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26 Terabit per second transmitted using one laser over one fiber channel

Nature Photonics - 26 Tbit per second line-rate super-channel transmission utilizing all-optical fast Fourier transform processing

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There has been transmission of data at over 100 terabits per second but those involved up to 370 lasers. German scientists of Karlsruhe Institute of Technology have succeeded in encoding data at a rate of 26 terabits per second on a single laser beam, transmitting them over a distance of 50 km, and decoding them successfully.

Optical transmission systems with terabit per second single-channel line rates no longer seem to be too far-fetched. New services such as cloud computing, three-dimensional high-definition television and virtual-reality applications require unprecedented optical channel bandwidths. These high-capacity optical channels, however, are fed from lower-bitrate signals. The question then is whether the lower-bitrate tributary information can viably, energy-efficiently and effortlessly be encoded to and extracted from terabit per second data streams. We demonstrate an optical fast Fourier transform scheme that provides the necessary computing power to encode lower-bitrate tributaries into 10.8 and 26.0 Tbit s⁻¹ line-rate orthogonal frequency-division multiplexing (OFDM) data streams and to decode them from fibre-transmitted OFDM data streams. Experiments show the

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feasibility and ease of handling terabit per second data with low energy consumption. To the best of our knowledge, this is the largest line rate ever encoded onto a single light source

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The team of Leuthold applies the so-called orthogonal frequency division multiplexing (OFDM) for record data encoding. For many years, this process has been used successfully in mobile (wireless) communications. It is based on mathematical routines (Fast Fourier Transformation). "The challenge was to increase the process speed not only by a factor of 1000, but by a factor of nearly a million for data processing at 26 terabits per second," explains Leuthold who is heading the Institutes of Photonics and Quantum Electronics and Microstructure Technology at KIT.

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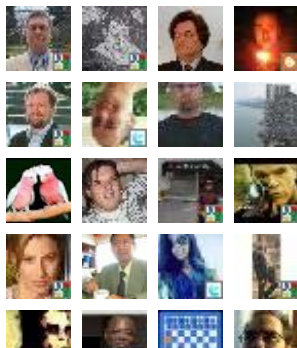
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