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| **EIGER and PILATUS3 CdTe DETECTOR SYSTEMS for ADVANCED X-RAY STUDIES**Stefan Brandstetter on behalf of the DECTRIS team DECTRIS Ltd, Baden-Dättwil, Switzerland, stefan.brandstetter@dectris.comE-mail: stefan.brandstetter@dectris.comHybrid Photon Counting (HPC) X-ray detectors [1,2] have transformed synchrotron research in the last decade by enabling noise-free detection and new data acquisition modes. Two new HPC detector families enable even more ambitious X-ray science. First, PILATUS3 X CdTe detectors combine the advantages of HPC technology with the superior quantum efficiency of cadmium telluride (CdTe) at energies from about 8 keV to above 80 keV [3]. All other detector properties are identical to those of the successful PILATUS3 X series, e.g. a pixel size of 172 µm × 172 µm and frame rates of up to 500 Hz. Second, EIGER detectors [4] offer smaller pixels of 75 µm × 75 µm, a frame rate of up to 9 kHz, and negligible dead time (3 µs) between exposures. These properties not only advance established methods like X-ray crystallography but also empower new fields of X-ray photon research like X-ray photon correlation spectroscopy and coherent studies.Here, I present results from different experiments. First, we characterized detector properties like count rate capability, readout noise (restricted to cosmic background), and spatial resolution. Second, combining a nanofocus X-ray tube with a PILATUS3 X CdTe 300K-W detector we resolved features as small as 150 nm from test patterns. This is a promising configuration for nano computed tomography. Moreover, using an EIGER X 1M in ptychography experiments we were able to resolve structures in the order of 40 nm on test patterns. Finally, in experiments carried out with the EIGER X 500K at the CHX beamline at National Synchrotron Light Source II in Brookhaven, United States, we demonstrated the combined power of a fourth-generation synchrotron light source and a state-of-the-art detector for coherent diffraction applications, by taking XPCS data at 9000 Hz. Together, these results show how latest HPC detectors empower advances in X-ray micro- and nanoanalysis.**References** 1. C. Broennimann et al., J. Synchrotron Rad. 13, 120 (2006).
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4. R. Dinapoli et al., Nucl. Instrum. Meth. Phys. Res. A 650, 79 (2011).
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