High-Throughput Manufacturing for PIC Polymer Waveguide Connection Fabrics

Title: High-Throughput Manufacturing for Waveguide Connectors

Invention: This invention is a low-cost high-throughput method of connecting silicon photonic chips to one another. The method is active and robust, taking into account the tolerances and variations of the PIC configurations. It is also rapid, accurate, immune to large dimensional variation, and amenable to rework.

Background: Photonic integrated circuits (PICs) combine multiple photonic functions into a single photonic chip. A fundamental problem in the optical packaging of PICs is the connection of optical waveguides of various forms, with modefield diameters (MFDs) of 10 microns in some cases, to silicon photonic circuitry, with MFDs of 300-400nm. The different manufacturing techniques and sizes makes it difficult to streamline the fabrication process for these multi-functional components. There is a need for improved fabrication processes of high speed low loss optical connections between the components of a PIC, between individual PICs, and between a PIC and optical fiber.

Applications:

- Telecommunications
- Component coupling
- Photonics (Network research)
- Metrology (interferometry)
- Navigation (fibre gyroscope)

Advantages:

- Improves cost of connecting various optical systems
- Reduces the time required to connect systems
- Low error occurrence
- Capable of correcting errors for manufactured systems
- High throughput

Contact Amy Phillips
Sr. Licensing Manager
amyp@tla.arizona.edu
(520) 621-9579

The University of Arizona, Tucson, Arizona
Licensing Manager:
Amy Phillips
aphillips@optics.arizona.edu
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Inventors
Nasser Peyghambarian
Professor, Optical Sciences
Stanley Pau
Professor, Optical Sciences
Robert Norwood
Professor, Optical Sciences
Thomas Koch
Dean, Professor, Optical Science