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Evolution of silicon photonics: Markets and opportunities

Ching Eng Jason PNG

Institute of High Performance Computing, A*STAR, Singapore

Silicon photonics enables the large scale on-chip integration of electronics and photonics. Significant progress has been made in silicon photonics such as high-speed modulators, and high-performance detectors that can bring disruptive changes to existing integrated optoelectronics systems. The silicon photonics market is expected to worth around USD 1,078.9 million by 2022, with transceivers for data centers being the major driver for this growth. Some other emerging markets for silicon photonics include light detection and ranging (LIDAR), switches and biosensors. In this talk, the author will give an overview of the evolution of the silicon photonics from research to commercial applications. Subsequently, the author will give an overview of their work and directions. In particular, we have designed and developed a library of optimized passive and active silicon photonic devices that meet the broadband (>50 nm), low-loss (<2 dB per device) and high speed (≥ 25 Gb/s) requirements for data communication applications. These devices include edge couplers, directional couplers, polarization beam splitters, arrayed waveguide gratings (AWGs) and modulators that can be used to design transceivers, LIDARs, switches and biosensors. Measurement results of our devices compare well with our simulation results.

pngce@ihpc.a-star.edu.sg