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# EIGER characterization results

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EIGER is the next generation single photon counting x-ray detector developed at Paul Scherrer Institut for synchrotron based applications. It is a hybrid silicon pixel detector that features a 75x75 um2 pixel size, a high maximum frame rate capability of ˜22 kHz (independent on the detector size), double buffered storage for continuous readout and a negligible dead time between frames of ˜3-4 us.
Characterization and performance measurements have been done on several single chip detector systems, produced with chips coming from two different lots, both with a lab x-ray source and at the Swiss Light Source. Results on the detector calibration, electronic noise, threshold dispersion, minimum selectable energy threshold, maximum detectable incoming photon flux and maximum frame rate will be presented. Furthermore, radiation endurance tests with doses up to ˜150 Mrad in the sensor and ˜60 Mrad in the chip will be shown. These tests prove that the chip is fully functional and suited for multi-chip modules and larger multi-module detectors.
An EIGER module is constructed from a ˜4x8 cm2 monolithic sensor bump-bonded to 4x2 readout chips, thus resulting in a 0.5 Mpixel detector. Several modules can be tiled together to form large area detectors and a 16 Mpixel system is already planned.
The first X-ray images and characterization results of a fully working module assembled with its complete readout electronics will be also presented.

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