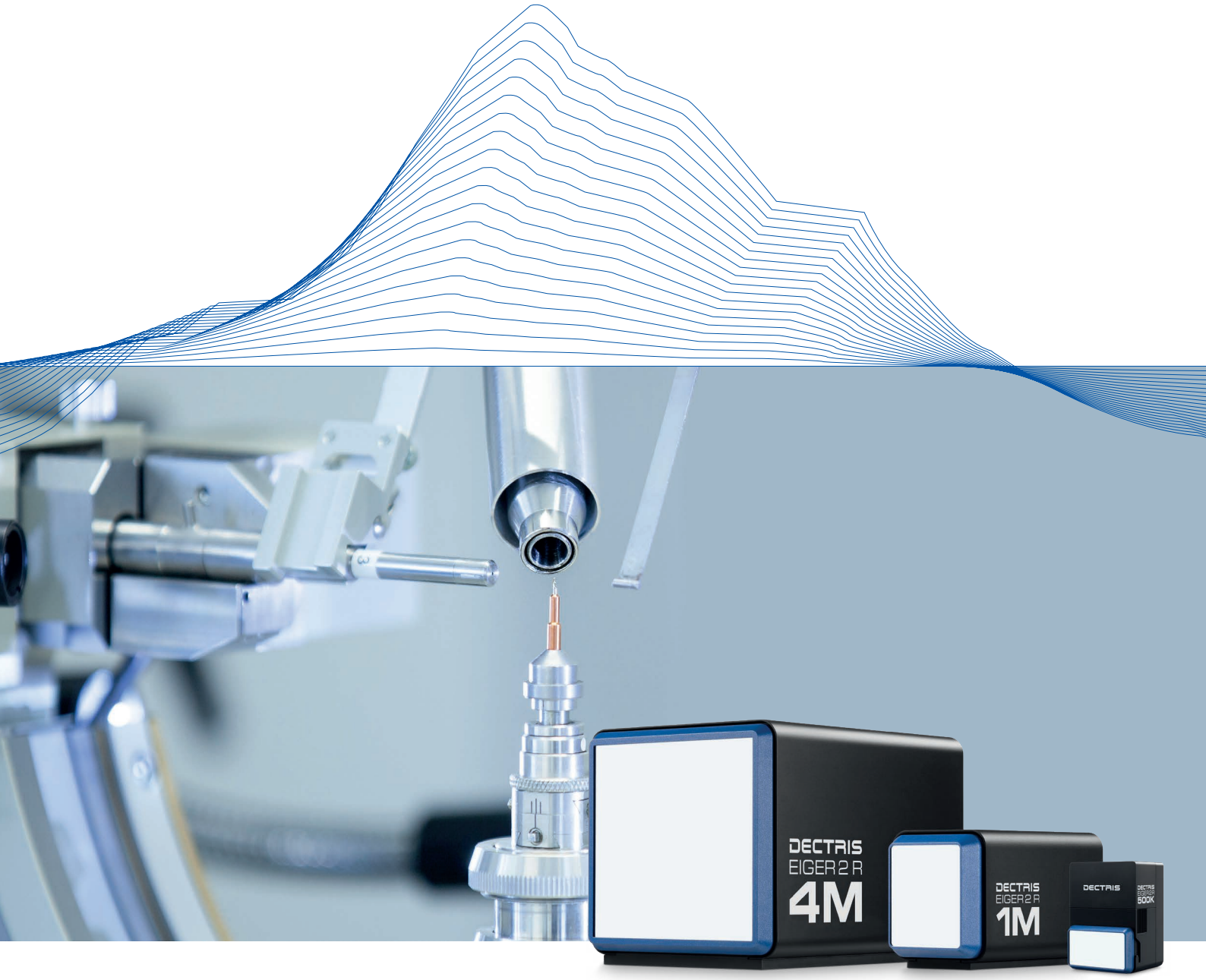
DECTRIS
detecting the future



EIGER2 R

The world's most successful detector technology gets even better



The latest-generation HPC technology for your laboratory

EIGER2 R combines every state-of-the-art feature of HPC technology in our most advanced detector series for laboratory applications. Small pixels, in combination with direct detection, achieve a high spatial and angular resolution and give you the benefits of fine sampling and wide coverage of reciprocal space. A superior count-rate performance enables accurate measurements of even the highest intensities. Take full advantage of this detector series' vast dynamic range, even during long exposures, using simultaneous read/write with zero dead time. Dual energy discrimination allows for extensive background suppression and improves signal-to-noise, in particular for weak signals and long exposure times. Thanks to the optional vacuum compatibility, absorption and scattering from air and windows can be eliminated. Choose from three different detector models to match your needs.

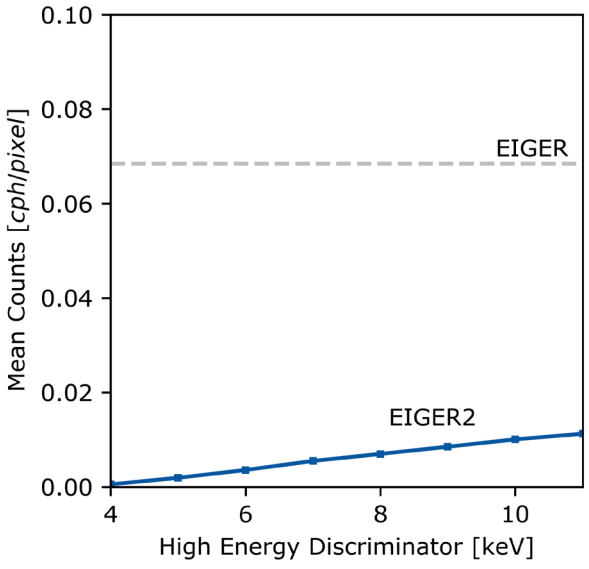
Key Advantages

- Highest possible dynamic range thanks to zero detector background, superior count rates and simultaneous read/write
- Direct detection and small pixel size for the best spot separation, minimal background overlap and maximal signal-to-noise
- Dual energy discrimination for suppression of low- and high-energy background
- DECTRIS Instant Retrigger for wide linear response without the dynamic range limitations of integrating detectors

Applications

- Macromolecular crystallography
- Chemical crystallography
- SAXS/WAXS
- X-ray powder diffraction
- X-ray reflectometry
- Diffuse scattering

Dark count suppression

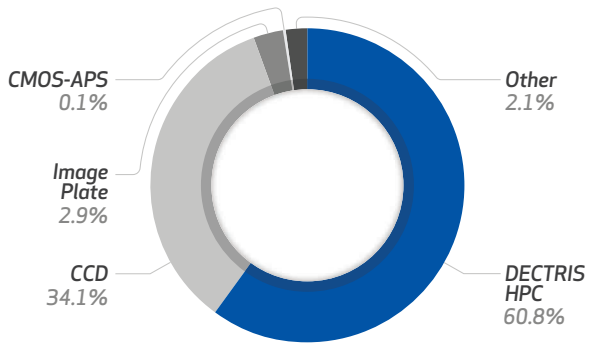


Dark count suppression thanks to dual energy discrimination. Grey dotted line: Dark counts for an EIGER model with a single energy discriminator set to 4 keV. Blue solid line: Dark counts for an EIGER2 R 500K with a low energy discriminator at 4 keV as a function of a high-energy discriminator setting. Dual energy discrimination achieves a fivefold reduction of environmental background.

DECTRIS HPC: The world‘s most successful detector technology

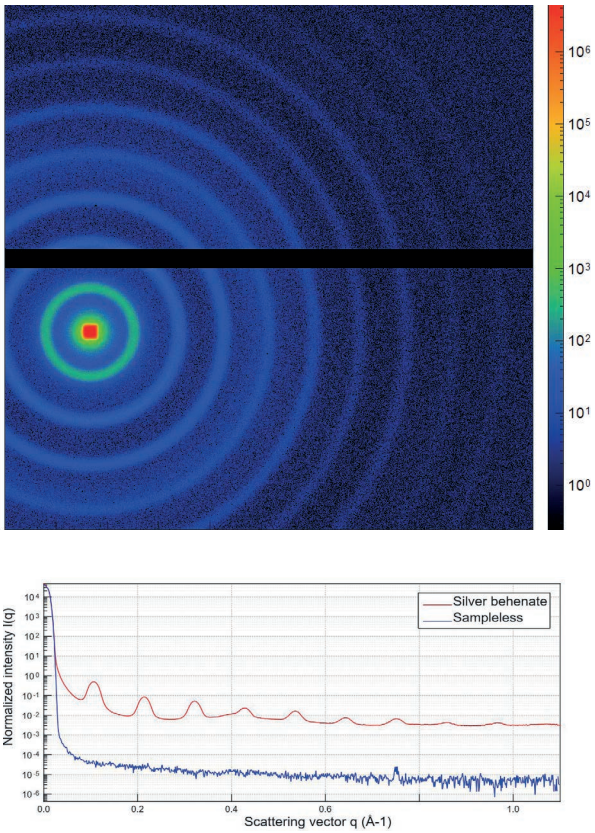
At synchrotrons and in laboratories, more and more indirectly detecting X-ray detectors, such as CCDs and image plates, are being replaced by hybrid pixel technology. The use of indirectly detecting CMOS-APS detectors in protein crystallography was first reported in 2009 [1], but nowadays the technology does not provide substantial contributions to structure determination. Sixty percent of the structures released in the Protein Data Bank from January to May 2019 are based on data that were acquired with DECTRIS HPC detectors. The advantages of direct detection and single-photon counting are key to the success of DECTRIS HPC technology. With EIGER2 R, the most successful detector technology in protein crystallography is getting even better.

[1] K. Hasegawa et al., “Development of a shutterless continuous rotation method using an X-ray CMOS detector for protein crystallography,” Journal of Applied Crystallography, vol. 42, no. 6, 2009.

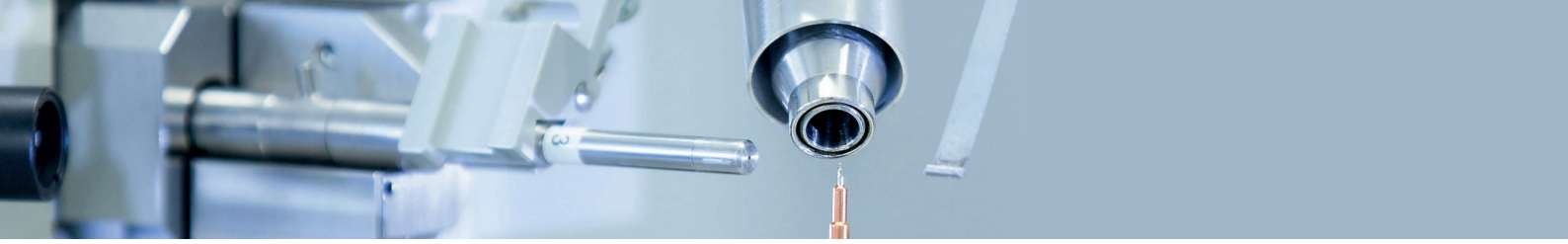


X-ray detector technologies used in PDB releases, January to July 2019

Highest dynamic range



The WAXS signal of Silver behenate (AgBH). Top: Raw data acquired with an EIGER2 R 1M in a Xeuss3.0 SAXS/WAXS instrument from Xenocs. AgBH is a well-known standard in SAXS due to its strong scattering peaks. I(q) is measured over seven orders of magnitude. Bottom: This dual plot of AgBH’s signal and a negative control shows that the dynamic range of the EIGER2 R detectors easily covers the more than ten orders of magnitude that are needed for weakly scattering samples



Technical specifications

EIGER2 R	500K	1M	4M
Number of detector modules	1	1 × 2	2 × 4
Sensitive area, width × height [mm²]	77.3 × 38.6	77.1 × 79.7	155.1 × 162.2
Pixel size [µm²]		75 × 75	
Point-spread function		1 pixel (FWHM)	
Energy discriminating thresholds		2	
Threshold range [keV]	4 - 11	3.5 - 30	3.5 - 30
Maximum count rate [cps/mm²]*	3.6×10^8	6.9×10^8	6.9×10^8
Counter depth [bit/threshold]		2 × 16	
Acquisition mode		simultaneous read/write with zero dead time	
Image bit depth [bit]		32	
Optional vacuum compatibility		yes	
Cooling	Air-cooled	Water-cooled	Water-cooled
Dimensions (WHD) [mm³]	100 × 140 × 93	114 × 133 × 240	235 × 237 × 372
Weight [kg]	1.8	3.9	15

* Values are for Cu radiation. Instant Retrigger and higher count rates for EIGER2 R 500K will be available in 2020.

All specifications are subject to change without notice.



DECTRIS Ltd.
Täfernweg 1
5405 Baden-Dättwil
Switzerland

Phone +41 56 500 21 00
Fax +41 56 500 21 01
E-Mail sales@dectris.com
www.dectris.com

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