

Guest editorial special issue on Electrical discharges in vacuum

Citation for published version (APA):

Smeets, R. P. P. (2009). Guest editorial special issue on Electrical discharges in vacuum. *IEEE Transactions on Plasma Science*, 37(8), 1346-1347. <https://doi.org/10.1109/TPS.2009.2025402>

DOI:

[10.1109/TPS.2009.2025402](https://doi.org/10.1109/TPS.2009.2025402)

Document status and date:

Published: 01/01/2009

Document Version:

Publisher's PDF, also known as Version of Record (includes final page, issue and volume numbers)

Please check the document version of this publication:

- A submitted manuscript is the version of the article upon submission and before peer-review. There can be important differences between the submitted version and the official published version of record. People interested in the research are advised to contact the author for the final version of the publication, or visit the DOI to the publisher's website.
- The final author version and the galley proof are versions of the publication after peer review.
- The final published version features the final layout of the paper including the volume, issue and page numbers.

[Link to publication](#)

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal.

If the publication is distributed under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license above, please follow below link for the End User Agreement:

www.tue.nl/taverne

Take down policy

If you believe that this document breaches copyright please contact us at:

openaccess@tue.nl

providing details and we will investigate your claim.

Guest Editorial

Special Issue on Electrical Discharges in Vacuum

IN this Special Issue, we are proud to present the expanded versions of selected papers presented at the 23rd International Symposium on Discharges and Electrical Insulation in Vacuum (ISDEIV), hosted by the University “Politehnica” of Bucharest, Bucharest, Romania, on September 15–19, 2008. The local organizing committee was chaired by Prof. Dan Pavelescu. The ISDEIV is a nonprofit international organization whose purpose is to encourage the advancement of the science and technology of electrical insulation and discharges in vacuum, primarily by conducting symposia for the exchange of scientific information. The symposia are held biennially (even number of years) and have a tradition since 1964, in a continued two-year interval. The symposia are interdisciplinary meetings for the exchange of results, presentation of progress, and discussion of ideas and challenges for the future in the field of electrical discharges and insulation in vacuum. Both fundamental and applied aspects are covered. The symposia programs consist of invited lectures, invited oral contributions, poster presentations, panel discussions, and mini courses.

Three types of awards were granted at the 2008 symposium. The Dyke Award, endowed by the Toshiba Corporation, was presented to Prof. Dmitry I. Proskurovsky, who presented the lecture “Explosive Electron Emission From Liquid-Metal Cathodes” (included in this issue). The recipients of the Chatterton Young Investigator’s Award (provided by ABB Calor-Emag Schaltanlagen AG) were Vladimir Yu. Anan’in for his paper “Hydrodynamic Model of Plasma Jet of Cathode Spot of Vacuum Arc in the Presence of External Axial Magnetic Field” (included in this issue) and Guan-Jun Zhang for his paper “Investigation on Novel Parameters Characterizing Surface Flashover Phenomena in Vacuum” (not included in this issue because it is out of this issue’s scope). The third and new award is the ISDEIV Best Paper Award—Japan Prize, which is for the best paper of the previous conference in 2006. Furthermore, this award was granted to two papers: “Conditioning of Series Vacuum Interrupters (VIs) for Medium Voltage by Applying High-Frequency (HF) Current to Increase the Dielectric Strength of VIs” by H. Fink *et al.* (published in the 2007 Special Issue of the IEEE TRANSACTIONS ON PLASMA SCIENCE, vol. 35, no. 4, pp. 873–878) and “Influence of Mechanical Finishing on Secondary Electron Emission Alumina Ceramics” by H. Suharyanto *et al.* (published in the IEEE TRANSACTIONS ON DIELECTRICS AND ELECTRICAL INSULATION, Vol. 14, Issue 3, 2007, pp. 620–626).

The ISDEIV meetings are under the supervision of the Permanent International Scientific Committee (PISC), whose current Chairman is Dr. André Anders of the Lawrence Berkeley Laboratory, and facilitated by a local organizing committee. Details on the ISDEIV and the PISC can be found at the ISDEIV website isdeiv.lbl.gov.

The manuscripts of the works that were presented at the 2008 ISDEIV are published in two different formats.

- 1) Short nonreviewed manuscripts are published in the proceedings, which are available to the participants at the beginning of each symposium. In the 2008 symposium, 154 of such short reports were submitted, categorized in four topics: breakdown and flashover (20), vacuum arcs (96), applications (26), and surface science and microelectronics (12).
- 2) Peer-reviewed expanded manuscripts, dealing with vacuum plasma and/or discharge physics, are published in the IEEE TRANSACTIONS ON PLASMA SCIENCE as a Special Issue. For the present Special Issue, 44 manuscripts were submitted, from which 27 papers made it to publication in five categories: vacuum breakdown phenomena (1), vacuum discharge modeling (6), vacuum discharge experiments (6), switching in vacuum (8), and sources and surface science (6).

There is no longer a Special Issue of the IEEE TRANSACTIONS ON DIELECTRICS AND ELECTRICAL INSULATION covering selected papers of the ISDEIV conference.

In this issue, authors report on progress both in theoretical and in experimental understanding of the vacuum discharge, mainly the vacuum arc discharge. In technology, the vacuum arc is the workhorse for (fault) current interruption in utility power distribution networks and as a source for material production, mainly for deposition and surface modification. In both technologies, arc control by the interaction of the arc with a magnetic field is heavily researched, both theoretically and experimentally.

Traditionally, the strong input from Russian scientists remains constant in this discipline. It must be appreciated that in spite of problems of various nature, a new generation of Russian plasma physics is now strongly reporting. A newer phenomenon is the appearance of young Chinese (and Korean) scientists in the field. Several Chinese papers, dealing with high-current interruption phenomena, can be found in this issue. Contributions to the development of sources of ions, metal vapor, X-rays, and light have been submitted from various research institutes.

The call, made in 2006, to open up the symposium to new topics such as microelectronic devices, surface modification technology, and other novel vacuum plasma applications does

not yet have a significant follow-up. The PISC would like to draw attention to these new opportunities for researchers in these fields.

The Guest Editor observed with pleasure a continuing responsibility to review, although the participation from industry is declining. From a total of 63 reviewers approached, 48 carried the reviewing process to an end, 11 refused, and only 4 did not reply. The cooperation with Dr. Ken Struve, the Senior Editor, and Dr. Steven Gitomer, the Editor-in-Chief, was very pleasant and instructive.

We highly recommend the papers in this issue, believing that they offer an adequate mirror of the continuing progress in this field of science and technology.

The next symposium will be held in Braunschweig, Germany, on August 30–September 3, 2010, to be hosted by the Carolo-Wilhelmina Technical University.

RENÉ PETER PAUL SMEETS, *Guest Editor*
KEMA T&D Testing Services
6800 Arnhem, The Netherlands



René Peter Paul Smeets (M'95–SM'02–F'08) received the Ph.D. degree on vacuum arc physics from the Eindhoven University of Technology, Eindhoven, The Netherlands, in 1987.

He is currently with KEMA T&D Testing Services, Arnhem, The Netherlands, the world market leader in testing and certification of high-voltage equipment, where he manages the R&D activities. Since 2001, he has also been a part-time Professor with the Eindhoven University of Technology in the field of high-power switching and testing. He was with the Toshiba Company, Tokyo, Japan, working on vacuum current interruption research. He is the author of some 170 international papers on high-power switching and testing.

Dr. Smeets is a member of the Permanent International Scientific Committee of the International Symposium on Discharges and Electrical Insulation in Vacuum (ISDEIV). Since 2007, he has been the Chairman of the “Current Zero Club,” an international research group on current interruption phenomena. He is active in the International Council on Large Electric Systems (CIGRE), the International Electrotechnical Commission, and the IEEE as a working group convener and member. Since 2009, he has been a convener of CIGRE WG A3.27 on the application of “vacuum” for high-voltage switching. He is the recipient of several international awards.