

## Development of 2nd generation of PERCIVAL Sensor and System for upgraded soft X-ray imaging

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PERCIVAL, the Pixellated Energy-resolving CMOS Imager Versatile and Large, is a 2-megapixel multi-gain X-ray detector designed for photon science experiments at Free Electron Laser (FEL) and synchrotron facilities. Cross-talk effects and non-uniformity of dark images limited the performance of the first generation of the sensor, limiting noise performance, frame rate, and dynamic gain performance as well as fully usable imaging area. 2nd version of the sensor ('respin') overcomes these issues, and together with upgraded DAQ hard-and firmware we are now approaching speed and full dynamic gain range of the original design.

In this contribution, we report on characterization of the Respin PERCIVAL chip and its new system. We demonstrate that the chip can be operated up to a frame rate of 285 Hz for the full-frame and 1 kHz for the Region of Interest (ROI) operation. We also show the first results of the testing Respin chip with synchrotron radiation at PETRA-DESY facility.

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