High-performance photonic integrated devices with machine learning and optimization

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High performance and large-scale integration are driving the design of innovative photonic devices based on non-trivial shapes and metamaterials. As a consequence, the number of parameters that must be handled vastly increases and often a strong dependence between them is introduced. Moreover, multiple figures of merit must be considered simultaneously to measure the quality of the selected devices, e.g., losses, bandwidth, or tolerance to fabrication uncertainty. In this invited talk we will present our recent work on the use of machine learning and optimization tools for the design of high-performance photonic components.