

Contents

Part I Wavefront Correctors and Mirror Control

1 Micromachined Membrane Deformable Mirrors <i>G. Vdovin</i>	3
2 The Development and Optimisation of High Bandwidth Bimorph Deformable Mirrors <i>D. Rowe, L. Laycock, M. Griffith, N. Archer</i>	9
3 Deformable Mirrors with Thermal Actuators <i>G. Vdovin, M. Loktev</i>	17
4 Technology and Operation of a Liquid Crystal Modal Wavefront Corrector <i>M. Loktev and G. Vdovin</i>	25
5 Aberration Compensation Using Nematic Liquid Crystals <i>S. Somalingam, M. Hain, T. Tschudi, J. Knittel, H. Richter</i>	35
6 Wireless Control of a LC Adaptive Lens <i>G. Vdovin, M. Loktev, X. Zhang</i>	45
7 Summary of Adaptive Optics at Stanford <i>P. Lu, Y.-A. Peter, E. Carr, U. Krishnamoorthy, I.-W. Jung, O. Solgaard, R. Byer</i>	53
8 Control of a Thermal Deformable Mirror: Correction of a Static Disturbance with Limited Sensor Information <i>M. de Boer, K. Hinnen, M. Verhaegen, R. Fraanje, G. Vdovin, N. Doelman</i>	61
9 A Novel Microprocessor-controlled High-Voltage Driver for Deformable Mirrors <i>H.-M. Heuck, I. Buske, U. Buschmann, H. Krause, U. Wittrock</i>	73

10 Preliminary Investigation of an Electrostatically Actuated Liquid-based Deformable Mirror	
<i>E.M. Vuelban, N. Bhattacharya, J.M. Braat</i>	83
11 Interferometer-based Adaptive Optical System	
<i>O. Soloviev, G. Vdovin</i>	91
Part II Wavefront Sensors	
12 Extended Hartmann–Shack Wavefront Sensor	
<i>B. Schäfer, K. Mann, M. Dyba</i>	103
13 High Resolution Wavefront Sensing	
<i>J.E. Oti, V.F. Canales, M.P. Cagigal</i>	111
14 Distorted Grating Wavefront Sensing in the Midwave Infrared	
<i>D.M. Cuevas, L.J. Otten, P. Harrison, P. Fournier</i>	119
15 Comparative Results from Shack–Hartmann and Distorted Grating Wavefront Sensors in Ophthalmic Applications	
<i>P. Harrison, G.R.G. Erry, P. Fournier, D.M. Cuevas, L.J. Otten, A. Larichev</i>	129
16 Shack–Hartmann Sensors for Industrial Quality Assurance	
<i>J. Pfund, M. Beyerlein, R. Dorn</i>	141
17 Single-Chip Neural Network Modal Wavefront Reconstruction for Hartmann–Shack Wavefront Sensors	
<i>T. Nirmaier, G. Pudasaini, C.A. Diez, J. Bille, D.W. de Lima Monteiro</i>	151
18 CMOS Technology in Hartmann–Shack Wavefront Sensing	
<i>D.W. de Lima Monteiro, T. Nirmaier</i>	163
19 Generalised Phase Diversity Wave Front Sensor	
<i>A.H. Greenaway, H.I. Campbell, S. Restaino</i>	177
20 Generalised Phase Diversity: Initial Tests	
<i>S. Zhang, H.I. Campbell, A.H. Greenaway</i>	187
21 Prime Microlens Arrays for Hartmann–Shack Sensors: An Economical Fabrication Technology	
<i>D.W. de Lima Monteiro, O. Akhzar-Mehr, G. Vdovin</i>	197

22 A Proposal for Wave-Front Retrieval from Hartmann Test Data

*V.M. Duran-Ramirez, D. Malacara-Doblado, D. Malacara-Hernandez,
D.P. Salas-Peimbert, G. Trujillo-Shiaffino* 207

Part III Laser Resonators and Laser Amplifiers

23 Use of Intracavity Adaptive Optics in Solid-State Lasers Operation at 1 μm

W. Lubeigt, P. van Grol, G. Valentine, D. Burns 217

24 Intracavity Use of Membrane Mirrors in a ND:YVO₄ Laser

P. Welp, I. Buske, U. Wittrock 229

25 Adaptive Optics for High-Power Laser Beam Control

*A. Kudryashov, V. Samarkin, A. Alexandrov, A. Rukosuev,
V. Zavalova* 237

26 Aberrations of a Master Oscillator Power Amplifier Laser with Adaptive Optics Correction

I. Buske, H.-M. Heuck, P. Welp, U. Wittrock 249

27 Dynamic Aberrations Correction in ICF Laser System

Y. Zhang, Z. Yand, C. Guan, H. Wang, P. Jiang, B. Xu, W. Jiang . . . 261

28 Aaptive Shapint of High-Power Broadband Femtosecond Laser Pulses

*T. Witting, G. Tsilimis, J. Kutzner, H. Zacharias, M. Köller,
H. Maurer* 273

29 Wavefront Measurement and Adaptive Optics at the Phelix Laser

*H.-M. Heuck, U. Wittrock, C. Häfner, S. Borneis, E. Gaul, T. Kühl,
P. Wiewior* 283

30 ISTC Projects from RFNC-VNIIEF Devoted to Improving Laser Beam Quality

F. Starikov, G. Kochemasov 291

Part IV Medical Applications

31 Adaptive Optical System for Retina Imaging Approaches Clinic Applications

N. Ling, Y. Zhang, X. Rao, C. Wang, Y. Hu, W. Jiang, C. Jiang 305

32 Adaptive Optics to Simulate Vision with a Liquid Crystal Spatial Light Modulator <i>S. Manzanera, P.M. Prieto, J. Salort, E.J. Fernández, P. Artal</i>	317
33 Confocal Scanning Retinal Imaging with Adaptive Optics <i>I. Iglesias, B. Vohnsen, P. Artal</i>	325
34 A High-Resolution Adaptive Optics Fundus Imager <i>G.R.G. Erry, L.J. Otten, A. Larichev, N. Irochnikov</i>	333
35 Perceived Image Quality Improvements from the Application of Image Deconvolution to Retinal Images from an Adaptive Optics Fundus Imager <i>P. Soliz, S.C. Nemeth, G.R.G. Erry, L.J. Otten, S.Y. Yang</i>	343
36 Adaptive Aberrometer for Acuity Measurements and Testing <i>A. Larichev, N. Irochnikov, S. Gorbunov</i>	353
Part V Stmospheric Propagation	
37 Adaptive Optics with Strong Scintillation and Optical Vortices for Optical Communication <i>C. Paterson, C.R. Walker</i>	365
38 Wavefront Measurements over an Extended Horizontal Path Using a Wavefront Curvature Sensor <i>J. Burnett, S. Woods, A. Turner, A. Scott</i>	377
39 The Detection of Atmospheric Tip-Tilt and its Program Construction in Lunar Laser Ranging <i>G. Rui, X. Yaoheng</i>	387