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## Special Issue on Plenary and Invited Papers From ICOPS 2012

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# Guest Editorial

## Special Issue on Plenary and Invited Papers from ICOPS 2012

**T**HE 39th International Conference on Plasma Science (ICOPS) was held in Edinburgh, Scotland in July 2012. This was the third time that the conference was organized outside North America, the previous ones being in Karlsruhe (Germany) in 2008 and Jeju (S. Korea) in 2003. The technical programme combined seven technical areas of plasma science and technology covering a wide range of topics. The conference featured a wide range of advances in innovative plasma and beam science and applications, and served as a venue for an international community to meet and discuss their ideas and research results. More than 800 abstracts were received in 35 different topical areas, with more than half the papers originating outside the United States. The conference was attended by over 600 delegates and enjoyed the participation of over 200 registered students.

The technical programme included 7 plenary talks by world leading scientists including Prof. G. Mesyats, recipient of the 2012 IEEE Marie Skłodowska-Curie Award for “*founding the field of nanosecond pulsed power and seminal contributions to the physics of vacuum breakdown at high power levels*” and Prof. Andrew Ng, recipient of the Plasma Science and Applications (PSAC) Award for his “*outstanding research and visionary leadership in plasma research, particularly in the area of Warm Dense Matter, as well as his many contributions to the plasma science and applications community.*”

This Special Issue of the IEEE TRANSACTIONS ON PLASMA SCIENCE contains eight refereed papers representing a small collection of some of the most exciting presentations from ICOPS 2012. A comprehensive review of the physical processes in cathode spots of vacuum arcs is presented in the article by Gennady Mesyats. Mesyats develops a model of explosive emission, and applies it to explain an extensive collection of experimental data. This paper is destined to become an important reference for workers in the field of vacuum arcs. The field of electromagnetic radiation production by electron beams is represented by articles from N. S. Ginzburg *et al.* and M. Franzl *et al.*. Ginzburg *et al.* discuss a wide range of different mechanisms for creation of superradiant emission by short electron bunches. In their article, Franzl *et al.* present simulations and experimental results of microwave production by a novel magnetron device. Gary Eden *et al.* explore plasma science and technology in the limit of the small and discuss microcavity plasmas and their emerging applications in an exciting overview of recent

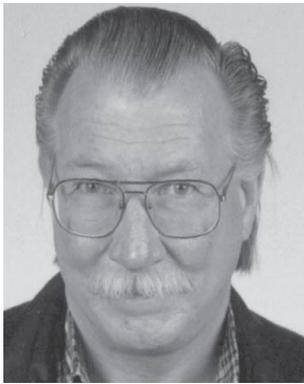
work. In the basic phenomena area, Luis Conde reports on emissive Langmuir probes in the strong emission regime for the determination of the plasma properties and the influence of thermionic emission in the interpretation of measurements. In his paper, Rajdeep Rawat discusses the exciting prospects of high-energy-density pinch plasma as a unique nonconventional tool for plasma nanotechnology. Kostya Ostrikov presents an interesting article on sustainable nanoscience for a sustainable future and on the technological side, Paul K. Chu provides an insightful review on the control of surface degradation on biodegradable magnesium alloys.

As guest editors, we would like to thank the authors for the excellent papers in this special issue. We hope this special issue will encourage the publication of similarly high-quality papers from future invited and plenary talks given at future ICOPS meetings. We also thank the many referees for their time spent in providing careful and thoughtful comments on the manuscripts. Special thanks go to the Editor-in-Chief, Dr. Steven J. Gitomer, for his support and help with details pertaining to the preparation of this special issue. The papers in this special issue were processed entirely using the IEEE Manuscript Central system, a web-based system for the submission and review of manuscripts, which greatly simplified the management of the process.

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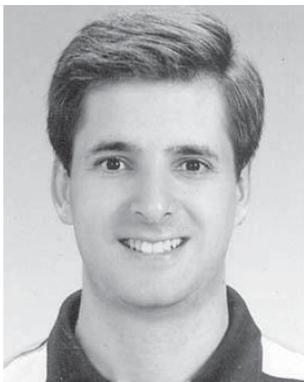


**Carl Ekdahl** received the B.A. degree in physics from San Diego State College, San Diego, CA, USA, and the M.S. and Ph.D. degrees in physics from the University of California at San Diego, La Jolla, CA.

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Dr. Iza is a Fulbright alumnus and a member of the Institute of Physics. He served as treasurer and local organising committee chair of ICOPS 2012.



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