Final Technical Report

Grant DE-SC0016352

Recipient: Board of Regents, NSHE, obo University of Nevada, Reno

Project title: ***Conference Grant Proposal for ICOPS 2016***

Principal Investigator: Prof. Alla Safronova
University of Nevada, Reno, NV 89557, phone: (775)784-6040,
fax: (775) 784-1398, email: alla@physics.unr.edu

December 7, 2016

Abstract

ICOPS (International Conference on Plasma Science) is an internationally renowned, well-attended annual conference that involves topics of direct interest to the Office of Fusion Energy Sciences of Department of Energy. In particular, ICOPS 2016 emphasized both the traditional areas of plasma science and the new areas of growth that include but are not limited to Fusion (Inertial, Magnetic and Alternate Concepts), Particle Acceleration with Laser and Beams, High Energy Density Matter, Laser Produced Plasma, Fast Z-pinches, Computational Plasma Physics, Plasma Diagnostics, and such frontiers as studying Warm Dense Matter using the X-ray free electron lasers. The travel support of the students at ICOPS comes usually from sponsor organizations. Increasing the participation of outstanding students at ICOPS 2016 who are the first authors of the abstracts and are selected to receive the travel support based on the scientific merit of the submitted abstracts is crucial for the creation of the new generation of the plasma physicists.

I. Background

ICOPS (International Conference on Plasma Science) is an internationally renowned, well-attended conference (of approximately 600 participants) involving topics of direct interest to the Office of Fusion Energy Science of Department of Energy. The meeting is sponsored by the IEEE Nuclear and Plasma Sciences Society (NPSS). The Plasma Science and Applications Committee (PSAC) of the IEEE NPSS oversees the ICOPS conferences and their development and a PI is a member-at-large of PSAC ExCom as well as a member of International Organizing Committee of ICOPS 2016 responsible for the Student Travel Grant. ICOPS has been held annually since 1974. Recent meetings were held in Antalya Turkey (2015), Washington DC (2014), San Francisco CA (2013), Edinburgh UK (2012), Chicago IL (2011), Norfolk VA (2010), San Diego CA (2009), Karlsruhe Germany (2008), Albuquerque NM (2007), and Traverse City MI (2006). The 43rd IEEE International Conference on Plasma Science (ICOPS 2016) took place in Banff, Canada, from June 19 to 23, 2016.

II. Conference Session Format

The conference includes plenary, oral, and poster sessions on research in plasma science and technology and a Prize Address by the recipient of the Plasma Science and Applications Committee Award. Oral sessions include both invited and contributed papers. Invited papers are allotted 25 minutes for presentation and 5 minutes for questions. Contributed papers are allotted 12 minutes for presentation and 3 minutes for questions.

III. Session Topics at ICOPS 2016

Applications of plasma technologies are expanding in many new areas for fusion, materials processing, lighting, environmental protection, and medical research and treatment. All of these technologies depend on a strong underpinning of basic research traditionally supported by our meeting. Also such plasma frontiers as studying warm dense matter using the X-ray free electron lasers at SLAC are represented. The program of the 43rd ICOPS emphasizes both the traditional areas of plasma science and these new areas of growth through the plenary talks and the regular technical program.

For more information see the conference website at http://icops2016.ece.ualberta.ca/

The technical program with topics and technical area and session organizers is listed below.

Session	Technical Area coordinator or Session Organizer
1. Basic Processes in Fully and Partially Ionized Plasmas	Miles Turner (Dublin City University)
1.1. Basic Phenomena	Shantanu Karkari (Institute for Plasma Physics, India)
1.2. Computational Plasma Physics	Thomas Mussenbrock (Ruhr University, Germany)
1.3. Space Plasmas	Declan Diver (University of Glasgow, Scotland)
1.4. Partially Ionized Plasmas	Mikhail Benilov (University of Madeira, Portugal)
1.5. Dusty Plasmas and Strongly Couples Plasmas	Peter Hartmann (Hungarian Academy of Sciences)
1.6. Plasma Chemistry	Vasco Guerra (Instituto Superior Technico, Lisbon, Portugal)
2. Microwave Generation and Microwave Plasma Interaction	Will White (Sandia National Laboratories)
2.1. Intense Beam Microwave Generation	Jim Browning (Boise State University)
2.2. Fast-Wave Devices	Wenlong He (University of Strathclyde)
2.3. Slow-Wave Devices	Chris Grabowski (AFRL)
2.4. Vacuum Microelectronics and THz Devices	James Anderson (General Atomics)
2.5. Codes and modeling	Lars Ludeking (MRC, ATK)
2.6. Non-Fusion Microwave Systems	Dave Abe (NRL)
2.7. Microwave Plasma Interaction	Brad Hoff (AFRL)
2.8. THz Sources, Radiation & Applications	Eric Mueller (Coherent-DEOS)
3. Charged Particle Beams and Sources	David Hinshelwood (Naval Research Laboratory)
3.1. Plasma, Ion, and Electron Sources	David Boris (Naval Research Laboratory)
3.2. Intense Electron and Ion Beams	Mark Johnson (Sandia National Laboratories)
4. High Energy Density Plasmas and Applications	Farhat Beg, University of California, San Diego
4.1. Fusion (Inertial, Magnetic and Alternate Concepts)	Peter Norreys (Oxford University)
4.2. Particle Acceleration with Laser and Beams	Loiuse Willingale (University of Michigan)
4.3. Radiation Physics & X-ray Lasers	Greg Rochau (Sandia National Laboratories)
4.4. High Energy Density Matter	Alla Safronova (University of Nevada, Reno)
4.5. Laser Produced Plasmas	Mingsheng Wei (General Atomics)
4.6. Fast Z-Pinches	Radu Presura (Voss Scientific)
4.7. Plasma Material Interactions	Sivanandan Harilal (Pacific Northwest National Laboratory)
5. Industrial, Commercial, and Medical Applications of Plasmas	Vittorio Colombo (U. Bologna)
5.1. Non-Equilibrium Plasma Applications	Luc Stafford (Universite de Montreal)
5.2. High-Pressure and Thermal Plasma Processing	Tony Murphy (CSIRO)
5.3. Plasma Thrusters	Jean Pierre Boeuf (CNRS LAPLACE, Toulouse)
5.4. Plasmas for Lighting and Flat-Panel Displays	Georges Zissis (CNRS LAPLACE, Toulouse)
5.5. Environmental and Industrial Applications	Sylvain Coulombe (McGill University)
5.6. Medical and Biological Applications	Masaru Hori (Nagoya University)
6. **Plasma Diagnostics**	Peter Bruggeman (University of Minnesota)
6.1. Optical, X-ray, FIR and Microwave Diagnostics	Edward Barnat (Sandia National Laboratories)
6.2. Particle Diagnostics	Holger Kersten (Christian-Albrechts-Universitat zu Kiel)
6.3. Electrical (Probe) Diagnostics	Yakov Krasik (Technion - Israel Institute of Technology)
7. **Pulsed Power and Other Plasma Applications**	Hidenori Akiyama (Kumamoto U)
7.1. Insulation and Dielectric Breakdown	James Dickens (Texas Tech University)
7.2. Opening and Closing Switches	Luis Redondo (Lisbon Superior Engineering Institute)
7.3. Generators and applications	Bruce Weber (Naval Research Laboratory)

7.4. Compact Pulsed Power and Applications	Koicih Takaki (Iwate University)

IV. Plenary Speakers at ICOPS 2016

Plenary speakers delivered exciting and comprehensive talks on a broad variety of the following topics:

Riccardo Betti (University of Rochester)
"*Status and prospects for Burning Plasmas via Laser Fusion*"

David Knudsen (University of Calgary)
"*Auroral Current Systems and Arc Formation: Observations and Theory*"

Graeme Lister (Ceravision Limited)
"*Electrodeless Discharge Lighting*"

PSAC Medal winner
Christine Coverdale (Sandia National Laboratories"
"The Physics of multi-keV Emissions from Z-pinches at the Z Accelerator"

James Irby (Massachusetts Institute of Technology)
"*FIR Polarimetry on the Alcator C-Mod Tokamak*"

Mark Kushner - Birdsall Award Winner (2015) (University of Michigan)
"*Enabling Technology Innovation through Plasma Modeling*"

Gerard van Rooij (Dutch Institute for Fundamental Energy Research (DIFFER)
"*CO_2 Conversion by Plasmolysis: a Route to Solar Fuels*"

V. International Organizing Committee and Chairs at ICOPS 2016

General Chair	Dr. Ying Tsui, University of Alberta
Technical Chairs	Dr. Sylvain Coulombe, McGill University Dr. Robert Fedosejevs, University of Alberta
Treasurer & Webmaster	Dr. Manisha Gupta, University of Alberta
Publication Chair	Dr. Andrei Smolyakov, University of Saskatchewan
Mini-courses	Dr. Sylvain Coulombe, McGill University (Co-Chair) Dr. Richard Sydora, University of Alberta (Co-Chair) Dr. Francisco Jiminez, University of Alberta
Exhibits	Dr. David Field (Chair) Ms. Shaugnessy Brown, Stanford University/SLAC
Conference Management	Ms. Lisa Boyd, IEEE
Student Travel Grant	Dr. Alla Safronova, University of Nevada, Reno
Student Paper Award	Dr. Richard Marchand, University of Alberta Dr. Wojciech Rozmus, University of Alberta
Publicity	Dr. Zhijiang Chen, SLAC

VI. Students at the ICOPS conference

The students comprise of about 25% of the conference attendees and participate in both oral and posters sessions. To enhance the participation of the students and the success in their future employment in plasma science, we organized a new event "IEEE NPSS Young Professionals Symposium" on Tuesday evening of June 21, 2016. The purpose of this poster symposium was to help connecting and enhancing interactions among young professionals and potential employers. All students and young researchers (defined as less than 10 years after the completion of Bachelor degree) who submitted abstracts to ICOPS 2016 were invited to present in this poster symposium and they could also present at the regular ICOPS oral and poster sessions in addition. The event was opened to all ICOPS attendees but special efforts were made to invite potential employers to be there to meet with students and young researchers to facilitate potential job interviews and hiring at or after ICOPS.

VII. Student travel grants supported by this award

The travel support of the students at ICOPS comes usually from few sponsor organizations in a form of 5-7K grants. The PSAC ExCom of the IEEE NPSS has the Student Travel Grant Subcommittee who solicits candidates and selects student awardees to receive grants to cover partial costs of attendance at the ICOPS 2016 based on the scientific merit of the submitted abstracts.

The award was made for $7K to pay travel expenses for selected students at ICOPS 2016. Seven student presenters from various US universities were selected to receive travel grants that cover registration fee and four nights of the hotel in the amount of $1,000. The selected students were from University of Minnesota (1 student), University of Florida (1 student), the Pennsylvania State University (1 student), Stanford University (3 students) and University of Michigan (1 student). Each of the students presented either oral talk or poster and also participated in the new event "IEEE NPSS Young Professionals Symposium" focused mostly on student participation. The provided travel funding for these students gave them an excellent opportunity of attending the conference with a lot of experts in the field of plasma science, delivering very good presentations, and attending the Symposium. We believe that it was crucial in developing their research skills and for future carrier in plasma sciences.

VIII. Acknowledgement of the support

The acknowledgement of the support by the Office of Science of the U.S. Department of Energy was added to the website of ICOPS 2016.