

University of Miami, Physics Department Colloquium

Date: Wednesday, Oct 1, 2025

Time: 4:00 pm – 5:00 pm

Location: Physics Library – Rm 335, Knight Physics Building

Hollow-Core Fibers: Physics, Applications and Beyond

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Abstract

Over the last 25 years, the field of fiber optics has experienced remarkable progress, contributing to the widespread expansion of the Internet and bringing about transformative changes in various domains such as quantum communication and sensing, industrial manufacturing, directed energy, non-invasive laser surgery, early cancer detection, optical microscopy, and biomedical sensing. Undoubtedly, one of the most significant innovations in this field is the development of hollow-core anti-resonant fiber (HC-ARF). HC-ARF offers several promising and unrivaled features such as exceptionally well-confined photons inside the core offering an ideal platform for studying prolonged, well-controlled and diffraction free light-matter interaction in Raman active and inactive gases; low-loss, multi-octave wide transmission, adjustable pressure dispersion; and can tolerate GW of power, not possible to obtain in any waveguides or fibers. This talk will cover the most recent advanced optical fibers for applications in high-energy laser delivery system, ultrafast non-linear dynamics, and beyond.

Biography



Md Selim Habib received the Ph.D. degree in Electrical and Photonics engineering from the Technical University of Denmark (DTU) in 2017. Following the completion of his doctoral studies, he joined the Fibers Sensors and Supercontinuum Group at the Department of Electrical and Photonics Engineering, DTU, as a Postdoctoral Researcher. After concluding his Postdoctoral Fellowship at DTU, he served as a Postdoctoral Research Associate at CREOL, The College of Optics and Photonics, University of Central Florida, USA, from 2017 to 2019. From 2019 to 2023, Dr. Habib held the position of Assistant Professor of Electrical and Computer Engineering at Florida Polytechnic University, USA. Currently, he is an Assistant Professor of Electrical Engineering at Florida Institute of Technology. His research mainly focuses on computational electromagnetics, next-generation optical fiber design, fabrication, and characterization, and ultrafast nonlinear optics. He has published more than 100 articles in referred journals and conference proceedings with over 3100 citations and an h-index of 33.

Dr. Habib is a Senior Member of Optica, USA and IEEE, USA. Dr. Habib is an Associate Editor of IEEE Journal of Lightwave Technology, Feature Editor of Applied Optics (Optica), and Guest Editor of IEEE Journal of Selected Topics in Quantum Electronics. Dr. Habib has actively participated in various technical program committees, including the IEEE Photonics Conference and IEEE RAPID, USA.