



CMOS hybrid-pixel technology

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DECTRIS X-ray detector systems are based on the newly developed CMOS hybrid-pixel technology and operate in single-photon-counting mode. The main difference to existing detectors is that X-rays are directly transformed into electric charge in the silicon sensor. The signals are amplified and processed in the CMOS

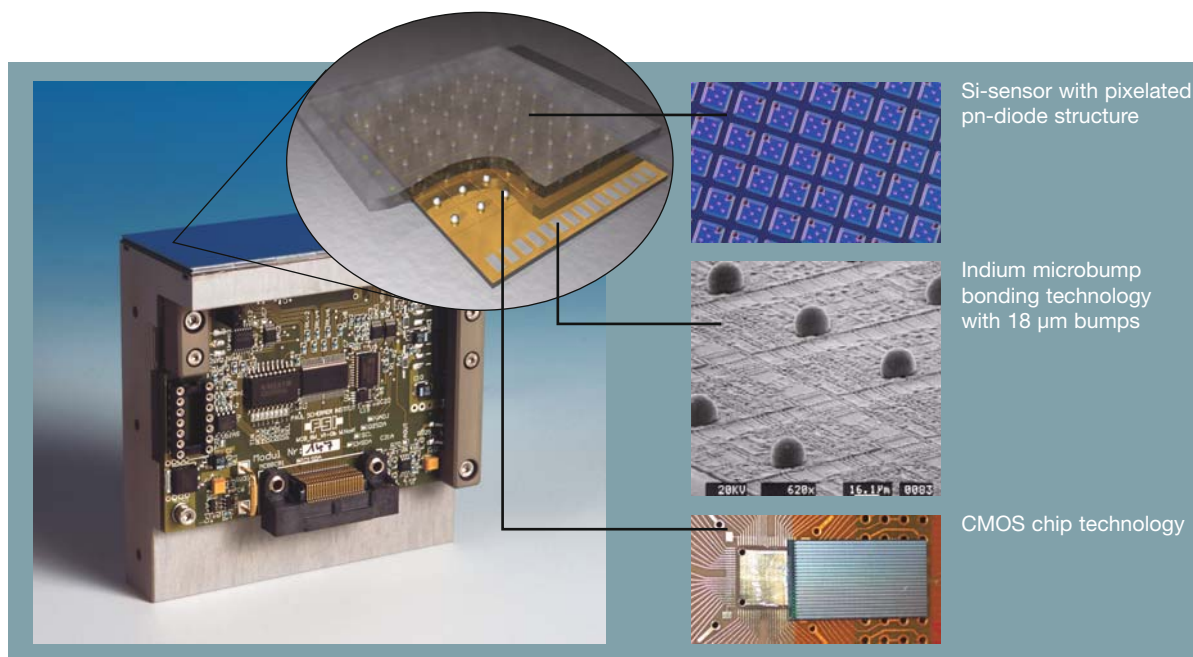
readout chips. The sensor and CMOS chips are connected by indium microbump bonds, a technology perfected at PSI. The basic element of every DECTRIS detector, the detector module, can be combined to form multimodule detector setups with different active areas.

Benefits

- Dramatic reduction of measurement time
- Best possible data quality due to excellent signal-to-noise ratio and high dynamic range
- Energy resolution permits novel kinds of experiments
- Shutterless operation simplifies measurements
- Modular design adapts to customer needs
- Simple operation at room temperature

Key features

- Direct detection of X-rays in single-photon-counting mode
- Radiation-tolerant design
- High dynamic range of 20 bits (1:1,048,576) per pixel
- Short readout times of less than 3 ms
- Excellent signal-to-noise ratio: no dark current or readout noise
- High counting rates
- High framing rates of over 200 images per second
- Excellent point-spread function
- Adjustable threshold to suppress fluorescence
- Electronically gateable



Principle of the PILATUS detector module, the fundamental unit of all DECTRIS detector systems

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Fields of application

- Basic research at synchrotron light sources
- Industrial X-ray diffraction (XRD)
- Quality control and nondestructive testing
- X-ray imaging