

Contents

1. Introduction to optical communications

P. Russer

1.1	History and methods of optical communications	1
1.2	Physical aspects of optical communications	16

2. Optical source devices

R. C. Goodfellow and R. Davis

2.1	Introduction	27
2.2	Material constraints	30
2.3	Light-emitting diodes	37
2.4	Injection lasers	60
2.5	Material preparation	90
2.6	Reliability and degradation	96

3. Photodetectors for communication by optical fibres

T. Pearsall

3.1	Introduction	107
3.2	Visible and infra-red photodetectors	110
3.3	Detector characteristics for communication by optical fibres	116
3.4	1.3- μm detectors	151
3.5	Assessment of detectors for optical communications	158

4. Optical waveguide components

D. B. Ostrowsky

4.1	Introduction	165
4.2	Modulators and Switches	167
4.3	Periodic structures: applications to filters, DFB and DBR lasers	177
4.4	Opto-electronic integration	181

4.5	Fibre–waveguide coupling	184
4.6	Materials: hybrid versus total integration viewpoints	185
4.7	Conclusions	186
5. Optical fibres and cables		
<i>C. K. Kao</i>		
5.1	Preferred fibre types	189
5.2	Fibre-fabrication processes	196
5.3	Fibre-drawing processes	203
5.4	Fibre strength and durability	206
5.5	Fibre cable design	228
5.6	Fibre and cable testing	239
6. Optical communication systems		
<i>I. Garrett and J. E. Midwinter</i>		
6.1	Introduction	251
6.2	The digital optical receiver	253
6.3	Optical transmitters	264
6.4	Transmitter package	280
6.5	Transmitter design and optimization	282
6.6	Device lifetime	289
6.7	Performance of present-day systems	290
6.8	Future developments	292
6.9	Appendix: Optical and electrical bandwidth	299
Subject Index		301