AAOSA-OSUM Seminar:

All-Fiber-Integrated Super-Continuum Sources with High Power in the Visible and Infrared Wavelengths from 0.47 to 12 μm

Prof. Mohammed N. Islam

Professor, Electrical Engineering and Computer Science, University of Michigan

&

Founder and CTO, Omni Sciences, Inc.

Abstract: All-fiber integrated super-continuum (SC) sources are described based on a platform architecture that can operate in the visible, near-infrared, short-wave infrared, mid-wave infrared and long-wave infrared, with demonstrated SC wavelengths ranging from 0.47 to 12 microns. Modulation instability initiated SC generation leads to a simple SC source with no moving parts and that uses off-the-shelf components from the mature telecommunications and fiber optics industry. The resulting light sources are basically a cascade of fibers pumped by fiber-pigtailed laser diodes and some drive and control electronics; thus, the SC sources have the potential to be cost-effective, compact and reliable. Starting from fused silica fibers, the SC spectrum can be extended to shorter or longer wavelengths by cascading fibers with appropriate dispersion and/or transparency. As one example, we demonstrate a long-wave infrared SC source that generates a continuous spectrum from 1.57 to 12 microns using a fiber cascade comprising fused silica fiber followed by ZBLAN fluoride fiber followed by sulfide fiber and, finally, a high-numerical-aperture selenide fiber. The time-averaged output power is 417 mW at 33% duty cycle, and we observe a near-diffraction-limit, single spatial-mode beam across the entire spectral range. A prototype is described that is based on a three-layer architecture with a form factor of 16.7”x10”x5.7” and that plugs into a standard wall plug. This SC prototype has been used in a number of field tests as the active illuminator for stand-off FTIR system over distances of 5 to 25m, thus enabling identification of targets or samples based on their chemical signature.

Light refreshments will be served.

When: January 29, 2019 (Tuesday): 4:00 PM-5:30 PM

Where: **FXB 1008**, Francois-Xavier Bagnoud Building (Aerospace Building), 1320 Beal Ave, Ann Arbor, MI 48109

A²OSA
Ann Arbor Section of the Optical Society of America

OSUM
The Optics Society at the University of Michigan