

UNH Materials Science/Physics Seminar

16:10-17:10, Wednesday, Feb. 9, 2011

Kingsbury S145

University of New Hampshire

There's plenty of room at the bottom...and time at the top

Dr. Keshav Dani

Los Alamos National Lab

Over fifty years ago, Feynman predicted the rise of nanotechnology, even before it was on the horizon. Today, not only have we made significant strides in the fields he proposed – nanomedicine, nanolithography and nanofabrication; but we have developed tools that allow us to go ‘small’ in the ‘other’ component of space – time. With the advent of femtosecond pulses of light, we have been able to pursue physics at the femtosecond timescale in systems characterized by a nanometer length scale.

In today's talk, I will present three very different ideas from my own research background that involve physics at the femto-nano scale. Using a Metamaterial – an artificially fabricated nano-composite, I will demonstrate the ability to do develop ultrafast, nanoscale, tunable, photonic devices. Next, in graphene – a newly discovered allotrope of carbon, using a counter-intuitive technique in ultrafast spectroscopy, I will demonstrate the relativistic nature of an electron-hole plasma within 100 femtoseconds of photoexcitation. Lastly, in the quantum Hall system – a two-dimensional electron gas in a large magnetic field, I will demonstrate the photoexcitation of complex, many-body states and then observe their quantum interference that can be seen only within the first few hundred femtoseconds.

Keshav Dani is currently a Director's Postdoctoral Fellow at the Center for Integrated Nanotechnologies at Los Alamos National Lab with Dr. Toni Taylor. He graduated from UC Berkeley in 2006 with a PhD in Physics under Prof. Daniel Chemla. He obtained his BS from Caltech in mathematics with a senior thesis in quantum information theory under John Preskill and Hideo Mabuchi. Keshav's recent research interests have been in ultrafast metamaterial devices, femtosecond dynamics in graphene and developing techniques of nonlinear spectroscopy from visible to THz frequencies.

Host: Prof. Karsten Pohl, x4197