

A*STAR'S IME AND FUJIKURA DEMONSTRATE WORLD'S FIRST 40 TO 60 GBPS SILICON PHOTONICS MODULATOR USING ADVANCED MODULATION FORMATS

Breakthrough paves the way for low cost, ultra-high bandwidth long-haul telecommunications

1. Singapore 27 March, 2013 -- In collaboration with Fujikura Ltd., researchers from Singapore's A*STAR Institute of Microelectronics (IME) have pioneered the world's first 40 to 60Gbps silicon-based optical modulators with advanced multilevel modulation formats for high speed long-haul data transmission. This represents a major advance towards low cost, ultra-high bandwidth and small footprint optical communications on silicon platform.
2. The adoption of multilevel modulations, in a simple Quadrature phase-shift keying (QPSK) and differential-QPSK (DQPSK) format, significantly increases the information capacity and thus total data communication throughput for a given optical channel.
3. Comprising a set of silicon phase-shifters that are integrated in a nested Mach-Zehnder configuration, the modulator has demonstrated high communication speeds of more than 40 Gbps and more than 60Gbps for DQPSK and QPSK respectively. For instance, for a channel grid spacing of 50 GHz, 40G DQPSK results in a spectral efficiency that is 2 times that of 20G with conventional on-off keying (OOK) format which is widely used commercially at present. Compared to conventional Lithium Niobate modulators, the new modulator is much smaller in footprint and is significantly cheaper to fabricate as it is CMOS-compatible.

4. This significant breakthrough is a progressive effort of years of strategic partnership between IME and Fujikura since 2006 to develop optical telecommunications component technologies. In the last 2 years, this joint effort has resulted in the release of an evaluation module of 10 Gbps silicon modulator that features excellent performance for mass production. The development in the silicon optical modulator made by IME and Fujikura demonstrates that reaching ultra-high performance levels on silicon platform technology is now a reality, thus providing a huge impetus towards driving future ultra-high bandwidth optical communications.

5. “We are proud to have jointly achieved this breakthrough with Fujikura,” said Prof. Dim-Lee Kwong, Executive Director, IME. “This will fuel the design and development prospects of next-generation long-haul telecommunication systems as well as truly bring low cost, high performance optical communications to the masses.”

6. “This joint effort is an excellent proof of strong synergy between IME and Fujikura. We open the door to expand silicon based modulators in next-generation optical telecommunication networks. Fujikura will accelerate the product development to meet the needs of increase in transmission capacity,” said Kenji Nishide, General Manager of Optics and Electronics Laboratory, Fujikura.

7. This remarkable achievement was recently reported on 20 March, 2013 at OFC/NEOEC 2013, the largest global conference and exposition on optical communications and networking that was held in Anaheim, CA, USA.

About Institute of Microelectronics (IME)

The Institute of Microelectronics (IME) is a research institute of the Science and Engineering Research Council of the Agency for Science, Technology and Research (A*STAR). Positioned to bridge the R&D between academia and industry, IME's mission is to add value to Singapore's semiconductor industry by developing strategic competencies, innovative technologies and intellectual property; enabling enterprises to be technologically competitive; and cultivating a technology talent pool to inject new knowledge to the industry. Its key research areas are in integrated circuits design,

advanced packaging, bioelectronics and medical devices, MEMS, nanoelectronics, and photonics. For more information about IME, please visit <http://www.ime.a-star.edu.sg>.

About Agency for Science, Technology and Research (A*STAR)

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About Fujikura Limited

Fujikura is a 128-year old multinational company based in Tokyo, Japan, with businesses in optical telecommunication network systems, power transmission systems, electric wires and cables, magnetic wires, automotive wire harness and related products, and electronic components. Its annual revenue as of last fiscal year stands at about JPY 500B. (www.fujikura.co.jp)

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