

# Colloquium Notice

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*Space: is it the final frontier of photonics?*

Fiber optic networks underlie the Internet, massive data centers, and all of the other data-centric services of our modern economy. The photonics community has sustained prodigious growth in that information flow by increasing the capacity of each optical fiber while simultaneously decreasing the cost per bit transmitted, but recent developments in coherent signaling have brought spectral efficiency close to its theoretical limits, and we are in need of a new revolution.

Space-division multiplexing (SDM), using novel fiber with multiple cores or multiple transverse modes in a large core, is being widely studied as the next wave of fiber optics. Both multicore and multimode approaches have been successfully demonstrated in research, with the throughput of a single multicore fiber exceeding 1 Pb/s. Nonetheless, the challenges facing SDM are numerous and daunting. Multicore fibers are difficult to fabricate, multimode systems are subject to severe inter-modal crosstalk, and successful reduction in the cost per bit will require advanced functional integration of transceivers, amplifiers, mode multiplexers, and other elements of the photonic communications ecosystem. For efficient network operation, flexible lightpath routing is essential, and SDM offers a number of ways to allocate lightpaths among wavelengths and spatial modes. Finally, to assure economic viability at all stages of the SDM introduction, a deployment strategy that supports interworking of SDM and non-SDM sections is needed.

In this talk, I will review the past, present, and future of SDM research, and suggest some criteria for a successful commercial introduction of SDM technology.

Monday

**April 20, 2015**

Starts at 12:15 PM

Coffee at 12:00 PM

Physics Conference Room, SB B326