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Pulsed SBC; 2.6 Summary; References; 3 Supercontinuum Sources Based on Photonic Crystal Fiber; 3.1 Introduction and Brief History; 3.1.1 Outline of this Chapter; 3.2 Photonic Crystal Fibers and Tapers; 3.2.1 Calculating PCF Properties; 3.2.2 Nonlinearity in PCF; 3.2.3 Dispersion in PCF; 3.3 Modeling Nonlinear Pulse Propagation in Optical Fiber; 3.3.1 Unidirectional Field Equation; 3.3.2 Envelope Equations; 3.4 Ultrafast Pumped Supercontinuum Sources; 3.4.1 Regimes of Supercontinuum Generation; 3.4.2 Initial Dynamics and Solitons; 3.4.3 Dispersive-Wave Generation; 3.4.4 Intrapulse Raman Scattering; 3.4.5 Tailoring the Shape of the SC - Ways of Shaping; 3.4.5.1 Power Dependence; 3.4.5.2 Wavelength Tuning; 3.4.6 Multiple ZDWs; 3.4.6.1 Three ZDWs; 3.4.7 Taper Transitions; 3.4.7.1 Soliton Dynamics in Axially Varying Fiber; 3.4.7.2 Intrapulse FWM; 3.4.7.3 Soliton Blue Shift; 3.4.8 Extreme SCG; 3.5 Conclusion; References; 4 Dissipative Soliton Fiber Lasers; 4.1 Introduction; 4.2 Theory: Analytic Approach; 4.2.1 Theory; 4.2.2 Experimental Results; 4.3 Theory: Simulations; 4.3.1 Temporal Evolution; 4.3.2 Variation of Laser Parameters; 4.3.2.1 Nonlinear Phase Shifts; 4.3.2.2 Spectral Filter Bandwidth; 4.3.2.3 Group-Velocity Dispersion; 4.3.2.4 Summary of the Effects of Laser Parameters; 4.3.2.5 Design Guidelines; 4.3.3 Experimental Confirmation; 4.4 Physical Limits; 4.4.1 Area Theorem; 4.4.2 Pulse Energy; 4.4.3 Pulse Duration; 4.5 Practical Extensions; 4.5.1 Core-Size Scaling; 4.5.1.1 Double-Clad Fiber; 4.5.1.2 Photonic Crystal Fiber; 4.5.1.3 Chirally-Coupled Core Fiber; 4.5.2 Environmental Stability; 4.6 Giant-Chirp Oscillators; 4.7 Summary; References

5 Modeling and Technologies of Ultrafast Fiber Lasers

Sommario/riassunto

A comprehensive account of the latest developments and applications in this rapidly developing field, covering a wide range of topics, such as power scaling and short pulse generation, dispersion management and modeling, broadband supercontinuum generation and wavelength tailoring. The book brings together contributions from the world's leading experts at major collaborative research centers throughout Europe, Australia, Russia and the USA. Each chapter presents a tutorial style introduction to the selected topic suitable for scientists, researchers and experts, as well as graduate and pos
