Photonics: Pump up the bandwidth

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U.S. scientists say they've developed an optical amplifier based on silicon that works across a wide range of frequencies.

Using all-optical devices on a chip, rather than electronic circuits, promises to boost the speed of information processing. And now the discovery by Cornell University researchers could help bring practical all-optical information processing closer.

As computer manufacturers are already very good at producing silicon chips, scientists have been trying to develop optical processing elements that are based on silicon. Previously developed optical amplifiers using silicon only work within a very narrow range of frequencies of light.

Alexander Gaeta and colleagues say they've developed a silicon waveguide that can amplify light waves with a relatively broad range of frequencies, relying on a process called phase-matched four-wave mixing. That, they said, should allow much higher volumes of information to be processed by the same chip, and makes it easier to add other devices, such as delays and switches, to the optical circuits.

The development is explained in the current issue of the journal Nature.

https://phys.org/news/2006-06-photonics-bandwidth.html