

TABLE OF CONTENTS

H. Haken:

THE THEORY OF LASERS AND LASER LIGHT	1
Introduction	2
Rate Equations	8
Semiclassical Theory	22
The Quantum Theory of the Laser	30
Classical and Quantum Theories of Coherence	36
Last Lecture	48

F. Casagrande, L.A. Lugiato:

QUANTUM STATISTICAL TREATMENT OF OPEN SYSTEMS, LASER DYNAMICS AND OPTICAL BISTABILITY	53
Introduction	53
Dynamics of Open Systems	55
Two Simple Applications: the Decay of a Two-Level Atom and the Brownian Motion of a Harmonic Oscillator ...	65
The One-Mode Laser Model	73
Semiclassical Treatment of Laser and Optical Bistability	79
Quantum Statistical Treatment of Laser and Optical Bistability	87

A. Schenzle:

NONLINEAR OPTICAL PHENOMENA AND FLUCTUATIONS	103
Introduction	105
Interaction of Field and Matter	107
Nonlinear Optical Phenomena	123
Fluctuations	145
Fluctuations in Nonlinear Optics	162
Appendix A	197
Appendix B	203

J.D. Hey, F.A. Hopf:

NON-LINEAR OPTICS	211
Introduction to Non-Linear Optics	213
The Maxwell Equations	215
Electromagnetic Wave Propagation in a Linear Anisotropic Medium	218
Optical Harmonic Generation in a Non-Linear Medium	225

IV

Phase Matching in Crystals	243
Practical Applications	261
Additional Non-Linear Optical Effects	275
Scattering by Non-Linear Media	287
Appendix I: Macroscopic and Local Quadratic Susceptibilities in Anisotropic Crystals	302
Appendix II: Crystal Classes Exhibiting Quadratic Susceptibility	306
Appendix III: The Manley-Row Relations	312
Appendix IV: The Index Ellipsoid	319