

**THURSDAY
JANUARY 17, 2008**

**Scaife Hall Auditorium
Room 125**

4:30 p.m.
Refreshments—4:00 p.m.

PROF. KEN CROZIER

**ASSISTANT PROFESSOR,
HARVARD UNIVERSITY**



Ken Crozier is an Assistant Professor of Electrical Engineering at Harvard University. His work has been featured in MIT Technology Review, Newsweek and Laser Focus World. MIT Technology review highlighted optical antennas as being one of the Top 10 Emerging Technologies for 2007. He received his undergraduate degrees in Electrical Engineering and Physics at the University of Melbourne, Australia. He was awarded the L.R. East Medal (University Medal in Engineering) by the University of Melbourne. He received his PhD in Electrical Engineering from Stanford University in 2003 under Professors Calvin Quate and Gordon Kino.

The Optical Antenna: A Versatile Structure for Nanophotonics

Progress in nanotechnology is fundamentally dependent on tools for observation, measurement and manipulation. Optical techniques are well established at the macro-scale, but difficult to apply on the nano-scale. This is due to the mismatch between the wavelength of light, and the dimensions of nanostructures. Optical antennas present an opportunity to bridge these length scales. These new photonic devices enable electromagnetic energy to be concentrated into deep sub-wavelength regions. In this presentation, I will discuss several aspects of optical antennas. I will discuss recent work on optical antennas fabricated on the facets of laser diodes (APL 89, 093120 (2006)). It was shown experimentally that the antenna concentrated light into a $\sim 40 \times 100$ nm spot, an area ~ 50 times smaller than the diffraction limit. Coupling between plasmon resonances plays an important role in optical antennas, as well as in other structures such as metal nanoparticle chain waveguides. I will discuss experimental measurements of the dispersion relations of metal nanoparticle chains (Opt Expr 15, 17482 (2007)). Lastly, I will discuss potential applications of optical antennas as nanoscale optical tweezers.

ECE Seminar Hosts:
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