Journal of Superconductivity and Novel Magnetism (2019) 32:2717–2720
https://doi.org/10.1007/s10948-019-05248-9

PREFACE

The 6th International Conference on Superconductivity and Magnetism-ICSM2018, Kemer-Antalya, Turkey: a Dedication to Science and Technology

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Published online: 23 August 2019
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The 6th International Conference on Superconductivity and Magnetism-ICSM2018 was held at Amara Premier Palace Hotel in Kemer, Antalya, at the very heart of historical and tourist attractions between 29 April and 4 May 2018. Previous meetings of ICSM have been held at nearby Side, Antalya, Istanbul, and Fethiye.

ICSM has become a prominent platform, accepting around one thousand contributions from internationally recognized reputable research institutions in over 60 countries. The conference is focused on fundamental matters of interest in materials and their applications, particularly as concerns the interplay of superconductivity and magnetism, and the new addition of enabling technologies based on cryogenics and engineering. All the ICSM conferences have been conducted with the provision of a climate for networking and collaboration between all interested research groups in view of mutual scientific interests. As is the custom with all ICSM conferences, we held a school program prior to the conference from the 24 to 28 of April 2018 at the same venue, attended by 25 international students. It is the general policy of ICSM that every student is accepted, regardless of country of origin, ethnicity, or religion; every student is welcomed and encouraged under the principle that "Learning science and technology is a fundamental right to be welcomed by everyone as one of the most important tools in the global promotion of humanity."

Selected students have attended the intensive courses. We are grateful to Prof. Dr. Ibrahim Belenli for the very effective coordination of the lectures and the school program. It has been a good opportunity for young, talented scientists to discuss the latest scientific advancements with pioneers in their specialized fields.

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Over the recent years, growing political and economic turmoil around the world and particularly in the Middle East has had some impact on participation. However, a well-attended conference with nearly one thousand participants was conducted in harmony. We are happy to note that the delegates enjoyed the conference and left with good impressions. As organizers, we express our sincere appreciation to all delegates for their cutting edge research, and to the session chairs for their curation of high-level presentations into harmonious sessions.

The success of the conference relies on major contributions both in the organization of fully focused sessions and in the scientific issues and debates. We, the organizers, are therefore most grateful to the worldwide community of superconductivity and magnetism. As with previous conferences in the series, the program committee consisted of focused session chairs, who participated actively in the selection of works presented at the conference.

The conference began on Sunday, 29 April, with the official opening ceremony, in which the Mayor of Kemer, Mr. Mustafa Gül, and district governor, Mr. İbrahim Keklik, delivered welcoming speeches and expressed their wishes for the success of the conference. Then, Ali Gencer delivered a Keynote Speech on "Emerging Technologies for the Energy Sector: A Focus on Superconductivity Applications" in the Opening Ceremonial Session. Then, Nobel Laurate Geoffrey Levermore delivered a Keynote Speech on "Climate Change, New Technology and Anti-Science." The talk focused on renewable energies, their implementation, and the role of superconductivity in a cleaner environment and society. Finally, Sadamichi Maekawa of the Japan Atomic Energy Agency delivered a Public Dissemination Plenary titled "Spin Mechatronics–Mechanical Effects on Spintronics." The talk was centered on new technologies based on spintronics for energy efficiency. Overall, the theme for the public outreach inaugural lectures on 29 April was "Clean Energy." The plenary and half-plenary talks on research advances that were delivered during the week are listed in Tables 1 and 2.

Table 1 Plenary talks presented at ICSM 2018

Presenter	Title
Cagliyan Kurdak, University of Michigan, USA	Robustness of the Insulating Bulk in the Topological Kondo Insulator SmB6
Masahiro Yamashita, Tohoku University, Japan	New Quantum Molecular Spintronics Based on Single-Molecule Magnets: Kondo Effects, Single-Molecule Memory, Spin Qubits, and Superconductivity
Laura Greene, Florida State Univ. and National MagLab, USA	The Dark Energy of Quantum Materials
Herman Ten Kate, CERN, Switzerland	Superconducting Magnet Technology for CERN's proposed Future Circular Collider
Hideo Hosono, Tokyo Institute of Technology, Japan	10th Anniversary of High Tc Iron based Superconductors-Exploration for New Superconductors and Functional Materials
Hai-Hu Wen, Nanjing University, China	Repulsive Interaction as the Driving Force for the Pairing Mechanism in Iron-Based Superconductors
Amit Goyal, Oak Ridge National Lab., USA	Enhanced Vortex-Pinning in Superconducting Wires
Bernhard Keimer, Max Planck Institute, Germany	High-resolution Spectroscopy of High-Temperature Superconductors
Oguz Gulseren, Bilkent University, Turkey	Rise of Racetrack Memory! Domain Wall Spin-Orbitronics
Gilbert Lonzarich, University of Cambridge, UK	Kondo Lattice Systems and Reconsideration of the Doniach Phase Diagram
Eli Zeldov, Weizmann Institute of Science, Israel	Nanoscale thermal imaging of dissipation in quantum systems
Arun Bansil, Northeastern University, USA	Topological Phases of Quantum Matter as Novel Platforms for Fundamental Science and Applications

The papers in this special issue were roughly classified into fundamentals, materials, and applications for both superconductivity, magnetism, and their interplay. We appreciate the active support from the publishing editors and the journal's staff. We are confident that the booming research and highlights of the conference have been accurately reflected in the special issue. We express our thanks to Prof. Vladimir Kresin, Ms. Sara Kate Heukerott, Ms. Sanaa Ali-Virani, Ms. Emilie A. Janguin, and the rest of the staff at Springer Nature. We are also most grateful to the plenary and half-plenary speakers for their invaluable contributions. Without their active involvement and support, this conference could not have been a real success.

Some of the papers from the conference were transferred to a parallel special issue in Springer Nature Applied Sciences (SNAS), as all the papers were impossible to fit into the same issue. We apologize for any miscommunication or confusion caused by this transfer process. Some delegates made direct submissions to the journal, some of which are included in the special issue. For future ICSM special issues, we plan to make clear publication arrangements in advance to minimize possible misunderstandings. There are 10 papers published in SNAS (which can be freely accessed at the link below):

https://bit.ly/2JWH7NU

The organizing committee and international advisory board members appreciate the efforts of all invited speakers, reviewers, and contributing authors. I would like to extend my sincere thanks to Prof. Mehmet Ali Aksan and Dr. Ali Bozbey for their very hard work in conjuction with both the conference layout and review process. We also thank the finance committee for the successful budget management. For the logistics of the conference, we are very happy to have cooperated with Prof. Ekrem Yanmaz, Prof. Bekir Ozcelik, Prof. Sukru Celik, Dr. Serap Safran, Dr. Hakan Gungunes, Dr. Ozgur Ozturk, Dr. Ercan Ertekin, Dr. Ebru Kilicarslan, Dr. Haluk Koralay, Dr. Gokhan Bakir, Dr. Sukru Cavdar, Dr.

Table 2 Half-plenary talks at ICSM 2018

Presenter	Title
Tuson Park, Sungkyunkwna University, South Korea	Probing Hidden Quantum Critical Point in Unconventional Superconductors
Akiyasu Yamamoto, Tokyo Univ. of Agriculture and Tech., Japan	New Candidates for Superconducting Bulk Applications: MgB_2 and Fe-based Superconductors
Andrei Kirilyuk, Radboud University, Netherlands	All-optical Switching of Magnetization: Mechanisms and Time Scales
Neven Barisic, TU Wien, Austria	A Fresh View of the Unusual Properties of the Cuprates
Masamitsu Tanaka, Nagoya University, Japan	Cryogenic Energy-Efficient, High-Performance Computing
Ismet Kaya, Sabanci, University, Turkey	Strong Localization in Suspended Graphene
Ziad Melhem, Oxford Instruments, United Kingdom	Recent Advances in Superconducting and Cryogenics Technologies for Quantum Applications and Devices
Tomasz Dietl, International Research Centre of Spintronics, Poland	Topological Crystalline Insulators: Role of Superconductivity and Magnetism

Hakan Yetis¸ Dr. Mustafa Akdogan, Dr. Baris Guner, Dr. Firat Karaboga, Dr. Asaf Tolga Ulgen, Dr. Ozgul Karatas, Dr. Sahure Gecer, Dr. Zeliha Ertekin, Dr. Sasan Razmkhah, Ms. Merve Tugce Incel, Mr. Ozkur Kuran, Mr. Altay Karamuftuoglu, Mr. Mustafa Eren Celik, Mr. Cagri Ocal Baris, Ms. Emine Demirturk, Mr. Eren Can Aydogan, Mr. Naki Kaya, Mr. Mehmet Ekin, Mr. Yusuf Oznal, Ms. Seda Demirhan, Ms. Tugce Metin, and Mr. Serdar Oncul.

The immensely rich and diverse program was composed of both special sessions and regular sessions. The special sessions were all focused on a specific subject and headed by a single organizer, while regular sessions included a broader range of subjects. There were 54 sessions all together, with co-organizers and moderators listed below. They have all done a fantastic job in conducting the sessions. We thank them sincerely for their active, supportive work.

• A15 Superconductors, from Properties to Applications-Najib Cheggour (USA)

• Ab Initio Magnetism-Matt Probert (UK)

• Advances In Thin Films, Multi-Layers, and Patterned Nanostructures-Dogan Abukay (Turkey)

• Broken Time-Reversal Symmetry in Superconductors-Egor Babaev (Sweeden)

• Bulk Superconductors-Andres Sotelo (Spain)

• Chiral Magnetism-Solitons and Skyrmions-Javier Campo (Spain)

• Coexistence of Superconductivity and Magnetism-Norman Birge (USA)

• Cryogenics Materials, Engineering, and Applications-Yasuharu Kamioka (Japan)

• Ferrites and Rare Earth Magnetic Materials-Muhammad Anis-ur Rehman (Pakistan)

• Frustrated Magnetism and Spin Systems-Alexander Kurbakov (Russia)

• Graphene and Other 2D Materials-Theory-Oguz Gulseren (Turkey)

• Graphene-Advances in Experimental Studies-Ismet Inonu Kaya (Turkey)

• Graphene-Properties Important for Applications-Mehmet Ertugrul (Turkey)

• Heavy Fermion Systems-Daniel Braithwaite (France)

• High-Temperature Superconductors-Ivan Bozovic (USA)

• HTS Superconducting Thin Films and Interface Superconductivity-Davor Pavuna (Switzerland)

• HTS Wires, Tapes, and Coated Conductors-Hakan Yetis (Turkey)

• Iron-Based Superconductors-Advances in Crystal Growth and Thin Films-Saicharan Aswartham (Germany)

• Iron-Based Superconductors-Fundamentals, Theory and Mechanisms-Alexei Koshelev (USA)

• Iron-Based Superconductors-Properties Important for Applications-Kazumasa Iida (Japan)

• Iron-Based Superconductors-Experimental Properties of Materials-Toni Shiroka (Switzerland)

• Electronics Applications of Superconductors-Pascal Febvre (France)

• Large Scale Applications of Superconductors and their fundamental Technologies-Naoyuki Amemiya (Japan)

• Low Dimensional Magnetism-Vladislav Kataev (Germany)

• Magnet Science and Technology-Vyacheslav Klyukhin (Switzerland)

• Magnetic Materials Processing and Physical Properties-Ekrem Yanmaz, Lutfi Arda, Sultan Ozturk (Turkey)

• Magnetic Recording, Sensors, and Microwave Devices-Peter Svec (Czech Republic), Ugur Topal (Turkey)

• Magnetism and Spin Effects in Low-dimensional Materials-Junji Haruyama (Japan)

• The Magnetism of Nanoparticles, Nanowires and Nanostructures-Hakan Koçkar (Turkey)

• Magnetization Dynamics and Magnonics-Farkhad Aliev (Spain)

• Magnetocaloric Effect-Abdelwaheb Cheikhrouhou (Tunus)

• MgB_2-Materials and Applications- Hiroaki Kumakura (japan) and Hakan Yetiş (Turkey)

• Multicomponent-multiband-multigap superconductivity-Milorad Milosevic (Belgium)

• Multiferroics and Magnetic Oxides-Maxim Mostovoy (Netherlands)

• New Phenomena and Applications in Molecular Magnets-Javier Campo (Spain)

• Non-Hermitian quantum mechanics and nonequilibrium phase transitions in magnetic and superconducting systems.-Valerii Vinokur (USA)

• Novel Functional Magnetic Materials - Basic Approach and Applications-Arkady Zhukov (Spain)

• Numerical Modelling of Superconducting Materials and Applications-Mark Ainslie (UK)

• Quantum Criticality-Siddharth S. Saxena (UK)

• Recent Progress in Renewable Energy Technology and Implications-Materials Perspectives- Germán F. de la Fuente (Spain), Ali Gungor (Turkey)

• Self-organization and Transport in Bio-inspired Active Magnetic Colloids-Igor Aronson, Tanya Prozorov, Alexey Snezhko (USA)

• Shapeable Magneto-electronics-Numan Akdogan (Turkey)

• Special Memorial Session- Milestone Contributions of Alexei A. Abrikosov -Rudolf Huebener (Germany)

• Spintronics-Maciej Sawicki (Poland)

• Spintronics of magnetic semimetals, semiconductors, and topological insulators-Tomasz Dietl (Poland)

• Strongly Correlated Electrons-Systems -Tuson Park (South Korea)

• The Superconductors Under Extreme-The Hydrides Under Pressure-Katsuya Shimizu (Japan)

• Theory of Superconductivity and Magnetism-Ali Zaoui (France)

• Tuning the Physical Properties by External Strain-Samuele Sanna (Italy, USA)

• Ultrafast Magnetization Dynamics and Switching-Andrei Kirilyuk (Netherlands)

• Vortices and Nano-Structured Superconductors-Adrian Crisan (Romania)

• Vortices in Superconductors-Ferromagnetic Hybrids-Vitalii Vlasko-Vlasov (USA)

The fruitful discussions and exchanges that took place among delegates throughout the conference were emblematic of one of ICSM's key concepts: bridging the gap between East and West through scientific and technological excellence. The delegates and their companions also enjoyed the beautiful weather and the social program in the historic Kemer and Antalya region.

It is difficult to give an exhaustive overview of the conference, so instead of a very technical summary, we refer to the closing presentations. Closing remarks were made in the late afternoon, and many eminent speakers offered reviews and comments about the various main streams of ICSM2018.

It is a great pleasure for us to thank them all for their pivotal role in the organization of the conference. We would also like to thank the speakers, the participants, and the exhibitors. We are grateful to Prof. Dr. Orhan Uzun, Rector of Bartın University for his role in the allocation of financial support for the eight scientists from Central Asia. We are also grateful to the staff of Ankara University and students from universities all around Turkey for their efforts. I owe a lot to my family, so special thanks go to Sadiye, Emine Begum, and Metehan for their understanding and devotion.

Last but not the least, thank you to the supporters and exhibitors who played a vital role:

- SuperMag Ltd.
- THY(Turkish Airlines)
- TUBITAK
- Eti Maden
- Kemer Municipality and District Governor
- Zenotek Cryogenics
- Teknis
- Lake Shore
- Pavezyum Ltd.
- Springer Nature
- TIKA via Bartin University Rectorate

The next International Conference on Superconductivity and Magnetism (ICSM2020) is scheduled to occur in the spring of 2020 from 19 April to 25 April in Milas-Bodrum. Bodrum is a well-known town with many historic and tourist attractions. It will surely be a good venue for the 7th ICSM in 2020. Plus, there is the bonus of nearby Milas which has alternative tourist attractions for those with a love of nature and history, as well as the opportunity to engage in many sporting activities.

The venue hotel, La Blanche Island Resort Hotel (Guvercinlik), is located on an island only about 14 km from the international airport of Milas-Bodrum, featuring a modern updated convention center with state-of-the-art facilities. It is the most convenient location between Bodrum and Milas, easy for commutation. International delegates will be happy to hear that it is just 15 min to Milas, which hosts the international airport. Both direct flights and connections via Istanbul airports are available. Further details will be announced.

For updates and news about ICSM2020, you may visit the website https://supermag.com.tr/icsm/2020/. We hope to see as many colleagues from around the globe at the next conference for yet another successful meeting under the renewed motto "True Dedication to the Novel Approaches in Innovation, Science and Technology."

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