Bibliography


Index

aberration, 35
corrections in holograms
(paraxial
approximation), 76
corrections, 58
acousto-optic modulator (AOM), 70
Airy disk, 29
amplitude gratings, 21
amplitude/phase, 16
angular dispersion, 13, 73
angular multiplexing, 44, 51, 53
atmospheric scattering, 58
binary/digital/analog, 16
blaze curve, 23
bragg’s law, 14, 51, 73
charge-coupled device (CCD), 56
coherece length, 73
coherece, 5–6
coherece waves, 5–6
complementary metal–
oxide semiconductor (CMOS), 56
complex notation, 3
computer-generated hologram, 10, 37, 76
conjugated term, 33
coupled-wave analysis, 14, 21
dichromated gelatin (DCG), 64
difference in writing and reading wavelengths, 35
diffracted beams, 34
diffraction, 7
diffraction by a slit, 29
diffraction by apertures, 75
diffraction efficiency of thick volume gratings, 74
diffraction efficiency of thin gratings, 74
diffraction grating, 9–10
diffraction integrals, 75
diffraction pattern, 8
diffraction terms from a hologram, 76
digital holography, 56
digital micromirror device (DMD), 71
edge-lit hologram, 18, 48
energy distribution, 14
Fourier holograms, 37
Fourier/Fresnel, 16
Fraunhofer diffraction integral, 28
Fresnel diffraction integral, 27
Fresnel holograms, 38
Fresnel transformation, 56
Fresnel zone plate, 10, 30
Gabor zone plate, 30
gelatin, 64
generaization in two dimensions, 29
Gerchberg–Saxton algorithm, 39
Index

grating equation, 12–13, 31, 35, 73
grating vector, 15
Helmholtz equation, 2, 73
hologram, 8
holographic data storage, 49
holographic
interferometry, 54
holographic optical
elements (HOEs), 10
holographic printing, 49
holographic stereograms, 49
holographic television, 57
image sensor, 56
inline point sources, 32
inline reflection hologram, 43
inline transmission
holograms, 42
inorganic crystals, 69
interference, 4
interference visibility, 73
interferogram, 4
intermodulation, 33
intermodulation noise, 34
K-vector closure condition, 15
Kirchhoff diffraction
integral, 26
LCoS, 71
linear perspective, 58
Lippmann photography, 52
liquid crystal on silicon
(LCoS), 71
lookup tables, 38
magnetic field, 2
master hologram, 45
media thickness variation, 36
micro-opto-electro-
mechanical systems
(MOEMS), 71
movement parallax, 58
multicolor images, 50
multiple slits, 30
multiplexing, 53
object beam, 34
occlusion, 58
off-axis transmission
hologram, 44
on-axis/off-axis, 16
optical field, 2
optical time reversal, 55
optical/computational, 16
orders, 9
organic compounds, 69
orthoscopic image, 45
perceptual factors, 58
phase conjugate mirror, 55
phase conjugation, 55
phase gratings, 20
phase or transmittance
discarded, 39
phase shifting, 56
phase stabilization
system, 60
photochromic materials, 65
photopolymer, 63
photorefractive materials, 68–69
photoresists, 66
physiological factors, 58
piston-mirror MOEMS, 72
plane wave, 2, 73

Field Guide to Holography
<table>
<thead>
<tr>
<th>Term</th>
<th>Page(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>plane waves incident at different angles</td>
<td>31</td>
</tr>
<tr>
<td>polarization holograms</td>
<td>67</td>
</tr>
<tr>
<td>position vector</td>
<td>2</td>
</tr>
<tr>
<td>pseudoscopic</td>
<td>45</td>
</tr>
<tr>
<td>pulsed laser</td>
<td>61</td>
</tr>
<tr>
<td>quantization</td>
<td>40</td>
</tr>
<tr>
<td>rainbow holograms</td>
<td>47, 51</td>
</tr>
<tr>
<td>reading beam</td>
<td>34</td>
</tr>
<tr>
<td>real pseudoscopic image</td>
<td>34</td>
</tr>
<tr>
<td>reference beam</td>
<td>34</td>
</tr>
<tr>
<td>reflection geometry</td>
<td>17</td>
</tr>
<tr>
<td>reflection hologram</td>
<td>52</td>
</tr>
<tr>
<td>reflection/transmission</td>
<td>16</td>
</tr>
<tr>
<td>remarkable-thin-grating</td>
<td>30</td>
</tr>
<tr>
<td>resolution</td>
<td>58</td>
</tr>
<tr>
<td>rigorous coupled-wave analysis (RCWA)</td>
<td>21–22</td>
</tr>
<tr>
<td>sampling</td>
<td>40</td>
</tr>
<tr>
<td>sawtooth-function phase</td>
<td>25</td>
</tr>
<tr>
<td>shading</td>
<td>58</td>
</tr>
<tr>
<td>side-by-side point sources</td>
<td>32</td>
</tr>
<tr>
<td>silver halide</td>
<td>52, 62</td>
</tr>
<tr>
<td>sinusoidal phase</td>
<td>24</td>
</tr>
<tr>
<td>sinusoidal transmittance</td>
<td>24</td>
</tr>
<tr>
<td>slant angle</td>
<td>14</td>
</tr>
<tr>
<td>source spatial extent</td>
<td>36</td>
</tr>
<tr>
<td>space–bandwidth product (SBP)</td>
<td>41, 57, 76</td>
</tr>
<tr>
<td>spatial light modulator (SLM)</td>
<td>71</td>
</tr>
<tr>
<td>spherical wave</td>
<td>3, 73</td>
</tr>
<tr>
<td>square-function phase</td>
<td>25</td>
</tr>
<tr>
<td>square-wave transmittance</td>
<td>24</td>
</tr>
<tr>
<td>stereoscopic parallax</td>
<td>58</td>
</tr>
<tr>
<td>super-blaze</td>
<td>23</td>
</tr>
<tr>
<td>surface/volume</td>
<td>16</td>
</tr>
<tr>
<td>transfer hologram</td>
<td>45–46</td>
</tr>
<tr>
<td>thick grating condition</td>
<td>20–21</td>
</tr>
<tr>
<td>thick gratings</td>
<td>19</td>
</tr>
<tr>
<td>thick-volume gratings</td>
<td>23</td>
</tr>
<tr>
<td>thin gratings</td>
<td>19, 24</td>
</tr>
<tr>
<td>thin/thick</td>
<td>16, 73</td>
</tr>
<tr>
<td>transfer hologram (H2)</td>
<td>46</td>
</tr>
<tr>
<td>transmission geometry</td>
<td>18</td>
</tr>
<tr>
<td>transmission holograms</td>
<td>45</td>
</tr>
<tr>
<td>transmission stereograms</td>
<td>51</td>
</tr>
<tr>
<td>two-beam interference patterns</td>
<td>75</td>
</tr>
<tr>
<td>two-plane-wave interference</td>
<td>73</td>
</tr>
<tr>
<td>vergence</td>
<td>58</td>
</tr>
<tr>
<td>virtual orthoscopic image</td>
<td>34</td>
</tr>
<tr>
<td>visibility</td>
<td>4</td>
</tr>
<tr>
<td>wave vector</td>
<td>2</td>
</tr>
<tr>
<td>wavefront</td>
<td>8</td>
</tr>
<tr>
<td>wavelength multiplexing</td>
<td>53</td>
</tr>
</tbody>
</table>
Pierre-Alexandre Blanche is an Assistant Research Professor at the College of Optical Sciences, University of Arizona. He received his Ph.D. in 1999 from the University of Liège (Belgium), after which he held a postdoctoral position at the University of Arizona in the field of nonlinear optics. Back in Belgium, he developed a hologram production facility for diverse scientific applications using dichromated gelatin and photopolymers. In 2006, he joined the College of Optical Sciences to work on photorefractive materials, holographic 3D displays, and various diffractive optical systems.