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The Percival 2-Megapixel Monolithic Active Pixel Imager

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The peak brilliance reached by today's Free-Electron Laser and Synchrotron light sources requires photon detectors matching their output intensity and other characteristics in order to fully realize the sources' potential. The Pixellated Energy Resolving CMOS Imager, Versatile And Large (Percival) is a dedicated soft X-ray imager developed for this purpose by a collaboration of DESY, Rutherford Appleton Laboratory/STFC, Elettra Sincrotrone Trieste, Diamond Light Source, and Pohang Accelerator Laboratory (Rep. of Korea).

Following several generations of prototypes, the Percival "P2M" 2-Megapixel imager – a 4.5x5cm monolithic, stitched sensor with an uninterrupted imaging area of 4x4cm² (1408x1484 pixels of 27x27um – was produced and has demonstrated basic functionality with a first-light image using visible light. It is currently being brought to full operation in a front-illuminated configuration. The readout system being commissioned in parallel has been developed specifically for this imager which produces - at full frame rate of 300Hz - data at a rate of 20Gbit/s.

Currently, a first wafer with 8 Percival P2M chips is undergoing backthinning and backside processing to enable soft X-ray detection.

We will present the P2M system, the project status, and the status of the performance evaluation of the first P2M sensors under illumination with visible light.

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