



PRESS RELEASE

European Silicon Photonics Project Demonstrates Laser and 10Gb/s Silicon Modulator Using CMOS Fabrication Processes

HELIOS Consortium Developing Building Blocks and Processes To Accelerate Adoption of Silicon Photonics

GRENOBLE, France – Nov. 17, 2010 – CEA-Leti, coordinator of the European HELIOS project to accelerate commercialization of silicon photonics, said today project partners demonstrated a laser and a 10Gb/s silicon modulator using a process that is compatible with complementary metal-oxide semiconductor (CMOS) processing.

Silicon photonics is an emerging technology for overcoming electrical connections' limits in processing increasingly data-rich content and reducing the cost of photonic systems by integrating optical and electronic functions on the same chip. The technology may enable low-cost solutions for a range of applications such as optical communications, chip-to-chip and rack-to-rack connections, data-center cables, optical signal processing, optical sensing, and biological applications.

The project, in its second year, is developing building blocks and processes to accelerate the adoption of silicon photonics. The laser was fabricated by first bonding a III-V material (indium phosphide) on top of a CMOS wafer and then processing it using the same equipment as in microelectronics production.

The consortium also demonstrated a 10Gb/s silicon modulator with an extinction ratio of 7dB. The 40Gb/s version has already been designed by the consortium and is under fabrication. First characterization results are expected next year.

"The capability of manufacturing optical components within the CMOS-processing infrastructure is key to realizing the potential of silicon photonics," said Laurent Fulbert, photonics programs manager at Leti and coordinator of HELIOS. "The HELIOS partners are focused on bringing this technology to foundries and component manufacturers for high-volume applications."

In addition to the laser and silicon modulator, building blocks under development by the HELIOS partners include a light modulator, passive waveguides and photodetectors.

Other recent results of the project include:

- Demonstration of high responsivity (0.8-1A/W), low dark current and high BW photodiodes (up to 130 GHz)
- Efficient passive waveguides (Mux/Demux, polarization diversity circuit, fiber coupling, rib/strip transition)
- Establishment of a photonics design flow
- Investigation of novel concepts for light emission and modulation

Most of the results of the second year have been presented at the IEEE Group Four Photonics Conference in Beijing.

The HELIOS consortium also developed a training course addressing all aspects of silicon photonics. This free, 21-hour course is available on HELIOS website:

<http://www.helios-project.eu/Download/Silicon-photonics-course>

In addition to Leti, the HELIOS partners are:

- imec (Belgium)
- CNRS (France)
- Alcatel Thales III-V lab (France)
- University of Surrey (UK)
- IMM (Italy)
- University of Paris-Sud (France)
- Technical University of Valencia (Spain)
- University of Trento (Italy)
- University of Barcelona (Spain)
- 3S Photonics (France)
- IHP (Germany)
- Berlin University of Technology (Germany)
- Thales (France)
- DAS Photonics (Spain)
- Austriamicrosystems AG (Austria)
- Technical University of Vienna (Austria)
- Phoenix BV (Netherlands)
- Photline Technologies (France)

The HELIOS Project website address is www.helios-project.eu/

About CEA-Leti

CEA is a French research and technology public organisation, with activities in four main areas: energy, information technologies, healthcare technologies and defence and security. Within CEA, the Laboratory for Electronics & Information Technology (CEA-Leti) works with companies in order to increase their competitiveness through technological innovation and transfers. CEA-Leti is focused on micro and nanotechnologies and their applications, from wireless devices and systems, to biology and healthcare or photonics. Nanoelectronics and microsystems (MEMS) are at the core of its activities. As a major player in MINATEC campus, CEA-Leti operates 8,000-m² state-of-the-art clean rooms, on 24/7 mode, on 200mm and 300mm wafer standards. With 1,200 employees, CEA-Leti trains more than 150 Ph.D. students and hosts 200 assignees from partner companies. Strongly committed to the creation of value for the industry, CEA-Leti puts a strong emphasis on intellectual property and owns more than 1,500 patent families.

For more information, visit www.leti.fr.

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