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2.2.3 Self-Synchronous LOCSET; 2.3 LOCSET Phase Error and Channel Scalability; 2.3.1 LOCSET Beam Combining and Phase Error Analysis; 2.3.2 In-Phase and Quadrature-Phase Error Analysis; 2.3.3 Two-Channel Beam Combining; 2.3.4 16-Channel Beam Combining; 2.3.5 32-Channel Beam Combining; 2.4 LOCSET High-Power Beam Combining; 2.4.1 Kilowatt-Scale Coherent Beam Combining of Silica Fiber Lasers  
2.4.2 Kilowatt-Scale Coherent Beam Combining of Photonic Crystal Fiber Amplifiers  
2.5 Conclusion; References; 3 Kilowatt Coherent Beam Combining of High-Power Fiber Amplifiers Using Single-Frequency Dithering Techniques; 3.1 Introduction; 3.1.1 Brief History of Coherent Beam Combining; 3.1.2 Coherent Beam Combining: State of the Art; 3.1.3 Key Technologies for Coherent Beam Combining; 3.2 Single-Frequency Dithering Technique; 3.2.1 Theory of Single-Frequency Dithering Technique; 3.2.2 Kilowatt Coherent Beam Combining of High-Power Fiber Amplifiers Using Single-Frequency Dithering Technique  
3.2.3 Coherent Polarization Beam Combining of Four High-Power Fiber Amplifiers Using Single-Frequency Dithering Technique  
3.2.4 Target-in-the-Loop Coherent Beam Combination of Fiber Lasers Based on Single-Frequency Dithering Technique; 3.3 Sine-Cosine Single-Frequency Dithering Technique; 3.3.1 Theory of Sine-Cosine Single-Frequency Dithering Technique; 3.3.2 Coherent Beam Combining of Nine Beams Using Sine-Cosine Single-Frequency Dithering Technique; 3.4 Summary; References; 4 Active Coherent Combination Using Hill Climbing-Based Algorithms for Fiber and Semiconductor Amplifiers  
4.1 Introduction to Hill Climbing Control Algorithms for Active Phase Control

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#### Sommario/riassunto

Recently, the improvement of diode pumping in solid state lasers and the development of double clad fiber lasers have allowed to maintain excellent laser beam quality with single mode fibers. However, the fiber output power is often limited below a power damage threshold. Coherent laser beam combining (CLBC) brings a solution to these limitations by identifying the most efficient architectures and allowing for excellent spectral and spatial quality. This knowledge will become critical for the design of the next generation high-power lasers and is of major interest to many industrial, environmental, and defense applications.

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