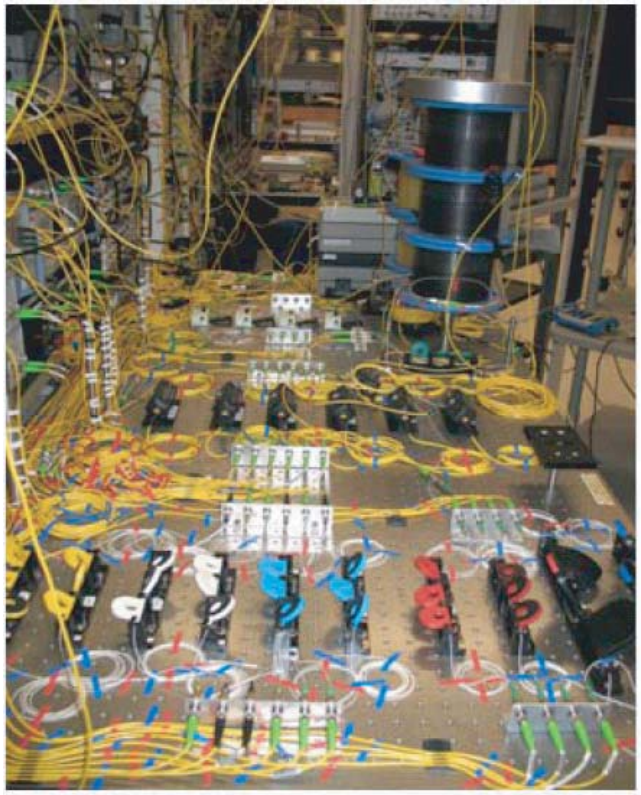
The Institute of OPTICS **Colloquium** University of Rochester

Overcoming Parametric Stochastic Barrier

Professor Stojan Radic
Electrical and Computer Science
University California San Diego

PhD Optics Rochester 1995
Corning Inc
Bell Labs
Duke University
UCSD 2003 -

We describe the effort that has led to the ability to sense molecular-scale geometry variations along km-long fiber for the first time. Implications of the new technique will be illustrated on general mixer applications.



3:00 pm, Monday, February 2, 2009
Sloan Auditorium, Goergen Building
Refreshments provided

Overcoming Parametric Stochastic Barrier

Professor Stojan Radic
University of California San Diego

Abstract

High efficiency parametric fiber devices are used for frequency generation, band-invariant amplification and general signal processing. Present generation of high-confinement fibers used for mixer design posses transverse variation control measured in silica molecular diameters, a critical feature for long-scale phase matching. With nanometer-scale radial precision maintained over kilometers, high-confinement fibers stand among the most precisely fabricated structures in modern engineering. Unfortunately, these fluctuations pose a basic barrier: an arbitrary-wide mixer cannot be constructed from randomly fluctuating waveguide. Rather than insisting on unphysical waveguides (requiring sub-molecular radial control), an alternative approach is possible: map the nanoscale fluctuations exactly and then use the information to synthesize arbitrary mixer response. To accomplish this, we introduce new energy delivery method based localized four-photon mixing. The technique improves the sensitivity of existing dispersion mapping methods by orders of magnitude and is applicable to arbitrary waveguide type. We describe the effort that has led to the ability to sense molecular-scale geometry variations along km-long fiber for the first time. Implications of the new technique will be illustrated on general mixer applications.

Biography

Stojan Radic graduated from The Institute of Optics in 1995 and has subsequently served in Corning and Bell Laboratories. He is presently a Professor and is heading the Photonics System Laboratory at University of California San Diego. Dr. Radic is a fellow of the Optical Society of America and serves as associate editor with IEEE Photonics Technology Letters and Optics Express journals. He chairs Parametric Processing LEOS Conference and has founded COTA conference.