Photonics components for optical communication in chip multicore architectures

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Chip multicore architectures represent the prevailing paradigm in the design of high performance very large scale integration (VLSI) systems. Such computational architectures can take advantage of CMOS silicon photonic integration in order to realize optical interconnection links. Optical interconnections among the different computational cores of an integrated system can provide a huge communication bandwidth and a favourable power budget with respect to the electrical counterpart. The fundamental component, necessary to achieve the signal routing among N transmitters and N receivers, is the switch that acts as the basic building block, which can be replicated several times within the network. In this presentation, an overview of our recent research on photonic components for optical networks on chip will be proposed. In particular, the design of silicon photonic devices, such as active and passive waveguide switches and photonic crystal routers for single layer and multilayer networks, will be presented.