

Preface

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This special issue of “Contributions to Plasma Physics” is devoted to modern developments in the field of correlated charged particle systems, in particular, concerning their interaction with intense electromagnetic radiation. This has become, over the last 20 years, a field of tremendous interest, due to the increased availability of high quality optical lasers and x-ray radiation sources. The subject of laser-matter interaction concerns not only plasma physics, but also condensed matter physics and high energy physics. The results are not only of fundamental interest in basic science but numerous technological applications are beginning to emerge.

The present status in this field was discussed at the recent workshop “Complex systems of charge particles and their interaction with electromagnetic radiation” which was held in April 2009 at the A.M. Prokhorov General Physics Institute of the Russian Academy of Sciences in Moscow. This was already the 7th in a series of annual Workshops (the first was in 2003) organized by one of us (MR). Some materials from these Workshops have been published in “Contributions to Plasma Physics” before. At this year’s workshop there have been 36 talks by experts in many fields from Russia, Germany and Israel. The workshop was attended by about 120 participants - scientists and graduate students.

The articles in this issue are based on invited talks at the 2009 workshop providing original research results. Yet this is not an issue of short proceedings-type papers. Instead we have tried to collect review-type longer articles which will be of interest to the broad readership of “Contributions to Plasma Physics”. All articles have undergone a strict anonymous scientific review by experts in the field assuring a high quality of this issue. Our thanks are to all colleagues who contributed their research to this issue and to the referees as well.

Finally, we wish to thank those who have made the workshop and the present publication possible: First of all the Alexander von Humboldt Foundation, Germany, who supported many speakers at this series of workshops. Further, we thank the A.M. Prokhorov General Physics institute, the Russian Academy of Sciences and the Russian Foundation for Basic Research for their support.

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