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MODERN NONLINEAR OPTICS
Part 1

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ADVANCES IN CHEMICAL PHYSICS
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INTRODUCTION

Few of us can any longer keep up with the flood of scientific literature, even in specialized subfields. Any attempt to do more and be broadly educated with respect to a large domain of science has the appearance of tilting at windmills. Yet the synthesis of ideas drawn from different subjects into new, powerful, general concepts is as valuable as ever, and the desire to remain educated persists in all scientists. This series, *Advances in Chemical Physics*, is devoted to helping the reader obtain general information about a wide variety of topics in chemical physics, a field which we interpret very broadly. Our intent is to have experts present comprehensive analyses of subjects of interest and to encourage the expression of individual points of view. We hope that this approach to the presentation of an overview of a subject will both stimulate new research and serve as a personalized learning text for beginners in a field.

Ilya Prigogine
Stuart A. Rice
PREFACE TO SECOND PRINTING OF
VOLUME 85 (PART 1)

Prof. Dr. Stanisław Kielich died on October 15th., 1993, after a long illness, bravely suffered. The first print run of the first part of this issue, Volume 85 (Part 1) of “Advances in Chemical Physics”, was sold out, and this is a second printing. This is also among the most eloquent of tributes that his contemporaries could pay to the late Professor Kielich and his renowned School at Adam Mickiewicz University of Poznań. In this preface I wish to pay my final respects to Stanisław Kielich, whose work I first came across as a graduate student some twenty years ago in Aberystwyth. Even then, it seemed to me that the proofs of his article for the Chemical Society of London was something quite out of the ordinary, so meticulous, accurate and thorough were its contents. Evidently, many others, all over the world, think the same, and the legacy of such a mind is a gift to all humanity. To me, it was indeed an honour to be associated with Kielich in the production of these three volumes, the first of which is the work of his School and Associated Laboratories. The other two volumes represent an outstanding international response in which the influence of Kielich and co-workers is liberally apparent.

“And death shall have no dominion”, indeed do the words of the poet Dylan Thomas ring true, indeed it shall have NO dominion, the influence of Kielich and his School will, I hope, be recognized at long last as one of the most profound and original contributions to physics in the late twentieth century. This work is a triumph of the mind over circumstance, of the human spirit and of great courage, manifest in Stanisław Kielich to the last.

“The thoughtful, bearer of truths, the heavy shield,
Is an intricate silence,
His Gaze is one of deep pools,
His the knowing power to paint the rocky, cruel land,
With intricate harvest,
His the burden of the mind,
A shield of hard slate, lashed together by angry rain,
For the keeper of ancient patterns and metres,
Silence is all, and there is profound dignity.
Even the faintest of words would be as stones
Thrown into silence, Reverberating like an iron hammer
In Iona’s Scriptorium.
Broken life is bourne on fields of deepest dark,
And shields the bounty of the mind,
Welcomed in the silent dawn
Each photon of light is worked magnificently
In the coal black galleries of time,
Each a token of hope, still, after millenia, freely given,
Yet mined in darkness as the new day slowly pivots
In the mind’s eye.”

Myron Evans

Charlotte, North Carolina
November 1993
PREFACE

Statistical molecular theories of electric, magnetic, and optical saturation phenomena developed by S. Kielich and A. Piekara in several papers in the late 1950s and 1960s clearly foreshadowed the developments of the next thirty years. In these volumes, we as guest editors have been honored by a positive response to our invitations from many of the most eminent contemporaries in the field of nonlinear optics. We have tried to give a comprehensive cross section of the state of the art of this subject. Volume 85 (Part 1) contains review articles by the Poznań School and associated laboratories, and volume 85 (Part 2 and Part 3) contains a selection of reviews contributed from many of the leading laboratories around the world. We thank the editors, Ilya Prigogine and Stuart A. Rice, for the opportunity to produce this topical issue.

The frequency with which the work of the Poznań School has been cited by others in these volumes is significant, especially considering the overwhelming societal difficulties that have faced Prof. Dr. Kielich and his School over the last forty years. Their work is notable for its unfailing rigor and accuracy of development and presentation, its accessibility to experimental testing, the systemic thoroughness of the subject matter, and the fact that it never seems to lag behind developments in the field. This achievement is all the more remarkable in the face of journal shortages and the lack of facilities that would be taken for granted in more fortunate centers of learning.

We hope that readers will agree that the contributors to these volumes have responded with readable and useful review material with which the state of nonlinear optics can be measured in the early 1990s. We believe that many of these articles have been prepared to an excellent standard. Nonlinear optics today is unrecognizably different from the same subject in the 1950s, when lasers were unheard of and linear physics ruled. In these three volumes we have been able to cover only a fraction of the enormous contemporary output in this field, and many of the best laboratories are not represented.

We hope that this topical issue will be seen as a sign of the ability of scientists all over the world to work together, despite the frailties of human society as a whole. In this respect special mention is due to Professor Mansel Davies of Criccieth in Wales, who was among the first in the West to recognize the significance of the output of the Poznań School.

MYRON W. EVANS

Charlotte, North Carolina
August 1993
CONTENTS

RELAXATION THEORY OF NONLINEAR PROCESSES IN THE SMOLUCHOWSKI ROTATIONAL DIFFUSION APPROXIMATION
By Władysław Alexiewicz and Bolesława Kasprzowicz-Kielich

SPECTRAL ANALYSIS OF LIGHT SCATTERED BY MONODISPERSE SOLUTIONS OF RIGID, ANISOTROPIC MACROMOLECULES IN A REORIENTING AC ELECTRIC FIELD
By M. Dębelska-Kotłowska and A. Miranowicz

HYPER-RAYLEIGH AND HYPER-RAMAN ROTATIONAL AND VIBRATIONAL SPECTROSCOPY
By T. Bancewicz and Z. Ożgo

POLARIZATION PROPERTIES OF HYPER-RAYLEIGH AND HYPER-RAMAN SCATTERINGS
By M. Kozierowski

FAST MOLECULAR REORIENTATION IN LIQUID CRYSTALS PROBED BY NONLINEAR OPTICS
By J. R. Lalanne, J. Buchert, and S. Kielich

NONLINEAR PROPAGATION OF LASER LIGHT OF DIFFERENT POLARIZATIONS
By Genevieve Rivoire

SELF-ORGANIZED NONLINEAR OPTICAL PHENOMENA IN OPTICAL FIBERS
By Pavel Chmela

NONLINEAR MAGNETO-OPTICS OF MAGNETICALLY ORDERED CRYSTALS
By R. Zawodny

DYNAMICAL QUESTIONS IN QUANTUM OPTICS
By Alexander Stanislaw Shumousky

1
51
89
127
159
217
249
307
375
xi
CONTENTS

PHOTON STATISTICS OF NONCLASSICAL FIELDS 405
By Jan Peřina, Jiří Bajer, Vlasta Peřinová, and Zdeněk Hradil

QUANTUM RESONANCE FLUORESCENCE FROM MUTUALLY CORRELATED ATOMS 461
By Z. Ficek and R. Tanaš

SQUEEZED STATES OF LIGHT IN THE SECOND AND THIRD HARMONIC GENERATED BY SELF-SQUEEZED LIGHT 497
By S. Kielich and K. Piątek

SELF-SQUEEZING OF ELLIPTICALLY POLARIZED LIGHT PROPAGATING IN A KERR-LIKE OPTICALLY ACTIVE MEDIUM 541
By S. Kielich, R. Tanaš, and R. Zawodny

AUTHOR INDEX 595

SUBJECT INDEX 613