

PREFACE

This special volume contains the Proceedings of the 9th Epioptics Workshop, held in the Ettore Majorana Foundation and Centre for Scientific Culture, Erice, Sicily, from July 20 to 26, 2006. The Workshop was the 9th in the Epioptics series and the 39th of the International School of Solid State Physics. Antonio Cricenti from CNR Istituto di Struttura della Materia and Theo Rasing from the University of Nijmegen, were the Directors of the Workshop. The Advisory Committee of the Workshop included Y. Borenstein from U. Paris VII (F), R. Del Sole from U. Roma II Tor Vergata (I), D. Aspnes from NCSU (USA), O. Hunderi from U. Trondheim (N), J. McGilp from Trinity College Dublin (Eire), W. Richter from TU Berlin (D), N. Tolk from Vanderbilt University (USA), and P. Weightman from University Liverpool (UK). Fifty five scientists from sixteen countries attended the Workshop.

The Workshop has brought together researchers from universities and research institutes who work in the fields of (semiconductor) surface science, epitaxial growth, materials deposition and optical diagnostics relevant to (semiconductor) materials and structures of interest for present and anticipated (spin) electronic devices. The Workshop was aimed at assessing the capabilities of state-of-the-art optical techniques in elucidating the fundamental electronic and structural properties of semiconductor and metal surfaces, interfaces, thin layers, and layer structures, and assessing the usefulness of these techniques for optimization of high quality multilayer samples through feedback control during materials growth and processing. Particular emphasis is dedicated to theory of non-linear optics and to dynamical processes through the use of pump-probe techniques together with the search for new optical sources. Some new applications of Scanning Probe Microscopy to material science and biological samples, dried and *in vivo*, with the use of different laser sources have also been presented. Materials of particular interest have been silicon, semiconductor-metal interfaces, semiconductor and magnetic multi-layers and III-V compound semiconductors. The Workshop is characterized by the adequate collection of notes in this volume, combined with the tutorials in some of the most advanced topics in the field.

This book is dedicated to Professor Gianfranco Chiarotti for his fundamental contributions to the development of Optical Spectroscopy as a tool to study Surface States: these studies have paved the way to the establishment of our Epioptics Community. During the School Prof. Chiarotti has been awarded the diploma of Father of Epioptics School, for the lecture regarding his contribution to the discovery of “Optical transition between semiconductor surface states”. Prof. Giorgio Benedek was also awarded in the occasion of his 65th birthday for his strong and successful effort in running the International School of Solid State Physics.

I want personally to thank Prof. Chiarotti for giving me the opportunity to start this wonderful trip in science and as an example of rigour and dedication in the endeavour of scientific research. It is sad to remember that during the editing of these Proceedings two of our colleagues passed away: Dr. Marco Fabio Righini, who started his research at CNR in our optical group becoming an excellent scientist and with whom I shared the optical set-up for several years, and Prof. Carlo Coluzza, who was a very intuitive scientist in many different fields of science and a very good friend. I want also to remember my father-in-law Benito Cello, who had been very special to me, and my father Domenico, who also passed away recently: he was an untiring worker all his life, who has been exemplary and has been a great resource for me.

I wish to thank our sponsors, the Italian National Research Council (CNR) and the Sicilian Regional Government for facilitating a most successful Workshop. We wish to thank Prof. A. Zichichi, the President of the Ettore Majorana Foundation and Director of the Ettore Majorana Centre for Scientific Culture in Erice, and all the staff members of the Centre for the excellent support, organization and hospitality provided.

Antonio Cricenti