Ultrafast Dynamics of Quantum Systems

Physical Processes and
Spectroscopic Techniques

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Series B: Physics

Ultrafast Dynamics of Quantum Systems

Physical Processes and
Spectroscopic Techniques

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*Quel sol che pria d'amor mi scaldò 'l petto
Di bella verità m'avea scoperto,
Provando e riprovando, il doce aspetto.*

—Dante, *Paradiso*, III Canto

PREFACE

This book presents the Proceedings of the course “Ultrafast Dynamics of Quantum Systems: Physical Processes and Spectroscopic Techniques” held in Erice, Italy from June 15 to June 30, 1997. This meeting was organized by the International School of Atomic and Molecular Spectroscopy of the “Ettore Majorana” Centre for Scientific Culture.

This Institute was devoted to the study of ultrafast physical phenomena, such as nonequilibrium phonon effects, evolution of excitations at surfaces, dynamics of electrons in semiconductors and metals, rapid conformational changes in molecules and optical control of the quantum states of molecules and solids. A total of 74 participants came from 54 laboratories and 14 different countries (the Czech Republic, Denmark, Finland, France, Germany, Italy, The Netherlands, Portugal, Russia, Spain, Switzerland, Turkey, The United Kingdom, and The United States).

The secretaries of the course were Giulio Gambarota and Daniel Di Bartolo.

50 lectures divided in 14 series were given. In addition 9 (one or two-hour) “long seminars,” 1 interdisciplinary lecture, 14 “short seminars” and 17 posters were presented. The sequence of the lectures was in accordance with the logical development of the subject of the meeting. Each lecturer started at a rather fundamental level and ultimately reached the frontier of knowledge in the field.

Two round-table discussions were held. The first round-table discussion took place after 4 days of lectures in order to evaluate the work done in the first days of the course and consider suggestions and proposals regarding the organization, format and presentation of the lectures. The second one was held at the conclusion of the course, so that the participants could comment on the work done during the entire meeting and discuss various proposals for the next course of the International School of Atomic and Molecular Spectroscopy.

I wish to express my sincere gratitude to Dr. Alberto Gabriele, and Mr. Pino Aceto and to all the personnel of the “Ettore Majorana” Centre, who contributed to create a congenial atmosphere for our meeting. I wish to acknowledge the sponsorship of the meeting by the NATO Scientific Affairs Division, Boston College, the ENEA Organization, the European Physical Society, the Italian Ministry of Education, the Italian Ministry of University and Scientific Research, and the Sicilian Regional Government.

I wish also to acknowledge the National Science Foundation for providing travel grants for some of our participants.

I would like to thank Ms. Maria Zaini of the Ettore Majorana Centre, the members of the Organizing Committee (Prof. Claus Klingshirn, Dr. Cees Ronda, and Dr. Giuseppe Baldacchini), the secretaries of the course (Giulio Gambarota and Daniel Di Bartolo), Prof. John Collins, Dr. Alik Collins, Prof. Xuesheng Chen, Ms. Daniela Alba, Mr. Giuseppe Corrao and Dr. Brian Walsh for their valuable help, and Dr. John Di Bartolo for putting the program in the Internet.

As in the past I felt privileged to direct a NATO Institute, to encounter in my native land of Trapani so many fine people, and to share with them the Erice experience. The meeting of this year provided me with a particularly joyous experience, for I had the singular pleasure and honor to receive all the participants in the house of my family in Trapani, which my brother Francesco has recently restored.

I am already looking forward to the next 1999 meeting of the International School of Atomic and Molecular Spectroscopy, where I am sure I will see again many of you, my friends. Arrivederci a presto!

Baldassare (Rino) Di Bartolo
*Director of the International School of Atomic
and Molecular Spectroscopy of the "Ettore
Majorana" Centre*

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