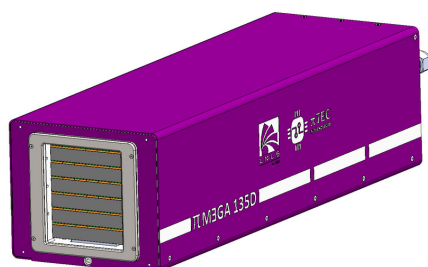


ADVANCED X-RAY DETECTORS FOR SYNCHROTRON LIGHT SOURCES

PIMEGA DETECTOR LINE

Drive communication and imaging systems evolution through advanced configurable hardware



PIMEGA 135D

2.4M Pixels

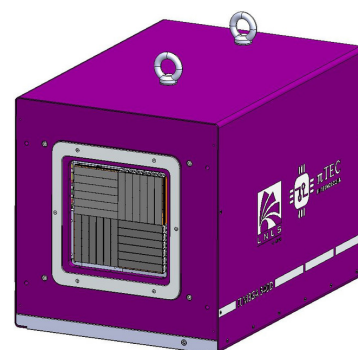
85 x 85 mm² detection area



PIMEGA 450D

7.9M Pixels

1710 x 14 mm² detection area



PIMEGA 540D

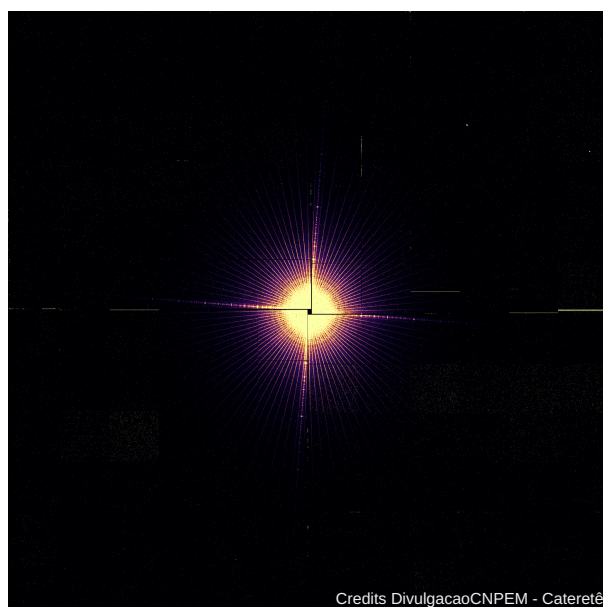
9.4M Pixels

170 x 170 mm² detection area

A PARTNERSHIP



In partnership with LNLS, PITEC launched the PIMEGA x-ray detectors to operate in the Sirius beamlines. PIMEGA-135D, PIMEGA-450D, and PIMEGA-540D are hybrid detectors based on semiconductor pixel sensors assembled over Medipix3RX ASICs. This brings together important features for direct x-ray detection such as superior signal-to-noise ratio, single-photon counting, and high detection efficiency.



Credits DivulgacaoCNPEM - Cateretê

Sample image of Siemens star diffraction pattern obtained with PIMEGA-540D during first test at Cateretê beamline at Sirius Synchrotron Light Source using a 300 µm Si sensor.

KEY FEATURES

- Noise-free hybrid photon counting technology
- Possibility of various sensor materials
- High frame rate (up to 2000 Hz)
- High dynamic range (up to 24 bits)
- Continuous or sequential data acquisition
- Short readout time
- Low dead area
- High modularity
- Compatibility with EPICS
- Two sensor options: Si 300 or 675 µm

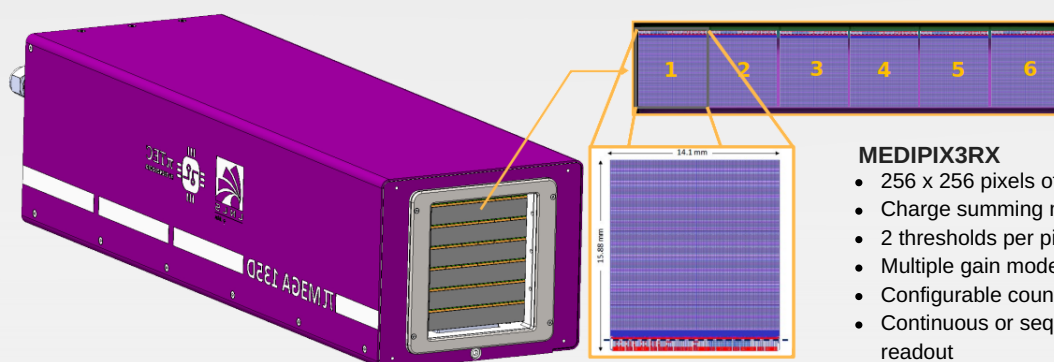
APPLICATIONS

- Macromolecular Crystallography
- Small Angle X-ray Scattering (SAXS)
- Wide Angle X-ray Scattering (WAXS)
- X-ray Powder Diffraction
- Coherent X-ray Imaging
- Cone beam tomography
- X-ray projection imaging

PHOTON COUNTING TECHNOLOGY

The PIMEGA detector incorporates the Medipix3RX chip, which belongs to a family of read-out chips for particle imaging and detection. Medipix detects and counts each particle hitting the pixels when an electronic shutter is open. Its two energy thresholds enable high-resolution color imaging by separating the photon hits into two energy ranges.

In PIMEGA, the grid of pixel sensors, integrated to the Medipix chip, is associated with an optical transport infrastructure (at 100Gb/s) with fiber cables. These sensors are placed in a ladder scheme making it possible to take non-invasive X-ray images with high resolution, transporting, and processing them in almost “real-time” with lower dead area.



MEDIPIX3RX

- 256 x 256 pixels of size 55µm x 55µm
- Charge summing mode for charge sharing mitigation
- 2 thresholds per pixel for multi-energy imaging
- Multiple gain modes
- Configurable counter depths: 2 x 12-bit and 1 x 24-bit
- Continuous or sequential data acquisition and readout



TECHINICAL SPECIFICATIONS

	PIMEGA 135D		PIMEGA 450D		PIMEGA 540D	
Number of ASICs MEDIPIX 3RX	6 x 6		1 x 120		12 x 12	
Pixel size [μm²]	55 x 55		55 x 55		55 x 55	
Pixels arrangement (X x Y)	1553 x 1548		31060 x 256		3106 x 3096	
Detection area [mm²]	85 x 85		1710 x 14		170 x 170	
Sensor type / thickness	Si 300μm	Si 675μm	Si 300μm	Si 675μm	Si 300μm	Si 675μm
Threshold energy [KeV]	2 - 20 ≥ 25% efficiency*	2 - 26.5 ≥ 25% efficiency*	2 - 20 ≥ 25% efficiency*	2 - 26.5 ≥ 25% efficiency*	2 - 20 ≥ 25% efficiency*	2 - 26.5 ≥ 25% efficiency*
Readout mode	sequential and continuous		sequential and continuous		sequential and continuous	
Readout time [μs]	492 (sequential mode)		984 (sequential mode)		492 (sequential mode)	
Depth dynamic range [bits]	12 and 24		12 and 24		12 and 24	
Frame rate @ 12bits [fps]	2000		1000		2000	
File format	HF5 (32 bits)		HF5 (32 bits)		HF5 (32 bits)	
Trigger mode	Internal and External		Internal and External		Internal and External	
Module cooling	Water-cooled		Water-cooled (sensors only)		Water-cooled	
Vacuum compatibility (mbar)	3 x 10 ⁻³		No		3 x 10 ⁻³	

* Estimated values

CONTACT US

ADDRESS: RUA WALTER HADLER, S/N (SOMA BUILDING) - CIDADE UNIVERSITÁRIA, CAMPINAS - SP.

PHONE (FRONT DESK): +55 19 40421992

EMAIL: contact@pitec.co