

PHYSICS AND ASTRONOMY COLLOQUIUM
TUESDAY, SEPTEMBER 1, 2009

TUESDAY, 4:10 PM, WEBSTER B17, WSU PULLMAN

**Incoming! Incoming! (Laser Beam):
Fundamentals of Laser Materials Interactions**



Tom Dickinson

Department of Physics and Astronomy, Washington State University



<http://www.zazzle.com>



The interaction of laser radiation and materials is an established and growing field with numerous applications in materials modification, synthesis, and technology. Examples include:

- synthesis of nanoparticles, nanotubes, active molecules, novel thin films
- laser assisted surface transformations (nano-structuring, lithography, etching)
- laser assisted bulk material transformation (coloration, doping, marking, crystallization)
- laser surgery and other biomedical applications
- laser cleaning of high tech surfaces, art work, buildings

An understanding of the underlying mechanisms is essential for technological progress as well as gaining control and predictability. In this talk we present our recent work on the fundamental mechanisms of material modification and material removal from three types of materials:

- wide bandgap materials (dielectrics/insulators)
- amorphous materials (e.g., polymers, silica based glasses)
- semiconductors

We focus on the processes leading to bond-breaking and/or defect formation as well as single particle desorption (ions, electrons, and neutral atoms/molecules) from the exposed surfaces and discuss the role of (unavoidable) thermal effects. The work to be described used nanosecond pulse ultraviolet excimer laser light corresponding to photon energies from 5 to 8 eV.

Please come meet the speaker over refreshments from 3:45-4:10 pm in the foyer on floor G above the lecture hall. All Welcome. Host: Dr. Chuanwei Zhang.