Workshop speaker	
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Presentation Title	Programmable silicon photonic processor and its application for microwave signal processing

Biography

Liangjun Lu received the B.Eng. degree from the Department of Optical Engineering of Zhejiang University in 2011, and his Ph.D. degree from the Department of Electrical Engineering of Shanghai Jiao Tong University in 2016. During his Ph.D., he has developed and implemented several large-port-scale silicon high-speed optical switches. Currently, Liangjun is a Tenure-track Assistant Professor in the Department of Electrical Engineering at Shanghai Jiao Tong University. His research interests include design, modeling and optimization of silicon photonic devices and integrated photoniccircuits for optical communications and microwave photonics applications. He has authored and co-authored more than 50 journal and conference papers. Liangjun Lu is a member of IEEE, OSA and SPIE. He is also a reviewer of Optics Express, Optics Letters, Photonics Technology Letters, Journal of Lightwave Technology, etc.

200 words abstract

Programmable photonic processors (PPP) consists of multitudes of repetitive basic units that can be reconfigured to perform multiple tasks. Nowadays, they are drawing much more attention due the advantages of flexibility and cost effectiveness compared with application specific PICs. Silicon photonics with the merits of compact footprint and CMOS compatible processes are one of the most promising platforms for large-scale low-cost PPP. Here, we review our recent achievement about a PPP for microwave photonic signal processing. It is based on a self-coupled optical waveguide (SCOW) resonant, which is formed by a single meandering waveguide self-coupled to form directional couplers at the input and output ends. The PPP consists of three-stages of SCOW resonators, where the directional couplers are replaced by Mach-Zehnder interferometers (MZIs) to work as tunable couplers. Both TiN-microheater-based phase shifters and PIN-diode-based variable optical attenuators (VOAs) are integrated in the device for active phase and amplitude tuning, respectively. By reconfiguring the states of tunable couplers, phase shifters and VOAs, the proposed chip can be programmed to various basic optical components, such as optical waveguides, ring resonators, MZIs filters, Fabry-Parot cavities, as well as cascaded or coupled components. With such diverse configurations of the chip, the PPP can perform multiple signal processing functions, like true delay lines, microwave phase shifters, and microwave photonic filters.