Applied Physics & OSA

Optics Seminar

The Optical Antenna: A Versatile Tool for Nanophotonics

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Abstract:

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. I will discuss recent work on optical antennas fabricated on the facets of laser diodes. It is shown experimentally that the antenna concentrates light into a ~40*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. Lastly, I will discuss potential applications of optical antennas as nanoscale optical tweezers.

Brief Biography:

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. He received his undergraduate degrees in Electrical Engineering and Physics at the University of Melbourne, Australia. On graduating from the University of Melbourne, he was awarded the L.R. East Medal (university medal in engineering). He received his PhD in Electrical Engineering from Stanford University under Professors Calvin Quate and Gordon Kino.

Wednesday, November 7th, 2007.
4:00pm-5:00pm.
Watson 104

Refreshments will be available in the Watson Lobby at 3:45pm