

Part A Laser Physics

1 Strong Signal Laser Theory 1

M. Sargent III

Laser theories are reviewed with emphasis on intense, single and multimode electromagnetic fields. Homogeneously and inhomogeneously broadened active media are treated for two-mirror and ring configurations.

2 A Preliminary Account of a New Approach to Unstable Resonators 47

H. Shih, M. O. Scully, S. F. Jacobs

A new approach to the physics of unstable resonators including diffraction and effects of the medium. Mode behavior is predicted continuously through the transition between stable and unstable operation.

3 Amplifier Theory 77

F. A. Hopf

Laser amplifier theory is developed from a pedagogical viewpoint. Various approximations and limits are discussed with emphasis on connection between theory and actual laser amplifiers.

4 Propagation of High Energy Laser Beams in the Atmosphere 177

C. B. Hogge

Effects of atmospheric turbulence on high and low power laser beams. Theoretical and experimental results for focused beams in a turbulent atmosphere and thermal blooming of high energy laser beams.

- 5 CO₂ Electrical, CO₂ Gas Dynamic, HF Chemical Gas Lasers 247

P. V. Avizonis

For all high energy gas lasers temperature must be controlled by flow rather than by conduction. In this chapter we discuss three such lasers.

Part B Controlled Thermonuclear Reactions

- 6 Survey of Laser-Initiated Fusion Research 293

K. Boyer

A review of the concept of controlled laser-initiated fusion, including recent history of the worldwide effort and an outline of the thermonuclear burn physics.

- 7 Lasers for Fusion 333

J. R. Murray and P. W. Hoff

A brief overview of laser systems suitable for concentrating large energies on a small thermonuclear target. Future excimer and quadrupole transition lasers for fusion are discussed.

- 8 Laser Fusion 391

R. Morse

A long "back of the envelope" calculation to convey orders of magnitude involved in laser fusion.

- Index 407