

Guest Editorial

Fifth Triennial Special Issue on Images in Plasma Science

IT IS our pleasure to present the Fifth Triennial Special Issue on Images in Plasma Science. This collection of compelling images aims to acknowledge the important role that visualization plays in plasma science. Visualization is not only an effective and efficient means of transmitting vast amounts of data and complex concepts but is also an aesthetic means to call attention and attract new membership to plasma science through the beauty of these images.

We had an enthusiastic response from the plasma community and received nearly 300 submissions of unique images of plasma phenomena to the Special Issue. These papers cover a broad range of traditional plasma topics including high-temperature plasmas, laser-produced plasmas, plasma material processing, plasma lighting and display devices, plasma-surface interaction, plasma diagnostics, and astrophysical plasmas. The Special Issue also emphasizes the increasing interest in atmospheric and high-pressure discharges: from conventional corona discharges to discharges in and around liquids, and from dielectric barrier discharges with a rich variety of discharge patterns to plasma applications in biology and medicine.

The tools used in these studies are just as varied as the images they produced and include laser and X-ray diagnostics, digital and analog photography, computer simulations, electrical and magnetic probes, and optical emission spectroscopy. These images focus our vision to the tiny dimensions of microplasmas and broaden our vision to the expanse of ionosphere and space

plasmas. The temporal evolution of plasma phenomena captured in these images ranges from a few picoseconds exposure times to several days.

The criteria for accepting contributions to the Special Issue were that they not only discuss a significant physics issue but also that the images be aesthetically pleasing. Although limited to only two journal pages, these papers contain sufficient detail about the relevant devices, processes, and operating conditions to be educational as well as aesthetic contributions. It is our hope that this issue (along with papers appearing in the four previous Special Issues) can be used as a resource for public education on the importance of plasmas. Illustrated with stunning images, which are mostly in color, the Special Issue offers a remarkable link between plasma science and art.

NATALIA YU. BABAEVA, *Co-Guest Editor*
Department of Electrical and Computer Engineering
Iowa State University
Ames, IA 50011 USA

MARK J. KUSHNER, *Co-Guest Editor*
Department of Electrical and Computer Engineering
Iowa State University
Ames, IA 50011 USA



Natalia Yu. Babaeva received the M.S. degree (with honors) in physics and engineering from the Moscow Institute for Physics and Technology, Moscow, Russia, in 1982 and the Ph.D. degree in plasma physics and chemistry from the Russian Academy of Sciences, Moscow, in 1993.

She was a Research Professor with the Pohang University of Science and Technology, Pohang, Korea, from 2001 to 2005. In January 2005, she joined Iowa State University, Ames, as a Research Scholar. She has authored more than 30 published journal papers and authored or coauthored over 55 proceedings abstracts on topics related to plasma and electric discharges, including RFs, glows, dielectric barriers, and streamer discharges.

Dr. Babaeva received the American Association for the Advancement of Science/National Science Foundation Best Russian Woman-Scientist Award in Physics in 1999.



Mark J. Kushner received the B.A. degree in astronomy and the B.S. degree in nuclear engineering from the University of California, Los Angeles, in 1976, and the M.S. and Ph.D. degrees in applied physics in 1977 and 1979, respectively, from the California Institute of Technology, Pasadena, where he was also a Weizmann Postdoctoral Research Fellow.

He was a physicist at Sandia National Laboratory and Lawrence Livermore National Laboratory before joining Spectra Technology, where he was the Director of Electron, Atomic, and Molecular Physics. In 1986, he moved to the University of Illinois, Urbana-Champaign, where he was the Founder Professor of Engineering in the Department of Electrical and Computer Engineering. He also served in many administrative roles, including Associate Dean for Administrative Affairs in the College of Engineering. He joined Iowa State University, Ames, as the Dean of Engineering and the Melsa Professor of Engineering in January 2005. He serves on the editorial boards of the *Journal of Physics D*, *Plasma Processing and Plasma Chemistry*, and *Plasma Processing and Polymers* and is the Editor-in-Chief of *Plasma Sources Science and Technology*.

He is the author of more than 230 published journal articles, has made more than 350 contributed presentations, and has delivered more than 200 invited conference talks and seminars on topics related to plasma materials processing, lasers, lighting sources, and pulse power plasmas.

Dr. Kushner is a Fellow of the American Physical Society, the Optical Society of America, the American Vacuum Society, the International Union of Pure and Applied Chemistry and the Institute of Physics. He also was a Fellow of the Japanese Society for Advancement of Science. He has received the Semiconductor Research Corporation Technical Excellence Award, the Tegal Thinker Award for Plasma Etch Technology, the AVS Plasma Science and Technology Award, the IEEE Plasma Science and Applications Award, and the Semiconductor Industry Association University Researcher Award.