255 Terabits/s: Researchers demonstrate record data transmission over new type of fiber

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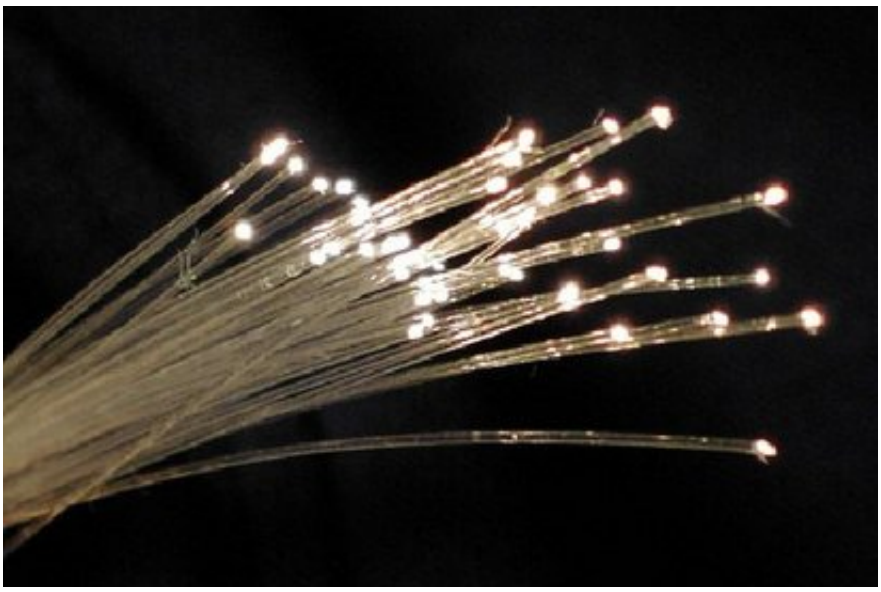

Researchers at Eindhoven University of Technology (TU/e) in the Netherlands and the University of Central Florida (CREOL), report in the journal *Nature Photonics* the successful transmission of a record high 255 Terabits/s over a new type of fiber allowing 21 times more bandwidth than currently available in communication networks. This new type of fiber could be an answer to mitigating the impending optical transmission capacity crunch caused by the increasing bandwidth

demand.

Due to the popularity of Internet services and emerging network of capacity-hungry datacentres, demand for telecommunication bandwidth is expected to continue at an exponential rate. To transmit more information through current optical glass fibers, an option is to increase the power of the signals to overcome the losses inherent in the glass from which the fibre is manufactured. However, this produces unwanted photonic nonlinear effects, which limit the amount of information that can be recovered after transmission over the standard fiber.

The team at TU/e and CREOL, led by dr. Chigo Okonkwo, an assistant professor in the Electro-Optical Communications (ECO) research group at TU/e and dr. Rodrigo Amezcua Correa, a research assistant professor in Micro-structured fibers at CREOL, demonstrate the potential of a new class of fiber to increase transmission capacity and mitigate the impending 'capacity crunch' in their article that appeared yesterday in the online edition of the journal *Nature Photonics*.

The new fiber has seven different cores through which the light can travel, instead of one in current state-of-the-art fibers. This compares to going from a one-way road to a seven-lane highway. Also, they introduce two additional orthogonal dimensions for data transportation – as if three cars can drive on top of each other in the same lane. Combining those two methods, they achieve a gross transmission throughput of 255 Terabits/s over the fiber link. This is more than 20 times the current standard of 4-8 Terabits/s.

Dr. Chigo Okonkwo: "At less than 200 microns in diameter, this fibre does not take noticeably more space than conventional fibres already deployed. These remarkable results definitely give the possibility to achieve Petabits/s transmission, which is the focus of the European Commission in the coming 7 year Horizon 2020 research programme.

The result also shows the key importance of the research carried out in Europe, and in particular at TU/e with other well-known teams around the world in high-capacity optical transmission systems."

More information: R.G.H. van Uden et al, Ultra-high-density spatial division multiplexing with a few-mode multicore fibre, *Nature Photonics* (online, 26 October 2014)
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