DECTRIS
Next Generation X-Ray Detectors

# PILATUS 2M

**Ultimate speed and data quality for small-angle X-ray scattering**

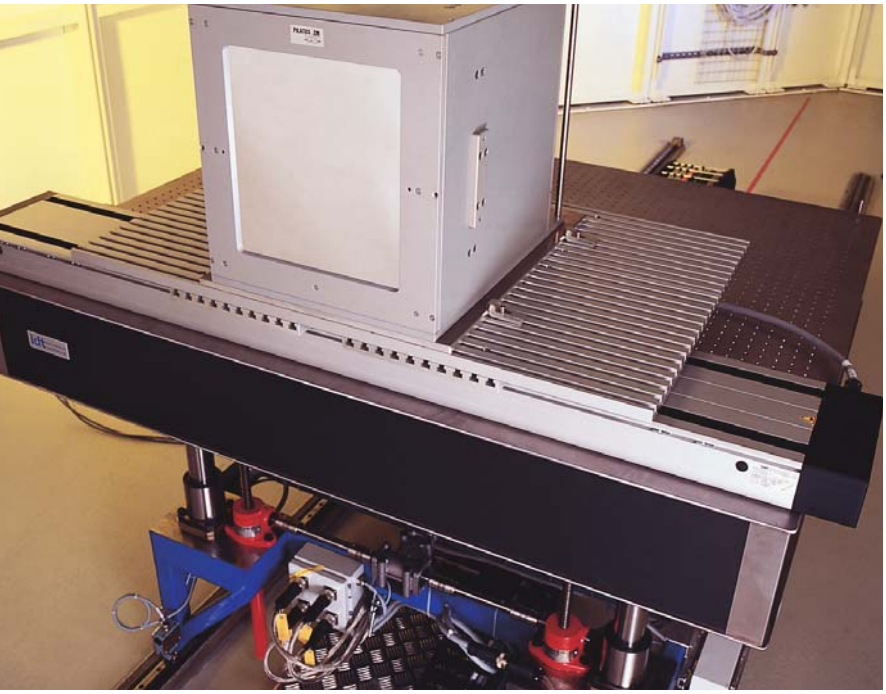
# PILATUS 2M

The PILATUS 2M detector is perfectly suited for modern small-angle X-ray scattering (SAXS) and macromolecular crystallography (MX) beamlines, which require fast detectors with very high dynamic range.

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 2M 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 2M is delivered fully calibrated and ready to use.



**PILATUS 2M prototype at the X12SA coherent small-angle X-ray scattering beamline, SLS**

**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

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**Technical specifications**

| | |
|---|---|
| Number of modules | 3 x 8 = 24 |
| Sensor | Reverse-biased silicon diode array |
| Sensor thickness | 320 µm |
| Pixel size | 172 x 172 µm² |
| Format | 1475 x 1679 = 2,476,525 pixels |
| Area | 254 x 289 mm² |
| Intermodule gap | x: 7 pixels, y: 17 pixels, 8.0% 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%<br>8 keV: 99%<br>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 | 200 W |
| Dimensions (WHD) | 384 x 424 x 458 mm |
| Weight | 42 kg |