



NEWS RELEASE

IRT Nanoelec Project Integrates Laser Directly on Silicon with a Modulator

III-V/Silicon Laser Integrated with a Silicon Mach Zehnder Modulator Achieves 25 Gbps Transmission over 10 km Single-mode Fiber

GRENOBLE, France – March 18, 2016 – IRT Nanoelec, an R&D consortium focused on information and communication technologies (ICT) using micro- and nanoelectronics, today announced the first co-integration of a III-V/silicon laser and silicon Mach Zehnder modulator demonstrating 25 Gbps transmission on a single channel. This transmission rate usually is achieved using an external source, over a 10 km single-mode fiber.

Current interconnect technologies, which use micro-optics integration to assemble a discrete laser and a silicon photonic circuit, will soon reach their limits and new, different solutions will have to be found to handle increasing traffic.

Integrating photonics capabilities on silicon chips is replacing currently established technologies, vastly increasing bandwidth, density and reliability, while dramatically reducing energy consumption. In the age of photonics-on-silicon, data transmission will be measured in terabits per second.

“Jointly obtained by STMicroelectronics and Leti in the frame of the IRT Nanoelec cooperation, these results, especially fabricating the laser directly on silicon, demonstrate IRT Nanoelec’s worldwide leadership in III/V-on-silicon integration to achieve high-data-rate fiber-optic modules,” said Stéphane Bernabé, project manager. “IRT Nanoelec and its partners on this project, Leti, STMicroelectronics, Samtec and Mentor Graphics, are paving the way to integrating this technology in next-generation transceivers for optical data links.”

To achieve these recent results, silicon photonics circuits integrating the modulator were processed first on a 200mm SOI wafer, although 300mm wafers also could be used in the near future. Then, a two-inch wafer of III-V material was directly bonded on the wafer. In the third step, the hybrid wafer was processed using conventional semiconductor and/or MEMS process steps to produce an integrated modulator-and-laser transmitter.

IRT Nanoelec launched its [silicon photonics program](#) in 2012, with core members Mentor Graphics, STMicroelectronics and CNRS. The program brings together, under one roof, the expertise and equipment needed to address the entire photonics-on-silicon value chain.

Leti, which will attend the Optical Fiber Communication Conference in Anaheim, Calif., March 20-24, and have a booth at the Exhibition Hall (3759), is a major innovation player in III-V/silicon integration for high-data-rate fiber optics modules.



About IRT-Nanoelec Research Technological Institute (IRT)

Nanoelec Research Technological Institute (IRT), headed by CEA-Leti conducts research and development in the field of information and communication technologies (ICT) and, specifically, micro- and nanoelectronics. Based in Grenoble, France, IRT Nanoelec leverages the area's proven innovation ecosystem to create the technologies that will power the nanoelectronics of tomorrow, drive new product development and inspire new applications – like the Internet of Things – for existing technologies. The R&D conducted at IRT Nanoelec provides early insight into how emerging technologies such as 3D integration and silicon photonics will affect integrated circuits. Visit www.irtnanoelec.fr

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