



Centre for Integrated Photonics

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Simple hybrid assembly technique for optical devices provides cost-effective platform for emergent optical networking applications

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The Centre for Integrated Photonics (CIP) has announced a novel hybrid assembly technique which offers a very simple yet highly reliable method of integrating optical devices. The field-proven technique eliminates the expense of actively aligning devices - the process in common use today - providing a cost-effective platform for creating the sophisticated building-blocks required for advanced optical networking.

"Hybrid integration is an optimal way forward for many of the optical functions needed in advanced optical networks, but most of the assembly techniques in mainstream use today rely on highly skilled labour and expensive equipment, and do not scale", says Graeme Maxwell, CIP's VP of Hybrid Research & Development. "Our technique requires just passive assembly, yet provides very low insertion losses - making it possible to create single-module solutions for applications such as packet switches and signal regenerators".

The technique integrates by means of plugging silicon daughterboards carrying individual optical components into a planar silica motherboard - each having precision-machined mating faces. The components themselves also employ simple interface modifications - namely mode expansion, and features to support precision cleaving. The result turns hybrid photonic integration into a similar form of process to that used for assembling electronic PCBs - with the planar silica motherboard providing the equivalent of printed wiring.

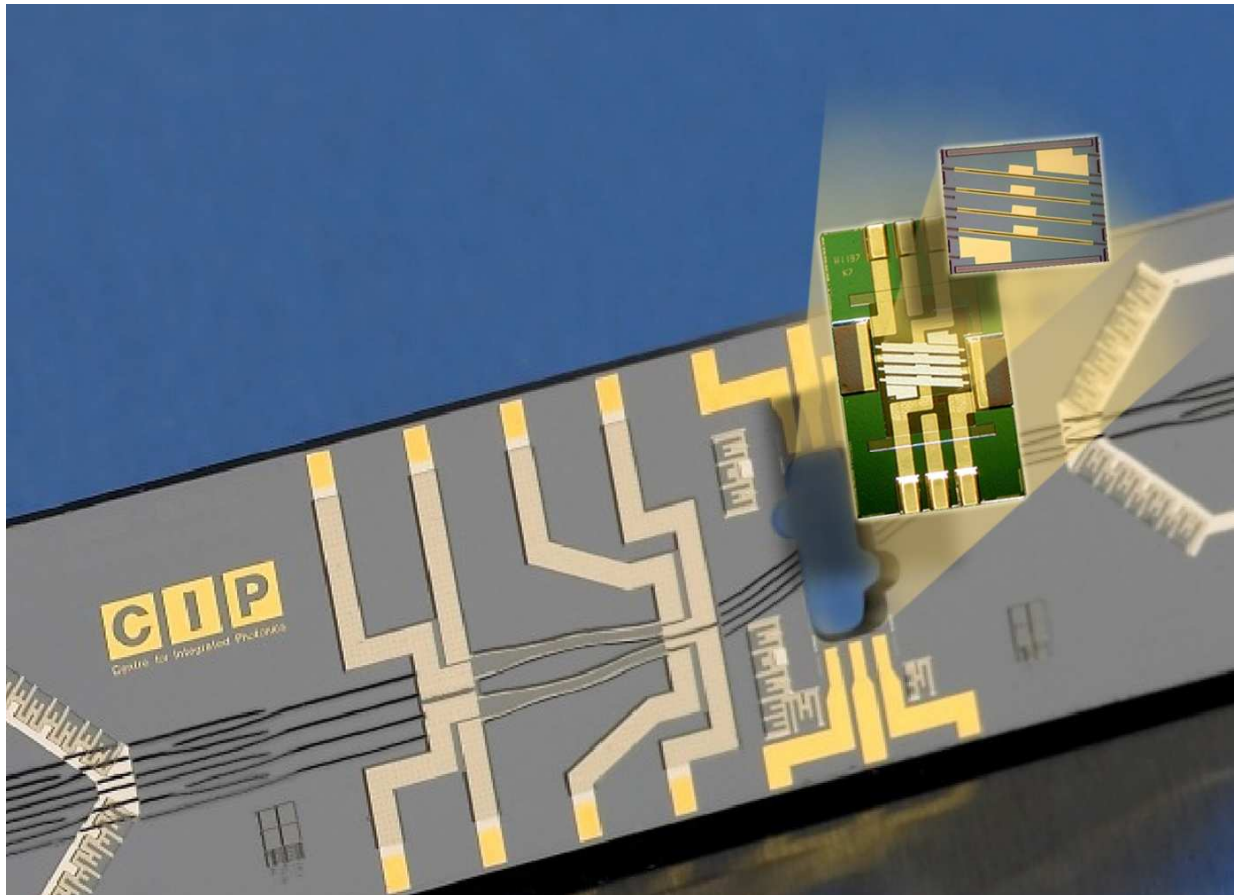
The assembly technique has been developed and refined over a time span of some 10 years, and has been highly optimised for low interface losses and ease of assembly, and does not involve any complex processing or etching. The technique is also highly scalable, and applies equally well to two devices or a large subsystem integrating many component elements.

CIP has manufactured numerous devices using the technique, such as its 2R regenerator - a recently-announced commercial device that is attracting a lot of interest from optical network developers. On this example of its hybrid integration, the component integrates a planar silica Mach-Zehnder interferometer (MZI) and a monolithic quad semiconductor optical amplifier (SOA) array to create a dual-channel 2R regenerator with just a 1 dB loss at daughterboard/motherboard interfaces.

The assembly technique has evolved from considerable research and development undertaken by CIP staff during the business' history as part of BT, then Corning, and for the last two years as an independent photonic design and manufacturing consultancy. CIP offers the technology in a variety of forms to suit different applications and users. These include technology consultancy to support design-in, funded development programs, and the provision of turnkey hybrid component solutions - such as its multi-channel 2R regenerator.

"We believe this hybrid integration technique provides the performance, reliability and economy to address many of the sophisticated component functions necessary for advanced optical switched fabrics", adds Maxwell. "Among the potential applications are reconfigurable add-drop multiplexers, 2R and 3R signal regenerators, high-speed interconnect, packet switches, WDM PON devices and optical buffer memories. In each of these cases I expect our platform approach to offer considerable cost reduction and performance advantages over current component solutions and integration methods".

Images and Text available at: <http://www.wordsun.com/cip11.htm> or www.ciphotonics.com/cip_press.htm



The Centre for Integrated Photonics Ltd (CIP) is a leading supplier of advanced photonic hybrid integrated circuits and InP based optoelectronic chips, devices and modules for communications, biomedical, defence and industrial markets. CIP is also a major provider of technical services and consultancy in the photonics field. With 500 years of combined expertise in photonics, CIP refines research into viable products based on leading edge technologies, thus helping customers develop the photonic products of tomorrow. CIP's wide range of competencies are based on advanced world renowned research and are uniquely broad, incorporating III-V photonic materials, silicon micromachining, planar silica waveguides and systems measurements expertise. Together with state-of-the-art, ISO9001:2000 registered, co-located fabrication and pilot production facilities, CIP is able to help customers realise new exciting product ideas based on these technologies.

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