Novel Wavelength Division Multiplexing (WDM)
for on-chip optical interlinks and active optical cables

- A very simple but efficient WDM architecture
- Potential for terabit optical communication systems
- Offers very high channel scalability
- High integration density
- Requires very low driving electrical energy
- Low fibre-to-fibre loss
The Technology Opportunity

WDM is a key technology for increasing the data rate in optical communications systems, which currently incorporate large electro-optic modulators/detectors, multiple lasers and complex multiplexer circuits. Consequently large electrical power is consumed and, as such, on-chip integration is prohibited. Our novel, energy efficient photonic crystal technology WDM architecture can be used both for ultra-high speed on-chip optical interconnects and in active optical cables.

Modulation and Detection Techniques

Our architecture consists of a single multi-wavelength laser and highly wavelength selective modulators and photodetectors. An optical waveguide is placed vertically on top of all the modulators and detectors to carry all the channels inside the transmitter and receiver section. At the transmitter end, individual channels are modulated by serially-placed modulators while propagating through the waveguide and then transmitted by an optical fibre to the receiver end.

Terabit Communication Link

This architecture eliminates the necessity for complex multiplexer and de-multiplexer circuitry. The photonic crystal technology based devices are 100 times smaller than those used in conventional architectures, thus promising a very high channel scalability and their power consumption can be three orders of magnitude smaller than in conventional devices. Our unique WDM architecture can combine hundreds of such channels, thereby promising to offer a terabit/s transmission link for both on-chip optical interconnects and active optical cables.

IPR Protection

Stemming from UK patent application 1113125.7, the patented technology concept is published as (WO2013/017814, 7 February 2013) with national phase patent applications being pursued in the United States of America, Canada, Europe and India.

What to do next

There are no commercial parties involved in this research and the University of St Andrews would welcome enquiries from third parties interested in developing commercial applications for this novel WDM technology. The University is looking to enter a commercial partnership with a company in the area of novel WDM technology.

If you would like to explore this technology transfer opportunity in more detail, please contact:

Alistair Main, The Knowledge Transfer Centre,
University of St Andrews, The Gateway, St Andrews, Fife, KY16 9RJ, UK
Tel: +44 (0) 1334 462165
Fax: +44 (0) 1334 462386
Email: abm4@st-andrews.ac.uk

Additional Information will be made available under a Confidentiality Agreement