

# Laser filamentation: Nonlinear optics and plasma physics for defense, sensing and atmospheric applications

High power laser pulses can undergo nonlinear propagation in transparent media. Self-induced nonlinearities result in evolution of the pulse along propagation as well as the propagation medium as it is partially ionized. This highly nonlinear and dynamic process, manifests as a narrow high intensity core that is maintained over long distances without suffering from diffraction, and is known as “filamentation”.

This talk will focus on introducing the fundamental aspects of filamentation (from nonlinear materials response to ultrashort molecular plasmas) and its transition to a new world of applications. These cover a wide range from long distance atmospheric propagation, stand-off sensing and beam engineering towards long-wavelengths guiding and remote THz generation.

The current challenges and promising future of this field are going to be discussed. They range from a full understanding of the physics and chemistry of these plasmas for weather control and the creation of transient conductive structures for lightning triggering and guiding, to their behavior over very large distances towards “space-born filamentation”.

**Wednesday, February 22, 2017**

**Meet and Greet**

**3:15—3:45PM**

**OPS, Rm 140**

---

**Colloquium**

**4:00—5:00 PM**

**OPS, Rm 140**

Dr. Sherminch Rostami Fairchild  
Research Scientist  
Townes Laser Institute, CREOL  
The College of Optics & Photonics  
University of Central Florida

