

# PROCEEDINGS OF SPIE

## ***XIX International Symposium on High-Power Laser Systems and Applications 2012***

**Kerim R. Allakhverdiev**  
*Editor*

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## Introduction

Held 10–14 September 2012 in Istanbul (Turkey) the XIX International Symposium on High Power Laser Systems & Applications may be considered as one of the most important in the almost 40-year history of this forum.

Launched in 1974 in Cologne/Germany under the name “Gas Flow & Chemical Lasers”, it has become the first international platform where leading scientists firstly from Western Europe and the United States, and later from other countries around the world could openly discuss and exchange views on the situation and development of high power gas flow (including chemical) lasers, which for more than four decades, were (and still are today) the only source of CW laser radiation of high optical quality in the MW-class.

For the first period (1974–1990), the most popular applications of these lasers have been in military related areas which addressed a rather narrow range of participants. Further growth of interest in high-power lasers and diversification of their applications increased the number of participant. For a long time supersonic chemical HF (DF)-lasers, CO<sub>2</sub>-gas-dynamic lasers, gas flowing electric-discharge CO-, and CO<sub>2</sub>-lasers, pulsed TEA-CO<sub>2</sub>, chemical, excimer and photodissociation lasers, were the focus of interest of the symposia's attendees.

In the late 1990s, an increasing number of papers were devoted to the chemical oxygen iodine laser (COIL) as a result of major programs in the United States (Airborne Laser) and other countries. This topic played significant part in the scientific program of the symposia in Wroclaw (2002), Prague (2004), Gmunden (2006) and Lisbon (2008). On the other hand innovative technologies emerged in the areas of solid state and fiber lasers leading to an increased importance in industrial and defense applications. This resulted in a consolidation of the GCL symposia which since 1998 was held under the name of International Symposium on Gas Flow & Chemical Lasers / High Power Laser Conference.

Finally, these trends took shape to the XVIII Symposium, held at Sofia in 2010, when it became clear that none of the existing technical implementations of gas and chemical lasers could satisfy the customer's requirements of CW megawatt class lasers. Besides power and beam quality overall efficiency, reliability, and easy integration in various platforms became major issues. It has been recognized that not only the laser source but the laser system as a whole and its costs had to satisfy the requirements of the applications. The last point gained in importance due the worldwide financial crisis in 2008–2009 and the shrinking budgets as a consequence thereof. Given this situation the International Advisory Committee decided to change the title of the Symposium into High Power Laser Systems & Applications (HPLS&A) at the meeting in Istanbul held 27–28 May 2011.

In addition, yet another important trend emerged: the increasing number of participants from Russia, Eastern Europe, and China suggests a geographical expansion of the Symposium. This is reflected by the fact that after Sofia and Istanbul the XX symposium will be held in China.

The XIX Symposium (HPLS&A) which was held in Istanbul in mid-September 2012 reaffirmed the major trends that emerged in the two previous forums. There was a further reduction in the number of attendees from the U.S. but a stabilization of the number of papers from Western and Eastern Europe. On the other hand the organizers have been pleased with an increased number of young participants from European countries as well as from China and Japan. The number of reports related to defense applications was greatly reduced which reflects the reduced budgets in that area. However, several reports on the European Extremely Light Infrastructure program, the Russian program to create the exawatt laser, and laser systems for fusion were presented.

This volume is a collection of papers presented at the XIX International Symposium on High Power Laser Systems & Applications in Istanbul, held 10–14 September 2012, which was organized and supported by TÜBİTAK (Turkish Scientific and Technological Research Council) MRC (Marmara Research Center). Over 120 scientists from Algeria, Austria, Australia, Azerbaijan, Belarus, Belgium, Brazil, Bulgaria Canada, China, Czech Republic, France, Germany, Greece, Iraq, Iran, Italy, Japan, Poland, Portugal, Russia, Spain, South Africa, Turkey, United Kingdom and the United States participated in this edition. The choice of Istanbul as a bridge between continents strongly enhanced the friendly and stimulating atmosphere of the Symposium.

We would like to thank Honorary Chair, Nobel Prize Laureate Jores Alferov who could not personally attend our Symposium but who sent a letter of greeting to Prof. Dr. K. Allakhverdiev and the participants. Recognizing the importance of Symposium, Prof. J. Alferov noted: "During the last half century, High Power Laser Systems and Applications not only became a base of technological development, but also the driving force of economic achievements of our society. The Program of our Symposium evidently demonstrates this fact and, at the same time, it shows that laser physics and laser technologies have been successfully developed not only in the United States and Russia, but also in many other countries of all over the world, including Turkey."

We would like to thank the members of the International Advisory Committee for their great support, as well as the authors and reviewers for their contribution to these proceedings. We wish to thank also the following for their financial and collaborative contribution to the success of Istanbul 2012 HPLS&A Symposium: TÜBİTAK, MRC; SPIE; EOARD, Air Force Office of Scientific Research, USAF Research Laboratory; OSA; Laser Systems, and all other sponsors.



Finally, we would like to invite the readers of this volume to take part in the XX HPLS&A symposium which will be held in 2014 in China.

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**Willy L. Bohn**  
**Anatoly S. Boreysho**

