Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Infrared emission induced by x-rays[1] RICHARD ROSENBERG, MOHAMMAD ABU HAIJA, Argonne National Laboratory, SIMON WATKINS, Simon Fraser University — Two of the most powerful methods for studying the properties of matter are Fourier transform infrared (FTIR) spectroscopy and synchrotron radiation (SR) based x-ray techniques. Having the ability to perform both types of research on the same samples at the same time would be a significant synergism. Furthermore, the spatial resolution of conventional FTIR microscopes is limited by diffraction, which in the mid IR is 2-20 μm, while SR based x-ray microscopes are capable of <30 nm diameter resolution. Thus, by utilizing nanometer sized x-ray beams to produce IR emission it should be possible to extend the spatial resolution of IR microscopy by orders of magnitude and simultaneously perform x-ray studies. To test the feasibility of this approach we have incorporated a commercial FTIR instrument into an existing ultra-high vacuum end station on an insertion device beamline at the Advanced Photon Source and measured the bandgap, exciton luminescence (0.4 eV) from InAs thin films. Results using both high intensity, near zero-order and low intensity, monochromatic x-rays will be presented.

[1]This work was supported by the U.S. Department of Energy, Office of Science, Office of Basic Energy Sciences under Contract No. DE-AC02-06CH11357.

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Date submitted: 20 Nov 2008 Electronic form version 1.4