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Infrared and THz Spectroscopy Using Synchrotron Light at the NSLS

Abstract

The National Synchrotron Light Source (NSLS) operates two electron storage rings (synchrotrons) and a linear accelerator for producing light from the very far-infrared (mm wavelengths) up through hard x-rays (0.1Å wavelength). In the infrared, the light is about 3 orders of magnitude brighter than the thermal source commonly used for vibrational spectroscopy, and is well-suited for a variety of throughput limited techniques such as microspectroscopy (including high-pressure diamond anvil cells), extremely high spectral resolution, and ellipsometry. The light is also produced in ~100 ps pulses that, in combination with a synchronized pulsed laser, are used for time-resolved studies of materials. The linear accelerator delivers sub-picosecond pulses that result in strong-field coherent THz pulses capable of inducing non-linear effects in solids. This presentation will survey the infrared and THz spectroscopy techniques available at the NSLS and will highlight recent research activities by NSLS staff and Users.

*The NSLS is a User Facility operated for the U.S. Dep't of Energy under contract DE-AC02-98CH10886.