

The Department of Electrical and Computer Engineering at Colorado State University is pleased to present a seminar by

**Dr. John Scales, Professor, Department of Physics, Mesoscopic Physics Laboratory, Colorado School of Mines**

**Title: “Millimeter Wave Localization: Slow Light and Enhanced Absorption”**

**Monday, February 12, from 4:10 to 5:10pm, Engineering Building, Room D102**

**Abstract:** In this talk I will describe recent experimental work in which we exploit millimeter wave technology to measure the broad-band reflection and transmission response of random dielectric media. This system is easily constructed from random stacks of identical, sub-wavelength quartz and Teflon wafers. It allows us to observe the characteristic transmission resonances associated with Anderson localization. We show that these resonances give rise to enhanced attenuation even though the attenuation of homogeneous quartz and Teflon is quite low. We provide experimental evidence of disorder-induced slow light and superluminal group velocities, which, in contrast to photonic crystals, are not associated with any periodicity in the system. Furthermore, we observe localization even though the sample is only about four times the localization length.

**Bio sketch:**

BS, University of Delaware  
PhD, University of Colorado

# Fellow, Institute of Physics  
# Fellow, Royal Astronomical Society  
# Visiting professor of the French Academy of Sciences, 1999-2000  
# Visiting professor of The Japanese 21st Century COE Program, 2004  
# Member The Electromagnetics Academy

@ CSM since 1993.

Before becoming an experimentalist I worked on computational physics, inverse theory, wave propagation in random media and quantum chaos. I switched to experimental work in 1997. My lab exploits ultrafast optics and millimeter waves to perform materials characterization and fundamental studies of disordered and chaotic systems. I also work on some remote sensing problems involving home-made millimeter wave radar and nonlinear ultrasonic arrays. I've also run an internet archive for free books since 1995 called Samizdat Press. Check it out at [samizdat.mines.edu](http://samizdat.mines.edu). My lab's web page is: [mesoscopic.mines.edu](http://mesoscopic.mines.edu), where you will find all sorts of stuff.

Refreshments will be served.

Please contact Prof. Branislav Notaros, [notaros@colostate.edu](mailto:notaros@colostate.edu), with any questions.