Contents

ntroduction	1
Part I Operational Vibronic Lasers/Advanced Design and Applications	
Recent Advances in Transition-Metal-Doped Lasers By P.F. Moulton (With 10 Figures)	4
Laser Action in Cr-Doped Garnets and Tungstates By G. Huber and K. Petermann (With 18 Figures)	11
Optical and Lasing Properties of Cr ³⁺ ,Co ²⁺ ,Ni ²⁺ and V ²⁺ Doped Perovskites. By U. Dürr, U. Brauch, W. Knierim, and C. Schiller (With 6 Figures)	20
Recent Progress in High Repetition Rate High Power, Line-Narrowed Alexandrite Laser. By R.C. Sam, R. Rapoport, and S. Matthews (With 9 Figures)	28
Alexandrite Laser Systems: Scaling to Kilowatt Powers By D.C. Johannsen (With 5 Figures)	38
An Overview of NASA Requirements for Tunable Solid State Laser Systems and Technology. By F. Allario and B.A. Conway (With 4 Figures)	42
Laser Transmitters for Meteorological Lidar: NTAL Program By F.P. Roullard, III (With 7 Figures)	53
Part II Vibronic Laser Materials Spectroscopy	
Recent Results on the Spectroscopy of Transition Metal Ions for Tunable Solid State Lasers. By R.C. Powell (With 7 Figures)	60
Measurements of Ti $^3+$:Al $_20_3$ as a Lasing Material By G.F. Albrecht, J.M. Eggleston, and J.J. Ewing (With 5 Figures)	68
Stimulated Emission from Flashpumped Ti:Al ₂ O ₃ By L. Esterowitz, R. Allen, and C.P. Khattak (With 4 Figures)	73
Laser Pumped Single Pass Gain By M.L. Shand and S.T. Lai (With 2 Figures)	76

Trivalent Cerium Doped Crystals as Tunable Laser Systems: Two Bad Apples. By D.S. Hamilton (With 8 Figures)	80 91
Transition Metals in Oxide Hosts. By G.M. Loiacono (With 1 Figure)	98
Growth of Crystals for Solid State Lasers By M.R. Kokta (With 6 Figures)	105
Growth of Fluoride Laser Host Crystals By A. Linz and D.R. Gabbe (With 5 Figures)	115
Growth of Co:MgF $_2$ and Ti:Al $_2$ O $_3$ Crystals for Solid State Laser Applications. By F. Schmid and C.P. Khattak (With 6 Figures)	122
The Laser-Heated Pedestal Growth Method: A Powerful Tool in the Search for New High Performance Laser Crystals. By R.S. Feigelson (With 9 Figures)	129
Part IV Vibronic Laser Theory and Cross-Fertilization Through Interdisciplinary Fields	
Energy Transfer in Vibronic Laser Materials By R. Orbach (With 8 Figures)	144
Theory of Fluorescence Quenching in Low-Field Chromium Complexes in Solids. By R.H. Bartram (With 5 Figures)	155
Theoretical Methods for the Study of Transition Metals in Crystals By N.W. Winter and R.M. Pitzer (With 3 Figures)	164
Cu+ in Alkali Halides: Model Systems for Understanding Ions in Crystals By D.S. McClure (With 10 Figures)	172
Electron-Phonon Interaction and Defect Processes in Laser Materials By A.M. Stoneham	190
Post Conference Contribution	
Laser Action of H3 Color Center in Diamond. By S.C. Rand and L.G. De Shazer (With 3 Figures)	199
Index of Contributors	203