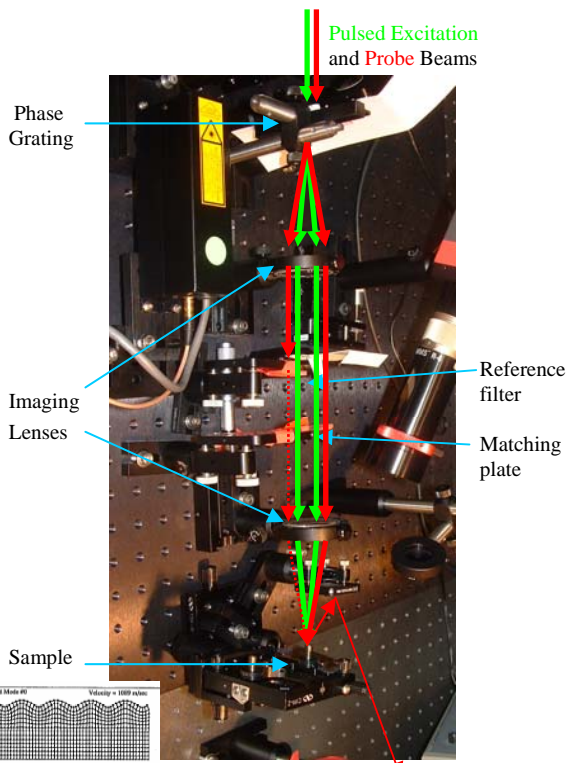


THE LAMBDA PROJECT: Outreach lab for high school students

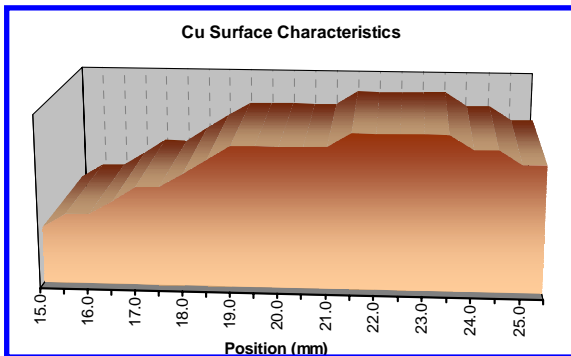
Rebecca M. Slayton and Keith A. Nelson MIT CHE-0212375



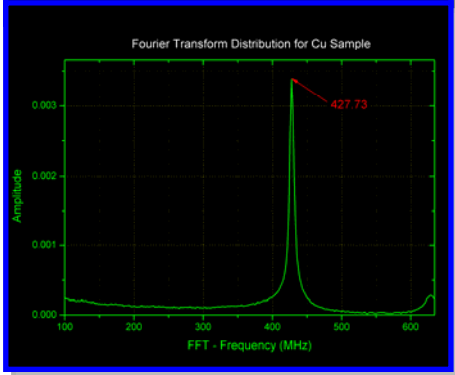
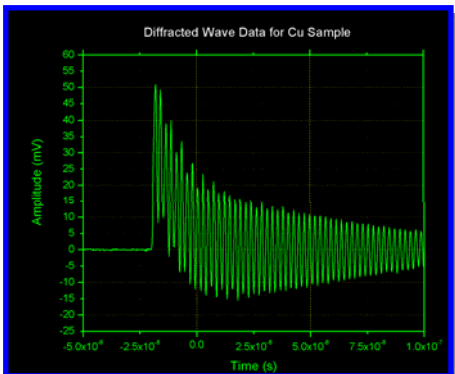
Fenway High School students Marco Lopez and Casey Bello, (above), study the transient grating experiment (right).

Acoustic waves in a metallic film are generated by excitation pulses, and produce a diffracted probe signal (shown above). Fourier analysis of the oscillatory response (right) can be used to determine metal film thickness (with angstrom precision), stiffness, and other characteristics. Students conducted frequency measurements and characterized the profile of a thin film sample (below).

Diffracted Probe & Ref. Beams to Detector



“Time-resolved four-wave mixing generation and monitoring of surface acoustic waves for advanced materials characterization”...
 Sound like the stuff of high school science projects? Hardly – unless the students are participants in an outreach project begun by Prof. Keith A. Nelson and NSF postdoctoral fellow Rebecca M. Slayton at the MIT Harrison Spectroscopy Laboratory. Students learn about modern optics and advanced materials, then conduct experiments involving picosecond laser generation of acoustic waves in metallic films. Acoustic frequencies are measured to determine metal film thickness and other characteristics. The outreach lab has just completed its second year of operation, during which students from Boston area public high schools visited MIT several times to learn the background material, conduct the experiments, and analyze the data. They presented their results as science class and science fair projects.
 For more information see: Slayton and Nelson, “Opening lab doors to high school students: keys to a successful engagement,” *J. Phys. Ed.*, 40(4) July 2005, pp 1-8.



Boston Latin High School students, (from right, Max Dandrich, Carl Goodrich, Jie Wu, and Han Tran) presented their results to their classmates.