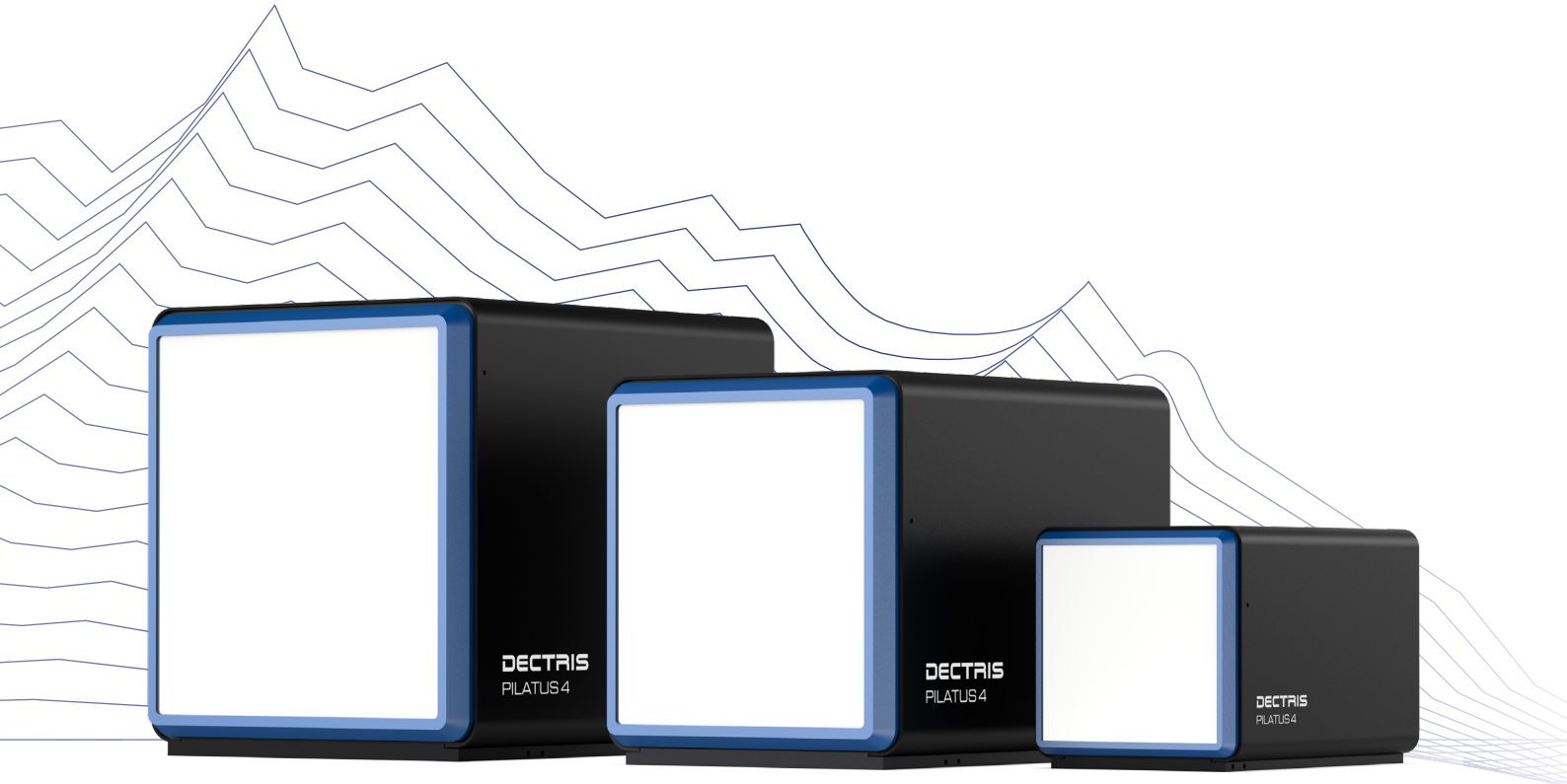
DECTRIS

PILATUS 4
for Synchrotrons



PILATUS 4

Large and Fast – Empowering High-Energy Synchrotron Experiments

DECTRIS PILATUS4 photon-counting X-ray detectors offer unprecedented speed, with up to 4,000 frames per second for large active areas. They empower fast measurements through their large angular coverage with a pixel resolution of 150 µm, in combination with highly efficient direct detection. The choice of a cadmium telluride or silicon sensor for optimal quantum efficiency at your photon energy range, as well as continuous readout with practically no count-loss between frames add to the excellent overall detection efficiency. Moreover, the silicon-based detectors' optional vacuum compatibility achieves the ideal compatibility for long, in-vacuum SAXS setups.

The latest photon-counting technology, with DECTRIS Instant Retrigger, enables a maximum count-rate capability of above 10^7 ph/s/pixel and ideally pairs with an image bit depth (dynamic range) of up to 32 bits. This will allow you to take full advantage of the increasing photon fluxes at contemporary beamlines. In addition, PILATUS4 comes fully calibrated, offers four adjustable energy thresholds and enables double gating for pump-probe experiments. It is easy to integrate with its reliable SIMPLON API control and data interface supporting low-latency data streaming. All of this will make PILATUS4 an advanced, versatile, and future-proof detector for your beamline.

Key Advantages

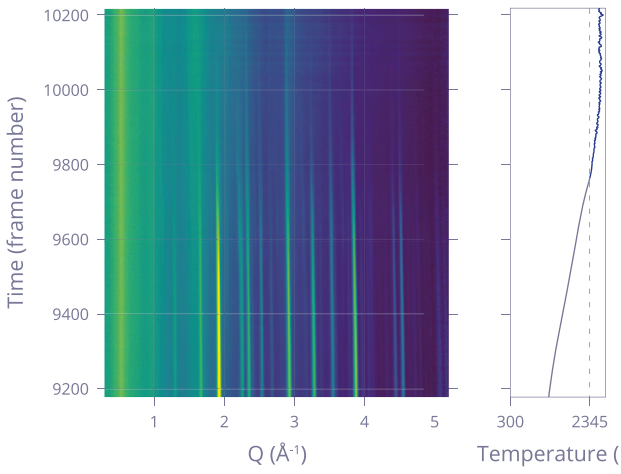
Large & fast.
PILATUS4 offers a frame rate of up to 4,000 Hz, even for the largest, 4M-pixel active area.

Continuous readout.
There is no signal loss between frames in time-resolved, *in situ*, or scanning experiments.

Reliable & stable.
Rely on the stable performance of DECTRIS detectors, the robust controls and data interfaces, and our top-notch global support.

Applications

- X-ray Diffraction Computed Tomography (XRD-CT)
- Pair Distribution Function (PDF) Analysis / Total Scattering
- Powder X-ray Diffraction (PXRD)
- Small-Angle X-ray Scattering (SAXS)
- Wide-Angle X-ray Scattering (WAXS)
- Laue Diffraction
- Chemical X-ray Crystallography
- Macromolecular Crystallography



***In situ* powder XRD at 4.35 kHz frame rate (230 microseconds time resolution):** Heatmap with temperature profile showing calcination of YAG acquired at DanMAX beamline at MAX IV. PILATUS4 CdTe, 25 keV.

Technical Specifications

PILATUS 4	XE/X 4M	XE/X 2M	X 1M
Active area (W x H) [mm²]	311.0 x 327.0	233.0 x 244.5	155.0 x 162.0
Pixel array (W x H)	2,073 x 2,180	1,553 x 1,630	1,033 x 1,080
Module size[1] (W x H) [pixels]	513 x 255		
Inter-module gap (hor./vert.) [pixels]	7 / 20		
Pixel size (W x H) [µm²]	150 x 150		
Readout time[3]	Continuous readout		
Frame rate[2]**, XE** (max.) [Hz]	2,000 (4,000 in 8-bit mode)		–
Frame rate[2]**, X** (max.) [Hz]	500 (1,000 in 8-bit mode)	950 (1,900 in 8-bit mode)	2,000 (4,000 in 8-bit mode)
Image bit depth [bits]	32, 16, 8 (depending on the frame rate)		
Sensor material	Cadmium telluride (CdTe) or Silicon (Si)		
Sensor thickness [µm]	1,000 (CdTe), 450 (Si)		
Energy range [keV]	8 - 100 (CdTe), 6 - 40 (Si)		
Number of energy thresholds	4		
Count rate (max.) [ph/s/pixel]	> 10^7		
Option for vacuum compatibility	No	Yes (Si), No (CdTe)	Yes (Si), No (CdTe)
Dimensions (W x H x D) [mm³]	400 x 430 x 500	340 x 370 x 500	235 x 237 x 372
Weight [kg]	55	41	15

All specifications are subject to change without notice.

[1] With single pixel vertical gap in the center of CdTe-sensor modules.

[2] For the readout of one threshold.

[3] The effective dead time between exposures is < 100 ns (max. loss of 1 count/pixel).

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January 2024

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