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UCSB Researchers Develop Hybrid Silicon Evanescent Laser

In what promises to be an important advance, researchers at the University of California, Santa Barbara have developed a novel laser by bonding optical gain layers directly to a silicon laser cavity. This hybrid laser offers an alternative to silicon Raman lasers and is an order of magnitude shorter. The laser is optically pumped, operates in continuous wave mode, and only needs 30 mW of input pump power.

This evanescent silicon laser demonstration is the first step toward an electrically pumped hybrid silicon laser. Increasingly, the performance of microelectronic systems will depend more on the connections between chips and devices than on the characteristics of the chips and devices themselves. As semiconductor systems get smaller, interconnect capacity and power dissipation will limit their performance. Optical interconnects could alleviate these limitations but the challenge has been to create a semiconductor laser that can be fully integrated with silicon microelectronics.

The laser developed by John Bowers and his students, Alex Fang and Hyundai Park, uses InAlGaAs quantum wells to provide optical amplification. ?The ability to combine the best of both worlds (i.e. III-V gain material wi th silicon photonics) could lead to a new way of enabling highly integrated laser sources with intelligent opto-electronic devices for future optical communications at low cost,? said John Bowers, professor of electrical and co mputer engineering at UCSB.

The research was published in Optics Express today. The work was funded by DARPA and Intel Corporation.

For more information: bowers@ece.ucsb.edu

Media Contact

Tony Rairden
trairden@engineering.ucsb.edu
805.893.4301