

RESEARCH SEMINAR

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2:15 – 3:00 · Ross 0220

Refreshments

Surface Plasmon Enhanced Evanescent Optical Limiting in Photonic Crystal Fibers

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Optical limiters are important because of their ability to protect sensitive devices from high intensity laser damage. In particular, optical limiters that are compatible with fiber optic systems are vital to telecommunications industries and the military. In these areas fiber optic devices are common, and system damage is a serious threat.

Recent studies of nonlinear absorbers housed in photonic crystal fibers (PCFs) show that these devices have the potential to provide excellent optical limiting while also minimizing linear absorption losses inherent to other common geometries. This is achieved through an intriguing phenomenon—evanescent nonlinear absorption. While this method is hindered by leakage loss, exploitation of the field intensity enhancements associated with surface plasmon excitations on metallic nanoparticles may mitigate such losses.

In order to realize the full potential of optical limiting in the PCF geometry, a thorough experimental and computational investigation into the limiting effects of combinations of nonlinear absorbing materials and plasmonic nanoparticles in the PCF geometry is underway.