Print Close

Scientists break data transfer record

Liz Tay | May 24, 2011 12:10 PM

Optically transmit 700 DVDs in a second.

Print Close

A newly developed data decoding technique has allowed German scientists to transmit a record 26 terabits of data on a single laser beam in one second.

Although it was only a quarter the record 109 Tbps demonstrated on multi-core fibre connections in March, the new, single-source technique was expected to deliver efficiency and capacity gains.

Karlsruhe Institute of Technology (KIT) professor Jürg Leuthold encoded data using orthogonal frequency division multiplexing (OFDM) techniques, typically used in ADSL and WLAN networks.

The technique involves splitting data into several, parallel data streams. Signals are traditionally generated from analogue circuitry and processed electronically, before being converted to an optical signal and transmitted over fibre.

Since signal processing occurs in the electronic domain, it is limited in bitrate. KIT researchers reported that the highest real-time OFDM processing rate was 101.5 Gbps at present.

In the scientific journal *Nature Photonics* this week, the researchers proposed an "all-optical solution" that could work "beyond the speed limitations of electronics".

Using data from a single light source, the researchers generated, transmitted and decoded 325 data streams over 50 kilometres of dispersion-compensated fibre, at a line rate of 26 Tbps.

"Experiments show the feasibility and ease of handling terabit per second data with low energy consumption," the researchers reported.

"To the best of our knowledge, this is the largest line rate ever encoded onto a single light source."

In a statement issued by KIT, Leuthold said terabit-per-second data rates were needed to meet modern communication demands.

"A few years ago, data rates of 26 terabits per second were deemed utopian even for systems with many lasers, and there would not have been any applications," he said.

"With 26 terabits per second, it would have been possible to transmit up to 400 million telephone calls at the same time. Nobody needed this at that time. Today, the situation is different."

Professor Ben Eggleton of Australia's Centre for Ultrahigh bandwidth Devices for Optical Systems (CUDOS) told *ABC Science Online* that the technique could make optic technologies cheaper and easier to deploy.

Internet traffic – and thus the network's energy requirements – was doubling every 18 months, "which means that in 10 years, we've got a real crisis", he told the *ABC*.