

Terahertz computer chip now within reach

March 26 2018

Following three years of extensive research, Hebrew University of Jerusalem (HU) physicist Dr. Uriel Levy and his team have created technology that will enable computers and all optic communication devices to run 100 times faster through terahertz microchips.

Until now, two major challenges stood in the way of creating the terahertz [microchip](#): overheating and scalability.

However, in a paper published this week in *Laser & Photonics Reviews*, Dr. Levy, head of HU's Nano-Opto Group and HU emeritus professor Joseph Shappir have shown proof of concept for an optic [technology](#) that integrates the speed of optic (light) communications with the reliability—and manufacturing scalability—of electronics.

Optic communications encompass all technologies that use light and transmit through [fiber optic cables](#), such as the internet, email, text messages, phone calls, the cloud and data centers, among others. Optic communications are super fast but in microchips they become unreliable and difficult to replicate in large quantities.

Now, by using a Metal-Oxide-Nitride-Oxide-Silicon (MONOS) structure, Levy and his team have come up with a new integrated circuit that uses flash memory technology—the kind used in flash drives and discs-on-key—in microchips. If successful, this technology will enable standard 8-16 gigahertz computers to run 100 times faster and will bring all optic devices closer to the holy grail of communications: the terahertz chip.

As Dr. Uriel Levy shared, "this discovery could help fill the 'THz gap' and create new and more powerful wireless devices that could transmit data at significantly higher speeds than currently possible. In the world of hi-tech advances, this is game-changing technology,"

Meir Grajower, the leading HU Ph.D. student on the project, added, "It will now be possible to manufacture any optical [device](#) with the precision and cost-effectiveness of flash technology."

More information: Meir Grajower et al. Non-Volatile Silicon Photonics Using Nanoscale Flash Memory Technology, *Laser & Photonics Reviews* (2018). [DOI: 10.1002/lpor.201700190](https://doi.org/10.1002/lpor.201700190)

Provided by Hebrew University of Jerusalem

Citation: Terahertz computer chip now within reach (2018, March 26) retrieved 20 March 2024 from <https://phys.org/news/2018-03-terahertz-chip.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.
