

LICENSING OPPORTUNITY: A PROBE FOR RAPID AND FLEXIBLE EVALUATION OF PHOTONIC INTEGRATED CIRCUITS (PICS)

DESCRIPTION

Problem

Photonic integrated circuits (PICs) are similar to computer chips but operate with light instead of electricity. They are a next-generation technology with potential impacts in high-bandwidth communications, deployable sensors, and computing interconnects. Quality assurance and process control of PICs require light outcoupling of individual device components for in-line testing. Currently, these tests require large patterned areas on chips, which increases circuit size and manufacturing complexity. Light probes are a solution to this problem, where a specialized sub-micron-diameter fiber optic is placed in proximity to a light circuit device to perform tests. These probes are reusable and can be repositioned to test multiple devices for rapid sequential testing. While glass-based probes are currently under development, they require specialized handling and fabrication processes.

Invention

The Tapered Polymer Optical Probe (TPOP) is a state-of-the-art light probe that collects light from very small, localized areas. It is a small loop of a thin plastic "string" that collects light from a localized area near the loop into a fiber optic for signal testing. The probe is made of

a durable polymer, and fabrication is facile and customizable using commercially available two-photon lithography direct laser write systems.

BENEFITS

Potential Commercial Applications

- Quality control in the manufacture of PICs for uses such as LiDAR, communications, sensing, and computing interconnects.
- Probe for small, pure light sources (single photon emitters) used in quantum technologies.

Competitive Advantage

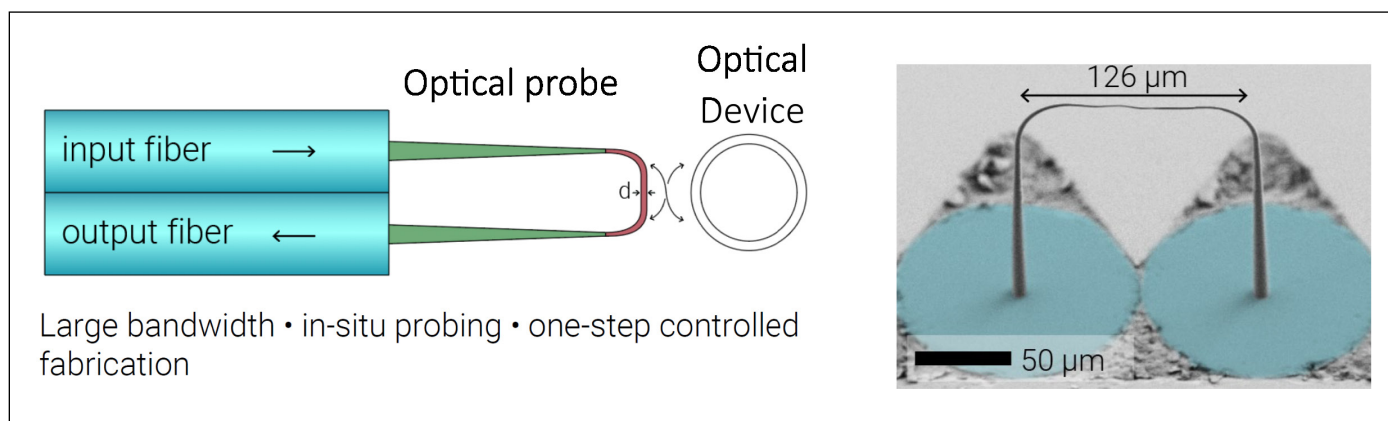
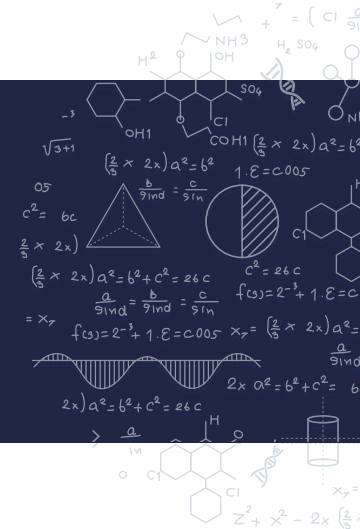
- Easy fabrication: only one lithography step without the need for the controlled environment of a cleanroom.
- Reproducible and customizable through the use of direct laser writing.
- Polymer-based probes are inherently robust compared to previous glass-based probes.
- Decrease time-to-market of light-based circuits by reducing complexity in design and in-line measurements.
- Decrease of device component size in light-based circuits.

Contact: licensing@nist.gov



NIST Technology Partnerships Office
National Institute of Standards and Technology
100 Bureau Drive, Gaithersburg, MD 20899-2200

LICENSING OPPORTUNITY: A PROBE FOR RAPID AND FLEXIBLE EVALUATION OF PHOTONIC INTEGRATED CIRCUITS (PICS)



The TPOP optical probe provides highly local probing of PICs, including optical devices and light sources located on-chip for developing next generation technologies.

Contact: licensing@nist.gov

NIST TECHNOLOGY PARTNERSHIPS
OFFICE

NIST Technology Partnerships Office
National Institute of Standards and Technology
100 Bureau Drive, Gaithersburg, MD 20899-2200