ECIO 2016
18TH EUROPEAN CONFERENCE ON INTEGRATED OPTICS 2016
18–20 MAY | WARSAW | POLAND

InP-based Photonic Integration: Achievements and Opportunities

Michael WALE[1,2*]

[1]Oclaro Technology Limited, Caswell, Towcester, NN12 8EQ, UK
[2]Photonic Integration Group, Eindhoven University of Technology, Eindhoven, The Netherlands
[*] Mike.Wale@oclaro.com

Photonic Integrated Circuit (PIC) technology based on indium phosphide has evolved over more than 30 years to become a key enabler for high-performance optical communications systems, which form the backbone of the internet, fixed and mobile telephony and all of the data-intensive systems on which modern life depends. In order to accommodate the exponential growth of internet traffic, modern optical fibre systems often employ wavelength division multiplexing with 80-100 channels, using tunable lasers operating under electronic control, whilst advanced modulation schemes coupled with coherent transmission techniques allow very high bit rates (100 Gbit/s per wavelength and above) with high spectral efficiency. The use of such advanced techniques is greatly facilitated by the adoption of integrated photonics and compact coherent transmission modules based on InP PICs are now in volume production alongside existing PIC-based integrated laser-modulator and receiver products for 10 Gbit/s and 40 Gbit/s. High data rate communications within and between data centres present further exciting opportunities for InP PICs.

Although the development of InP PIC technology has historically been driven by communications and this sector still accounts for the majority of the production volumes, it is clear that many other applications can benefit from this technology. InP PIC technology is unique in being able to offer the integration of semiconductor lasers, optical amplifiers, modulators, detectors and a full range of passive waveguide functions, all with very high performance, within a single chip. As such it is expected to become a major enabler for many other business sectors, including medical, industrial and aerospace applications, where complex optical functionality is required within a compact, power-efficient and cost-effective component.

Major progress has been achieved over the last few years in the development of generic platform-based design and manufacturing methods, which will facilitate the use of PICs in new applications and stimulate innovative product design.

The talk will review the current state of the art and point towards future opportunities.