
11:00-11:20	Invited High-Pressure NMR Studies of FeSe _{1-x} S _x : Interrelationships between Nematicity, Antiferromagnetic Spin Fluctuations, and Superconductivity Yuji Furukawa, Iowa state University, United States
11:20-11:40	Invited DFT/HSE06 Investigation on Low Index Surfaces of the TiSe ₂ Material to Analysis New Potential Applications Sergio Ricardo de Lazaro, State University of Ponta Grossa, Brazil
11:40-11:55	Oral Understanding the Long Length Uniformity and Potential of Bi-2212 Wires by Critical Current Distribution Measurements Shaon Barua, Florida State University, USA
	Plenary Session (Online) (35 Minutes+5 Minutes Q&A)
	Moderator: Ibrahim Kesgin, Argonne National Laboratory, United States
11:55-12:35	Plenary High-Field Magnets: MIT Magnet Lab Experience

Yukikazu Iwasa, Massachusetts Institute of Technology, USA

	Online Session: Superconductors: From Fundamentals to Applications-2
	Moderator: Ibrahim Kesgin, Argonne National Laboratory, United States
12:35-12:55	Invited Low-temperature Pulsed Field Magnetization of HTS Bulk Assembly Difan Zhou, Shanghai University, China
12:55-13:15	Invited Automatic Detection of Local Inhomogeneity in REBCO Coated Conductor by High-Speed Reel-to-Reel Scanning Hall Probe Magnetic Microscopy Coupled with Machine Learning Based Image Analysis Takanobu Kiss, Kyushu University, Japan
13:15-13:35	Invited Design Progress of the CFETR Superconducting Magnet Yong Ren, Chinese Academy of Science, China
13:35-13:55	Invited Magnetization of the Field Pole of a High-temperature Superconducting Motor Constituted of Multiple Bulks Antomne A. Caunes, Tokyo University of Marine Science and Technology, Japan
13:55-14:10	Oral Electronic and Superconducting Properties of Some FeSe-based Single Crystals and Films Grown Hydrothermally Xiaoli Dong, Chinese Academy of Science, China
14:10-14:25	Oral Screening Current Induced Stress in High Field Magnets Using REBCO Coated Conductors Timing Qu, Tsinghua University, China
14:25-14:40	Oral Challenges of Large Scale Production of 2G Wires for High Field Application at SuperOx Japan Valery Petrykin, SuperOx Japan LLC, Japan
	Online Poster Presentations
	Moderator: Motasim Billah, The University of Queensland, Australia
14:40-14:50	e-poster (7+3) Minutes Conceptual Design of an HTS Linear Power Generator for Wave Energy Conversion Petrus Kambo, Tokyo University of Marine Science and Technology, Japan
14:50-15:00	e-poster (7+3) Minutes Superconducting EIS Coil for 1.5T Whole-body MRI Magnet Ajit Dattu Nandawadekar, Inter University Accelerator Centre, India
15:00-15:10	e-poster (7+3) Minutes Some Key Issues Related to Development of the Iron-based Superconductor Inserted Coil Wenge Chen, High Magnetic Field Laboratory, China
15:10-15:20	e-poster (7+3) Minutes Analysis on Mechanical Properties of 10 MJ HTS SMES Magnet Wound by Q-ISs and STCs

e-poster (7+3) Minutes

Break

Magnet Wound by Q-ISs and STCs

15:20-15:30

15:30-17:30

Zikun Zhao, North China Electric Power University, China

Yubo Gao, North China Electric Power University, China

Analysis on Distribution of Critical Current and Thermal Stability of 10 MJ HTS SMES

	Online Session: Superconductors: From Fundamentals to Applications-3
	Moderator: Mahboobeh Shahbazi, Queensland University of Technology, Australia
17:30-17:50	Invited Influence of the Wire Diameter, Filament Size and Interval Ag Space on the Processing Window of Bi2212 Wires Zhenbao Li, Northwest Institute for Nonferrous Metal Research, China
17:50-18:10	Invited Superconducting Properties and Vortex Avalanches of High Entropy and Medium Entropy Alloys Synthesized by Melting and Powder Metallurgical Processes Jong-Soo Rhyee, Kyung Hee University, Korea (South)
18:10-18:30	Invited Hybrid Energy Transfer with Superconductivity - What is Going on Vitaly Vysotsky, All-Russian Scientific Research Institute of the Cable Industry, Russia
18:30-18:50	Invited ReBCO High-Temperature Superconductors for Future High-field Accelerator Magnets Anna Kario, University of Twente / EMS, Netherlands
18:50-19:10	Invited Vortex Commensurability and Ordered Bose Glass Phenomena in YBa ₂ Cu ₃ O ₇₋₈ Thin Films with Ultradense Pinning Landscapes Fabricated by Focused Helium Ion Beam Irradiation Wolfgang Lang, University of Vienna, Austria
19:10-19:30	Invited Intelligent and Sustainable Processing of Innovative Rare-Earth Magnets Spomenka Kobe, Jožef Stefan Institute, Slovenia
	Online Session: Superconductors: From Fundamentals to Applications-4
	Moderator: Shahriar Hossain, The University of Queensland, Australia
19:30-19:50	Invited Influence of Annealing Conditions on the Structure and Critical Parameters of MgB ₂ Superconducting Wires with Nano ¹¹ B made by CTFF Method and Future Approach for the PIT Technique Michal Babij, Polish Academy of Sciences, Poland
19:50 20:10	Invited Modification of Superconducting Properties in Nb Using Laser Technologies Luis A. Angurel, University of Zaragoza, Spain
20:10-20:30	Invited Laser based 3D Technologies to Texture Large Size Bi-2212 Superconducting Materials with different Geometries Can Ozcelik, University of Zaragoza, Spain
20:30-20:50	Invited Resonant Photoelectron Spectroscopy Unravels Out-of-plane, s-type Electronic Contributions in Bi-cuprates Christoph Janowitz, Institut für Physik, Germany
20:50-21:10	Invited Anisotropic Flux Pinning Mechanism in Fe(Se,Te) and YBCO Superconducting Films Gaia Grimaldi, National Research Council - CNR, Italy
21:10-21:25	Oral Overcoming the Challenges Associated with Joining RE-Ba-Cu-O Bulk Superconductors J V J Congreve, University of Cambridge, United Kingdom
21:25-21:40	Oral The Connection between Porosity and Superconducting Properties in YBCO Single Grains Josef Baumann, University of Cambridge, United kingdom



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