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Foreword

Z. Hussain*, P.D. Johnson, S.D. Kevan, B. Sinkovic

Lawrence Berkeley National Laboratory, Advanced Light Source Division, One Cyclotron Road, MS 2-400, Berkeley, CA 94720, USA

Electron spectroscopy using vacuum ultraviolet and soft x-ray synchrotron radiation has become an indispensable tool for studying the electronic, structural, and magnetic properties of solids, thin films and surfaces. Indeed, the progress of electron spectroscopy over the past few decades has paralleled advances in synchrotron radiation sources, from first generation where relatively low-resolution studies were possible to third generation where the details of electronic structure relevant to thermal and transport properties are being actively probed. In the area of complex oxides, for example, synchrotron radiation based angle-resolved photoemission has become one of the key tools to test and verify models for high temperature superconductivity and colossal magnetoresistance. These exciting and ongoing developments led the Editorial Board of the *Journal of Electron Spectroscopy and Related Phenomena* to suggest a special issue indicating the present state-of-the-art in electron and photon spectroscopies using synchrotron radiation that would include not only articles giving the present status of the field, but also views ahead to the coming years of development. The guest editors of this volume have thus assembled a collection of 14 invited articles written by experts in various specialties including surface physics and chemistry, solid state physics, magnetism and microscopy. These articles range from short reviews to topical papers of a more specific nature. We believe that they provide a broad and authoritative overview of this

thriving and growing field, and that they will be useful for both experienced scientists and newcomers to the subject.

We are also pleased to dedicate this volume to Dr. Neville V. Smith of Lawrence Berkeley National Laboratory and to Professor Charles S. Fadley of the University of California at Davis, as a token of esteem on their recent 60th birthdays. Both of these researchers are true pioneers of electron spectroscopy, having participated in seminal developments ranging from the first angle-resolved photoemission studies probing the detailed band structure of a solid to the first surface structural studies using photoelectron diffraction. Neville Smith was among the early practitioners of photoemission to use synchrotron radiation is among the few researchers to have worked at first, second, and third generation facilities. He has had a large research output, authoring over 180 papers and working with many senior colleagues and postdoctoral associates through his years at Bell Laboratories and LBNL. For his pioneering and influential work in this area, he was awarded the Davisson and Germer Prize of the American Physical Society in 1991. Chuck Fadley's early work involved x-ray photoelectron spectra of core and valence levels, where he pioneered x-ray photoelectron diffraction to determine surface structures. His focus has remained primarily on core level studies, with increasing precision and sophistication and using synchrotron radiation. He has continued pioneering new techniques with the use of synchrotron radiation. His recent work showing the application of standing waves for probing the buried

*Corresponding author.

E-mail address: zhussain@lbl.gov (Z. Hussain).

interfaces is clearly revolutionary. He has had enormous research output; authoring or co-authoring over 230 papers including 25 invited book chapters, and supervising over 30 PhD theses. He is a fellow of American Vacuum Society, American Physical

Society and Elected Foreign Member of the Russian Academy of Natural Sciences. Our dedication of this issue to Neville Smith and Chuck Fadley, with much gratitude for their many contributions to our field, is thus most fitting.