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Coherent Optical Signal Processing using Semiconductor Based Frequency Combs

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The development of stabilized optical frequency combs has led to a revolution in many areas of optical spectroscopy, metrology, communications and signal processing. The size, weight, cost and power consumption of frequency comb sources plays an important role in determining whether these sources are suitable for specific applications. In that light, many of these application areas could benefit from the existence of chip scale frequency comb sources for use in fully integrated “systems on a chip”. This talk will cover recent developments in semiconductor based comb sources and their use in ultrafast optical signal processing applications. Specifically, we will focus on results pertaining to comb stabilization, synchronization and coherence between independent combs, and using the combs for arbitrary waveform generation and measurement, and pattern recognition.