Current Developments in Atomic, Molecular, and Chemical Physics with Applications
Preface

Atomic, Molecular and Chemical Physics continues to be an area of activity, which has been contributing to the frontline of Physics. The International Conference on “Current Developments in Atomic, Molecular and Chemical Physics with Applications” was held at the Department of Physics and Astrophysics, University of Delhi, during March 20-22, 2002, under the auspices of Indian Society of Atomic and Molecular Physics (ISAMP). Research on the topics dealt in the conference has fetched the noble prize in 1997, 1999 and 2001. For example, in 1997 Jens Skou and Cohen Tannoudji won Noble Prize for Laser Cooling and Trapping, in 1999 Ahmed Zewail won Noble Prize for Chemical Reaction Dynamics and last year in 2001, E. A. Cornell, W. Ketterle and C. A. Wieman won Noble Prize for the Bose-Einstein Condensation. With the development of laser technology, the production of ultrashort intense laser pulses with high field strengths have become quite usual. It is now possible to study the physics of Ultra-Cold Atoms, Bose-Einstein Condensation, and Quantum Mechanics of Nanostructures. A new dimension has been added to the exploration of atomic forces. From elementary reaction dynamics to any level, new physical tools are being exploited to study molecular structure and dynamics. The great advancement is made, both spatial and temporal resolution, down to the atomic scale, provides new opportunities to elucidate the nature of elementary processes in complex molecular systems and relates dynamics and structures to function in real systems at the most fundamental level. This field plays a central role in science with close links to chemistry, through the study of molecular dynamics and chemical reactions, and offers future prospective with respect to biological and other arenas.

The conference was the first of its kind in bringing together scientists from Atomic, Molecular and Chemical Physics from all over the world on the same platform. The scientific Program of the conference consisted of a
series of 44 invited lectures covering the thrust areas of present and future research in Atomic, Molecular and Chemical Physics. In addition to the invited lectures eighty-four contributed papers were presented in the conference. There was overwhelming response from the foreign scientific community. Enriched by the presentation of quality research work and with the opportunity of having better interaction among the participants, the conference proved to be highly useful with lot of academic input and future prospects.

The outcome of this conference has been transformed into the book to make its proceedings more meaningful to the entire scientific community. The reader will find variety of articles on diverse subjects. The contributions cover broad range of research activities categorized into four sub-topics namely
1. Processes in Laser Fields
2. Chemical Physics
3. Collision Processes
4. Atomic Structure and Applications

I express my sincere gratitude to all authors for contributing their valuable articles as well as for their kind co-operation in the preparation of the book. I also take this opportunity to thank everyone who helped in shaping the conference and the book to the present form.

Man Mohan
Editor
Acknowledgments

It is a great pleasure to express my sincere thanks to all for the success of the conference. I am greatly indebted to Shri. B. S. Rawat, Hon’ble Minister of state, Science and Technology, Govt. of India for inaugurating the conference. I am thankful to our Patron Prof. Deepak Nayyar, Vice Chancellor and Prof. C. R. Babu, Pro-Vice Chancellor, University of Delhi, for their kind support and encouragement. I am very grateful to Prof. A. Nigavekar, Chairman U.G.C., for extending his wholehearted support to the conference.

I sincerely thank Prof. K. C. Tripathi, Head of Department of Physics and Astrophysics and Dean, Faculty of Science, University of Delhi, who has been very supportive of the program right through the conception of the conference. I am also thankful to Prof. B. S. Garg, Head of Department of Chemistry, University of Delhi, for initiating the idea of conference in the Physics Department.

I am thankful to our colleagues Prof. R. P. Tandon and Prof. D. S. Kulshreshtha for helping us all the time for the success of the conference. I thank all the members of our group especially Dr. Vinod Prasad, Rachna Kundliya, Kriti Batra, Narendra Singh, Nisha Singhal and A.K. Singh for their full support and co-operation without which we could not have organized the conference.

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