

Special Issue of the International Conference
on Research and Applications of Plasmas
(PLASMA-2019)

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Invited Speakers:

Rainer Burhenn	IPP, Greifswald, (Germany)
Dawid Campbell	ITER, Cadarache (France)
Tonny Donne	EUROfusion (EU)
Josef Krasa	AV ČR, Prague (Czech Republic)
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Preface

The conference PLASMA — “International Conferences on Research and Applications of Plasmas” has been organized every two years since 1993. This conference has started as a local all-Polish scientific event but participation of guests from abroad has gradually increased. Consequently, it has been transformed into a fully international conference. The founder and chair of many editions of the PLASMA conference was Professor Marek Sadowski who still remains the driving force of the conference itself and a great deal of plasma research in Poland. Over the course of almost thirty years, the small plasma spectroscopy group at Opole University has had the honour of hosting the conference three times — in 1997, 2005 and 2019.

The last PLASMA conference was dedicated to a broad spectrum of issues in the spirit of the definition of plasma itself which, indeed, is very broad and can cover more than 90% of the observed universe. The topics covered low-density, low-temperature space plasmas (including objects which are regarded as a space vacuum by some), the state of matter present in a glowing lamp, in very efficient plasma thrusters, arc discharges, high temperature (100 mln K) fusion plasmas in magnetic confinement fusion devices (e.g. tokamaks and stellarators) and very dense and hot plasmas created by intense laser pulses in inertial confinement fusion experiments. Accordingly, a substantial amount of very diverse research on those subjects was presented during the five-day conference held in Opole. It was a great pleasure to participate in lectures and demonstrations connected with high temperature plasmas, properties of laser-produced plasmas, plasma spectroscopy, plasma in technology, plasma-focus devices, plasma thrusters and many other subjects.

One of the most interesting (and most important) scientific issues linked with plasma physics is solving the problem of controlled nuclear fusion. The fusion research activities in the European Union are coordinated by the EUROfusion Consortium. The keynote lecture of our conference was delivered by the Programme Manager of the Consortium, Tony Donné, who presented the status and future plans of fusion research. We appreciate the fact that he arrived in Opole for one day to inaugurate the conference despite his very tight schedule — on the same day he had to leave for Riga to participate in the EUROfusion General Assembly meeting. Importantly, many conference lectures and presentations were related to the subject of controlled nuclear fusion.

Research on fusion plasma in Poland is coordinated by the Institute of Plasma Physics and Laser Microfusion in Warsaw (IPPLM). This institute was the organizer of the last three conference editions and also supported our local organizing committee. IPPLM was strongly represented at PLASMA 2019 by its professors and members of the scientific and managerial staff.

Apart from the scientific programme, the participants of the PLASMA conference had the opportunity to attend several social events. These began with an evening at the Polish Song Museum enriched by a short recital of Jarosław Wasik who is not only a great singer but also the director of the museum. The programme also included visits to such unique places as the X-Ray Tubes Museum in Opole and a paleontological site in Krasiejów. We will never forget our “happy hour”, when the clouds dispersed for a short moment and all participants could gather at the astronomical observatory of Opole University to admire a lunar eclipse.

The publication of the conference proceedings has been significantly delayed due to problems linked with the COVID-19 pandemic and its impact on our lives. We would like to express our gratitude to Prof. Jan Mostowski and the editorial team of *Acta Physica Polonica A* who agreed to publish the papers despite the fact that we were unable to keep the previously set deadline.

Ireneusz Książek
Chair of Plasma 2019