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Electrical Engineering Professor Receives Patent for Fiber Cable Feature

University of Texas at Arlington Assistant Professor of Electrical Engineering Michael Vasilyev and his co-inventors at Corning have received a U.S. patent for a fiber optic cable design that improves the quality of transmitted signals. This is Dr. Vasilyev's fourth patent involving electro-optic technology.

The new design, called a dispersion-managed cable, avoids the unwanted spreading of optical pulses that usually occurs during long-haul propagation. Unlike the conventional lossy dispersion compensators typically located at the ends of optical fiber spans, this cable uses special reverse-dispersion fiber (RDF) inserted as a part of the span itself. The key feature of the invention is its positioning of the RDF at some distance from either end of the span. The resulting dispersion-managed cable becomes an ideal medium for distributed Raman amplification, with performance approaching the fundamental quantum limit.

A series of optical networking experiments by Dr. Vasilyev and his co-workers demonstrated the advantages of the novel fiber cable, which achieved record information capacity and reach distance. A number of leading telecom equipment providers have begun using this novel symmetric dispersion-managed cable in their 10 Gb/s and 40 Gb/s wavelength-division-multiplexing systems, making it the de-facto standard for high-end, long-haul transmission.

Dr. Vasilyev recently received a \$61,734 grant from the National Science Foundation to investigate a novel approach to all-optical signal regeneration. This award is a part of \$114,634 collaborative project with Dr. Taras I. Lakoba at the University of Vermont. Their design employs an optical decision circuit that can simultaneously regenerate many different wavelength-division-multiplexed channels. Current approaches are limited to processing only one channel at a time; the new regenerator promises a hundred-fold increase of signal-processing capacity without a corresponding increase in cost. Drs. Vasilyev and Lakoba recently applied for a patent on their design.