



Emergence and Development of New Generation of Compact Photonic Sensors

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ABSTRACT

Although fibre based optical sensors are now sufficiently mature and well established in the market, however, designs based on more exotic tapered nanowires and photonic crystal fibres are becoming increasingly important and showing much improved sensitivity by accessing a larger evanescent field. Similarly, novel planar Integrated Optic design concepts, such as the silicon slot guide-based design is showing even greater promise, allowing the exploitation of well-developed CMOS fabrication technologies for potentially low-cost sensor elements. Micro-resonators supporting whispering gallery modes, plasmonic slots, and ring resonators are also emerging as novel photonic sensors by exploiting strong light-matter interactions. The designs and optimizations of a suite of novel optical sensors will be presented, showing the need and value of using rigorous full-vectorial numerical approaches.