X-ray detector development at Cornell

Kate Shanks, Cornell University

Abstract:

This talk will provide an overview of the x-ray detector development activities taking place in our research group at Cornell. Our work has generally focused on the development of area detectors suitable for use at synchrotron x-ray sources, including storage rings and XFELs, with the goal of enabling new experiments via advances in detector technology. I will discuss our work on photon-integrating pixel array detectors (PADs), which consist of a custom readout ASIC bonded pixel-by-pixel to an x-ray sensor. Our group has developed two main families of integrating PADs: the Mixed Mode PAD (MM-PAD), a wide dynamic range imager capable of continuous framing at 1 kHz, and the Keck-PAD, a burst-mode imager capable of recording a limited number of frames at 10 MHz. Recent work has focused on investigating high-Z sensors capable of efficient x-ray detection at energies above 20 keV, where silicon becomes prohibitively transparent, and on upgrades to the detector readout ASIC, with a focus on increasing readout speed and high-flux capabilities.