Baylor University
PHYSICS

2013 Spring Physics Colloquium Series

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From Microphotonics to Nanophotonics: Photonic Crystal Fibers for Mid-IR Applications and 3D Plasmonic Nanoantenna Array

Photonic systems become more and more complicated in recent years. In the first half of this talk, I will focus on microphotonic research for chalcogenide photonic crystal fiber. I will describe a procedure for maximizing the bandwidth of supercontinuum generation in chalcogenide fibers and the physics behind this procedure. I show that it is possible to generate an optical bandwidth of more than 4 μm with an input pump wavelength of 2.5 μm using a chalcogenide fiber with an air-hole-diameter-to-pitch ratio of 0.4 and a pitch of 3 μm. Obtaining this bandwidth requires a careful choice of the fiber's waveguide parameters and the pulse's peak power and duration, which determine respectively the fiber's dispersion and nonlinearity. For the second half of this talk, I will focus on nanophotonic research, more specifically, nanodot effect on surface Plasmon resonant wavelength and field enhancement for surface enhanced Raman scattering (SERS) signal in disk-coupled dots-on-pillar antenna array. The existence of nanodots on the pillar sidewalls does not affect much of the resonant wavelengths of localized surface plasmons and propagating surface plasmons, but significantly increase enhancement factor by over two orders of magnitude.

Wednesday, January 30, 2013
4:00 p.m.
Room E.125, Baylor Sciences Building
Reception at 3:40 p.m. in BSB D.311
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