DECTRIS®

detecting the future

X-ray detectors for plasma diagnostics

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History of DECTRIS

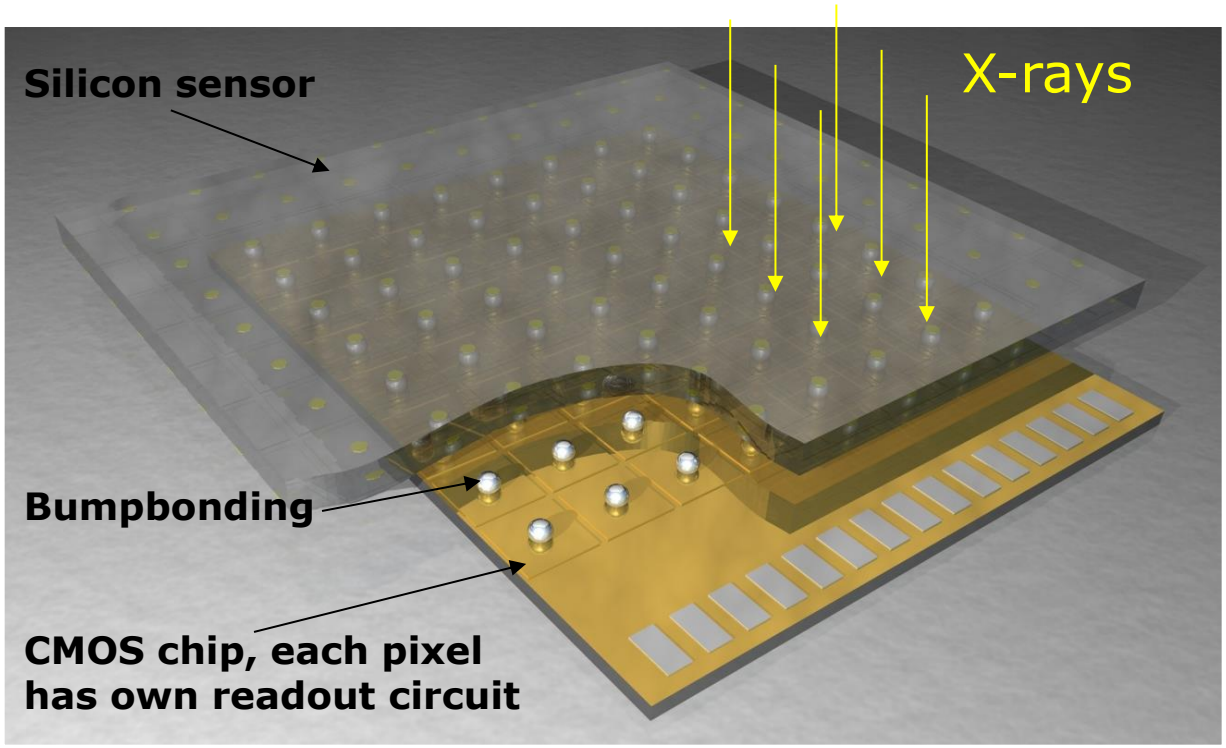
2006: PILATUS 6M. First large-area hybrid-pixel X-ray detector

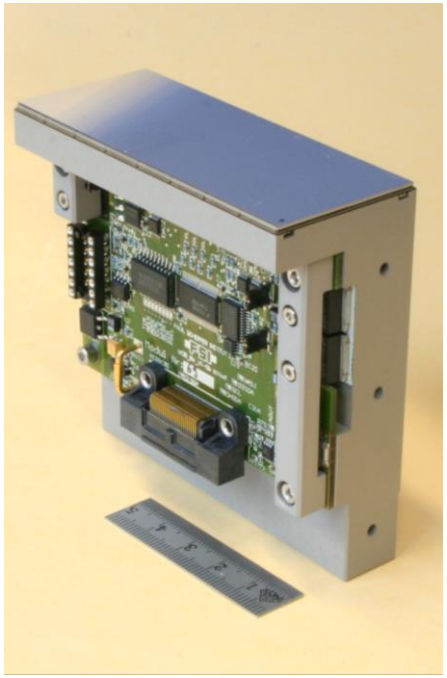
Facts:

- Spin off from PSI founded in 2006
- Located in Baden, Switzerland: 1500 m^2 production facilities, labs and office space (production, sales, and support)
- Products: 1D and 2D Hybrid-Pixel X-ray Detectors for scientific & industrial applications
- World leader in hybrid pixel X-ray detectors

- Staff by the end of 2013: ~50 FTE
- Turnover 2012: ~22 MCHF (17.5 MEUR)
- 151 systems delivered
- Strong focus on R&D! (ASIC design) R&D expenses: 4.25 MCHF

Hybrid Pixel Technology





PILATUS module
100'000 pixels

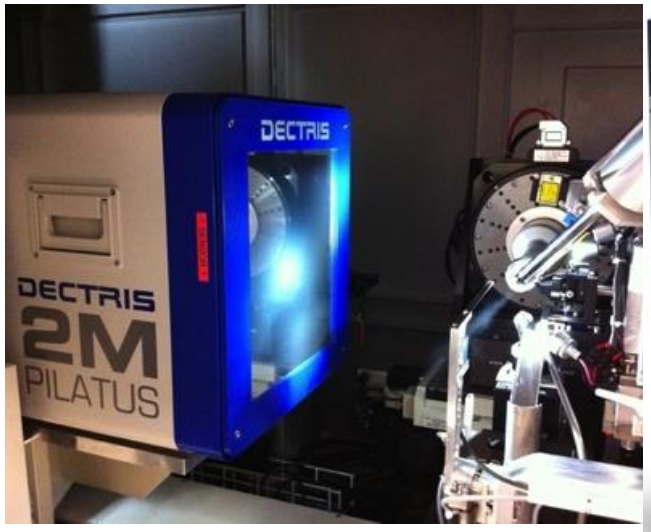
Single-photon counting => Noise-free imaging

Large energy range: 1.8 – 30 keV

Radiation hard design

Business Segments

synchrotron	laboratory & industry	specific solutions
– ***Highest performance***	– ***High performance***	– ***Special detectors***



PILATUS 2M at protein crystallography beamline

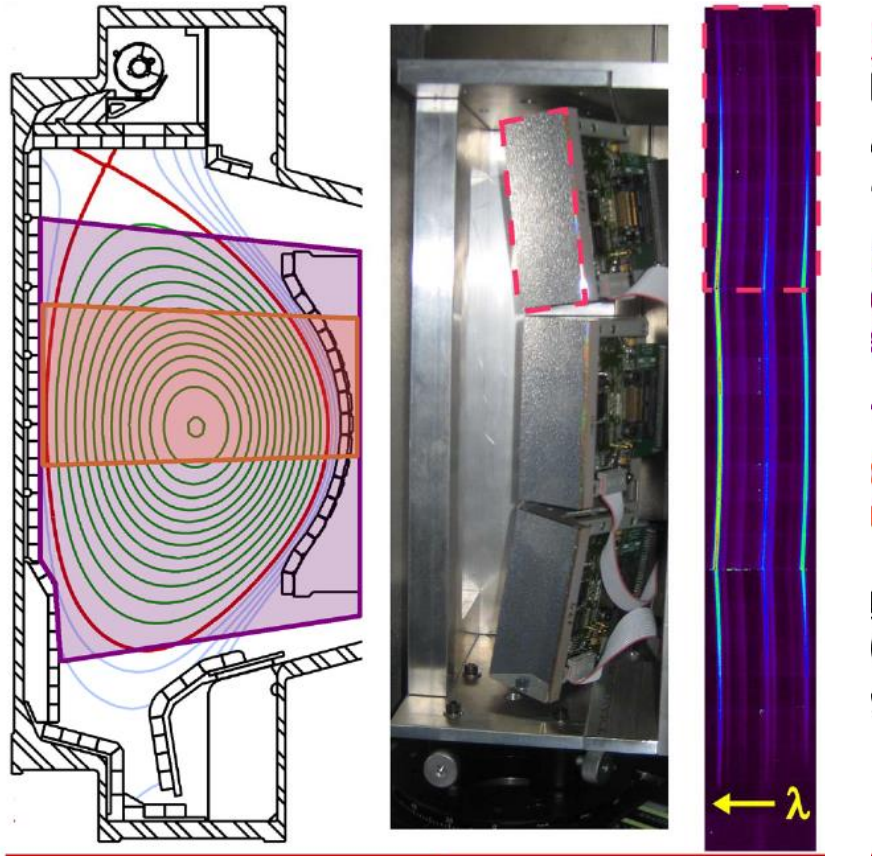
Mainly OEM partners. Example: Rigaku - Compact HomeLab™ with PILATUS 100K

Customized PILATUS 900K for EAST tokamak, IPP

Plasma spectroscopy systems with PILATUS

	System	Detector	Application
Alcator C-Mod (Boston, USA)	XICS Ar16+ system	3x Pilatus 100K	Routine analysis of plasma temperature and rotation
	XICS swappable crystal system	Pilatus 100K	Impurity density and high temperature studies *Both XICS systems operated in one Helium box*
	Energy Resolving Pinhole camera	Pilatus 100K	Demonstration system for impurity density and electron temperature imaging *Operated in air*
LHD (Japan)	XICS Ar16+ system	Pilatus 300K, water-cooled	Routine analysis of plasma temperature and rotation
	XICS Ar17+ system	Pilatus 100K camera	Routine analysis of plasma temperature and rotation in high temperature plasma *Both systems operated in vacuum*
EAST (China)	XICS Ar16+ system	2x Pilatus 100K cameras	Routine analysis of plasma temperature and rotation
	XICS multi crystals system	Pilatus 900K, specific in-vacuum detector	*delivered 07/2013*
KSTAR (Korea)	XICS Ar16+ system	Pilatus 100K	Routine analysis of plasma temperature and rotation
NSTX (Princeton, USA)	XICS Fe24+ system	2x Pilatus 100K	Impurity density, plasma temperature. (operated in 2010-2011, detectors were later shipped to EAST)

X-ray Imaging Crystal Spectrometer at Alcator C-Mod



- Bent-crystal spectrometer measuring Ar^{16+} emission line (3.1 keV)
- Operation in He-filled chamber
- Spatial resolution (1D poloidal profile) and energy resolution
- Plasma velocity (v) and temperature (T) are measured via the Doppler effect

HIREXSR system at Alcator C-Mod, 2007
Images courtesy of Matt Reinke

PILATUS3 900K-IPP for EAST tokamak

Detector:

- *9 modules (84 × 325 mm²)*
- *in-vacuum operation*
- *fast framing, up to 500 Hz*
- *readout time 0.95 ms/frame*

delivered: 07/2013

commissioned: 09/2013

Description of XICS multi-crystal system design:
B. Lu *et al.*, Review of Scientific Instruments, **83**, 10E130 (2012)

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Thank you for your attention!

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