

HELIOS makes silicon breakthrough

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Researchers in Europe have succeeded in presenting an integrated tuneable transmitter on silicon - the first time this has ever happened. This results are an outcome of the HELIOS ('Photonics electronics functional integration on complementary metal oxide-semiconductor, CMOS') project. The team presented the results at the recent Optical Fiber Communication conference in Los Angeles.

Experts from the Electronics and Information Technology Laboratory of the French Atomic Energy Commission (CEA-Leti) and III-V lab, a joint lab of [Alcatel-Lucent](#) Bell Labs France, in cooperation with Thales Research and Technology in the United Kingdom, say the tuneable laser source integrated on [silicon](#) is a groundbreaking achievement in efforts to secure fully integrated transceivers. Researchers at Ghent University

and the Interuniversity Microelectronics Centre (IMEC) in Belgium, and the University of Surrey in the United Kingdom, who designed the modulator, supported the research.

The group from CEA-Leti and III-V lab also demonstrated single wavelength tuneable lasers, with a 21 mA threshold at 20°C, a 45 nm tuning range and a side mode suppression ratio larger than 40 dB over the tuning range.

The researchers say silicon photonics is a powerful technology. Silicon photonics have the potential to bring the large-scale manufacturing of CMOS to photonic devices that are not cheap because the technology is missing. Another challenge to silicon photonics is the lack of optical sources on silicon, the base material on CMOSs, according to the researchers.

"We can overcome this problem by bonding III-V material, necessary for active light sources, onto a silicon wafer and then co-processing the two, thus accomplishing two things at once," says Martin Zirngibl, Bell Labs Physical Technologies Research leader. "Traditional CMOS processing is still used in the process, while at the same time we now can integrate active light sources directly onto silicon."

Commenting on the results, CEA-Leti France Photonics Program Manager, Laurent Fulbert, says: "We are proud to jointly present with III-V lab the results of the integrated [silicon photonics](#) transmitter and the tuneable laser. The ability to integrate a tuneable laser, a modulator and passive waveguides on silicon paves the way of further developments on integrated transceivers that can address several application needs in metropolitan and access networks, servers, data centres, high-performance computers as well as optical interconnects at rack-level and board-level. We are pleased to bring our contribution to these state-of-the-art results which can truly revolutionise optical communications."

More information: www.helios-project.eu

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