



The Keck-PAD: a pixel array detector for single-bunch imaging

FOCUSING ON THE FUTURE

K. S. Shanks^a, H. T. Philipp^a, B.W. Martin^b, V.E. Fleischauer^b, M. W. Tate^a, S. M. Gruner^{a,c}

^aLaboratory of Atomic and Solid State Physics, Cornell University, Ithaca, NY; ^bSydor Technologies, Fairport, NY; ^cCornell High Energy Synchrotron Source, Ithaca, NY

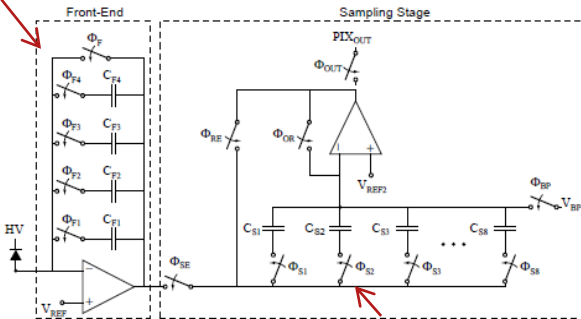
Overview

The Keck-PAD is a photon-integrating area detector compatible with **single-bunch(-train) imaging** at storage ring sources. 256x384 pixel prototype cameras are available for use through the Cornell Detector Group, and 512x512 pixel cameras have been commercialized by Sydor Technologies. Both **Si** and **CdTe** sensors are available.

Keck-PAD specifications	
Burst mode framing	8 consecutive frames with minimum separation ~100 ns
Read time	0.86 ms/stored frame
Frame timing	Programmable to 10ns resolution
Pixel size	150 μm x 150 μm
Format	256 x 384 pixel and 512 x 512 pixel units
Read noise	1 photon @ 8 keV (high gain) 4 photons @ 8 keV (low gain)
Well capacity	~1100 photons @ 8 keV (HG) ~7300 photons @ 8 keV (LG)

Programmable gain

Pixel schematic



Frame storage capacitors

Potential applications

- Warm dense matter properties in magnetic pinch and impact experiments
 - Crack propagation
 - Turbulence
 - Shock waves
 -

Demonstration of single-bunch-train imaging with the Sydor 512x512 CdTe-Keck-PAD @ CHESS MSN-C

Measured signal is a convolution of the ring fill pattern with the detector response

