

Multiple I/Os Waveguide-based Frontend design for beam steering operation

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ABSTRACT

Recently, research attention has focused into integrated solutions with Waveguide Frontend (WFE) circuits instead of conventional fiber frontends for on-chip beam transforming functions in Wavelength Selective Switches (WSSs) and Transponder Aggregator (TPA) configurations. These integrated WFEs can reduce the bulky free-space components together with the associative cost and footprint while allowing for tighter integration of I/Os. Moving towards advanced switching systems such as TPAs requires upgraded functionalities such as beam transforming combined also with beam steering by the respective integrated circuits. In this communication we extend our previous work on InP-based WFEs and present our recent progress on the design concept and operating principle of an InP-based WFE with multiple I/Os that can emit and receive multiple beams allowing for both beam transforming and steering operation. The proposed circuit can in turn enable the combination of multiple WSSs maximizing in this way the gain in integration density brought by the WFEs in hybrid TPAs.

Keywords: Beam transforming, Optical Passive Devices and Modules, Photonic Integration, Photonic integrated circuits.