

Data transport via fibre-optic network could be faster still

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Due to the explosive growth in data transport the need for a greater utilisation of the bandwidth of fibre-optic networks is increasing. Dutch researcher Erwin Verdurmen examined how the transmission capacity of the glass fibre can be increased by a better use of the bandwidth. He succeeded in achieving a data transfer of 320 gigabits per second. That is much faster than the 15 Mb per second which the fastest Internet connection for private users can currently provide (connections at companies are about ten times faster).

An existing technology for increasing the bandwidth is 'wavelength division multiplexing' (WDM). In this approach the electrical data signals modulate different colours of light, which are combined in a single optical fibre. An alternative for WDM is combining several optical signal streams into a single stream of short pulses of a single colour of light: 'optical time division multiplexing' (OTDM).

Verdurmen's research focused on the adding and extraction of a specific data stream from an OTDM signal. The component that performs this function is a so-called add-drop multiplexer (ADM). These ADMs can be subdivided into two categories. The first category is based on solutions that make use of semiconductor structures and the second category makes use of the nonlinearity of an optical fibre.

The application of the ADM technology on the basis of semiconductor material encountered the problem that the necessary higher input capacity led to a faster signal response but also a deterioration in the

signal-noise ratio. The study therefore focused on ADMs that use the nonlinearity of optical fibres.

The advantage of using the nonlinearity of the optical fibre turned out to be an ultrafast response time. As a result of this Verdurmen succeeded in producing an ADM with a speed of 320 gigabits per second. According to Verdurmen, combining WDM and OTDM will lead to even higher speeds still in the future.

Source: NWO

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