Coherence in Spectroscopy and Modern Physics

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PREFACE

This volume contains the lectures and seminars presented at the NATO Advanced Study Institute on "Coherence in Spectroscopy and Modern Physics," the seventh course of the International School of Quantum Electronics, affiliated with the "Ettore Majorana" Centre for Scientific Culture, Erice, Sicily. The Institute was held at Villa LePianore (Lucca), Versilia, Italy, July 17-30, 1977.

The International School of Quantum Electronics was started in 1970 with the aim of providing instruction for young researchers and advanced students already engaged in the area of quantum electronics or wishing to switch to this area from a different background. From the outset the School has been under the direction of Prof. F. T. Arecchi, then at the University of Pavia, now at the University of Florence, and Dr. D. Roess of Siemens, Munich. Each year the Directors choose a subject of particular interest, alternating fundamental topics with technological ones, and ask colleagues specifically competent in a given area to take the scientific responsibility for that course.

The past courses were devoted to the following themes:

- 1971: "Physical and Technical Measurements with Lasers"
- 1972: "Nonlinear Optics and Short Pulses"
- 1973: "Laser Frontiers: Short Wavelength and High Powers"
- 1974: "Cooperative phenomena in Multicomponent Systems"
- 1975: "Molecular Spectroscopy and Photochemistry with Lasers"
- 1976: "Coherent Optical Engineering"

The purpose of the present course was to provide instruction in the field of modern physics and spectroscopy as it is influenced by coherent quantum-mechanical phenomena. It is generally acknowledged that this rapidly developing field of research, besides offering an intellectual challenge, has had a significant impact on modern technology.

Prof. R. Bonifacio, University of Milan, and Prof. M. O. Scully, University of Arizona, undertook the scientific direction of the

present course, selecting the specific topics and lectures.

The lectures collected in this volume cover the basic concepts and principles of coherence in quantum optics as well as in other areas of physics together with the most promising applications.

We wish to express our appreciation to the NATO Scientific Affairs Division, whose financial support made this Institute possible. We also acknowledge the contribution of the following:

CISE
IBM Italia
Philips, Eindhoven
Siemens, Munich

We finally thank the secretaries of Divisione Elettronica Quantistica, CISE, Mrs. G. Ravini and Miss M. Oriani, for their valuable assistance in the organization of the Institute and in the preparation of these proceedings, and Miss A. Camnasio of Servizio Documentazione, CISE, and again Mrs. G. Ravini for their assistance during the course itself.

F. T. Arecchi
R. Bonifacio
M. O. Scully

CONTENTS

A - Basic Tools

Coherence in Spectroscopy	1
A. Kastler	
Coherence in Synergetics	21
H. Haken	

B - Coherence in Spin-like Systems

Coherent Optical Transients	41
R. G. Brewer	
Mean Field Theory of Optical Bistability and Resonance Fluorescence	85
L. A. Lugiato and R. Bonifacio	
Optical Bistability and Differential Gain	111
H. M. Gibbs, S. L. McCall, and T. N. C. Venkatesan	
Superfluorescence Experiments	121
H. M. Gibbs	
Coherent Two-Photon Amplification in an Inverted Medium	131
L. M. Narducci, L. G. Johnson, E. J. Seibert, and W. W. Eidson	

C - Coherence in Atomic Spectroscopy

High Resolution Spectroscopy in Atomic Rydberg States	151
S. Haroche	
The Method of Separated Fields in Optics	173
V. P. Chebotayev	
Coherence in Beam-Foil Spectroscopy	195
H. J. Andr�	
Magnetic Resonances in Sodium Vapours Oriented by a C. W. Dye Laser	219
G. Alzetta	

D - Applications of Coherence to Physical Systems

Superconductivity and Quantum Optics	231
A. Di Rienzo, D. Rogovin, M. Scully, R. Bonifacio, L. Lugiato, and M. Milani	
Surface Plasmon Effects on Molecular Decay Processes near Metallic Interfaces	261
H. Morawitz	
Introduction to Picosecond Spectroscopy	301
B. Bosacchi	
Picosecond Spectroscopy and Solid State Physics	305
B. Bosacchi	
Coherent Effects in Picosecond Spectroscopy	329
A. Laubereau and W. Kaiser	
Nonthermal Microwave Resonances in Living Cells	347
F. Keilmann	

E - New Laser Sources

The Free Electron Laser: A Single Particle Classical Model . .	361
A. Bambini and A. Renieri	
Frequency Tunability and High Speed Modulation of Far Infrared Optically Pumped Lasers by Stark Effect	381
F. Strumia	
Index	397