

PILATUS **1M**

**A powerful combination
of large area and
high speed for small-angle
X-ray scattering**



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The PILATUS 1M detector is perfectly suited for modern small-angle X-ray scattering (SAXS) applications either in a home lab or at synchrotron light sources, which require fast detectors with ultra low noise and very high dynamic ranges.

It is based on the newly developed CMOS hybrid-pixel technology and operates in “single-photon counting” mode. With its large active area, high dynamic range, high frame rate, the PILATUS 1M is ideally suited for SAXS.

The detector system operates at room temperature, with a cooling unit for temperature stabilization. It comes as a complete system with detector, water cooler, a high-end server to cope with the high data transfer rates and the data acquisition and analysis software package TVX.

The PILATUS 1M is delivered fully calibrated and ready to use.

Applications

- X-ray diffraction (XRD)
- Small-angle scattering (SAXS)
- Macromolecular crystallography (MX)

Key features

- Direct detection of X-rays in single-photon-counting mode
- Radiation-tolerant design
- High dynamic range
- Short readout time
- High frame rates
- High counting rates
- No dark current or readout noise
- Adjustable threshold to suppress fluorescence
- Excellent point-spread function
- Electronically gateable
- Shutterless operation

Technical specifications

Number of modules	2 x 5 = 10
Sensor	Reverse-biased silicon diode array
Sensor thickness	320 µm
Pixel size	172 x 172 µm ²
Format	981 x 1043 = 1,023,183 pixels
Area	169 x 179 mm ²
Intermodule gap	x: 7 pixels, y: 17 pixels, 8.4% of total area
Dynamic range	20 bits (1:1,048,576)
Counting rate per pixel	> 2 x 10 ⁶ X-ray/s
Energy range	3 – 30 keV
Quantum efficiency (calculated)	3 keV: 80% 8 keV: 99% 15 keV: 55%
Energy resolution	500 eV
Adjustable threshold range	2 – 20 keV
Threshold dispersion	50 eV
Readout time	3.6 ms
Framing rate	30 Hz
Point-spread function	1 pixel
Data formats	Raw data, TIF, EDF, CBF
External trigger/gate	5V TTL, 3 different modes
Software interface	Through socket connection; clients for EPICS, SPEC and stand-alone operation are available
Cooling	Close-circuit water cooling unit for temperature stabilization
Power consumption	100 W
Dimensions (WHD)	Approx. 300 x 310 x 458 mm
Weight	Approx. 25 kg

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