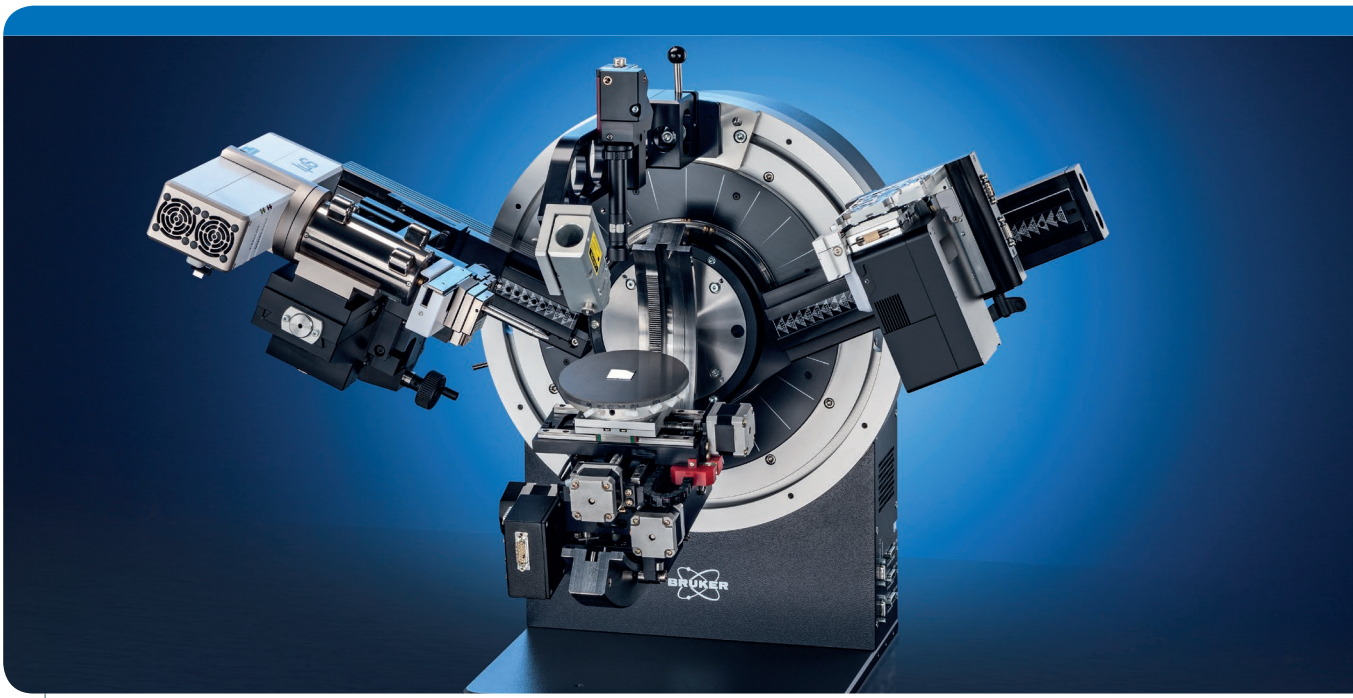


D8 Family with EIGER2 R 500K

The Next Generation HPC Detector for the Most Powerful XRD Platform

The EIGER2 R 500K is a multi-mode (0D/1D/2D) detector designed specifically for laboratory instruments. It is based on the next generation of Hybrid Photon Counting (HPC) technology developed by Dectris Ltd.

Intensive collaboration during development of the EIGER2 R 500K has resulted in an exceptional level of physical integration into Bruker AXS' D8 ADVANCE and D8 DISCOVER and digital integration into the measurement and analysis software DIFFRAC.SUITE.

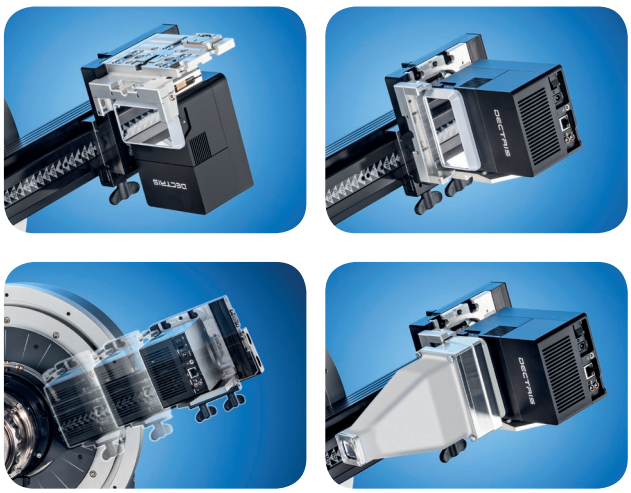
Key Benefits

- Highest dynamic range and largest field of view in 0D detector mode
- Full view panoramic optics and more than 1000 channels in 1D detector mode, with channel size perfectly sized for optimum angular resolution and count rate capability
- Continuously variable sample-to-detector distance and ideal pixel size for balancing γ and 2Θ coverage and angular resolution in 2D detector mode

Taking Integration to the Next Level

From the beginning of the EIGER2 R 500K development, Bruker has been working with DECTRIS to ensure seamless integration into the D8 ADVANCE and D8 DISCOVER instrument platforms, and further improve performance for numerous XRD applications.

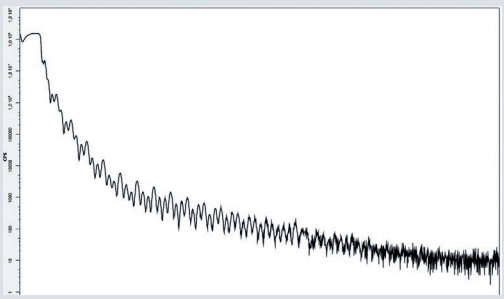
- **Universal Detector Mount Plus**
  - Easy and failsafe detector mounting to optimize γ and 2Θ angular coverage in seconds
  - Micron-precise repositioning accuracy enabling alignment-free rotation
  - Automatic recognition of the detector orientation
- **Flexible detector positioning**
  - Optimizing angular coverage versus resolution
  - Continuously variable sample-to-detector distance from 100 mm up to 500 mm
  - Automatic distance recognition (D8 DISCOVER)
- **Panoramic optics**
  - Enable full detector field of view
  - Tool-free mounting with real-time component recognition



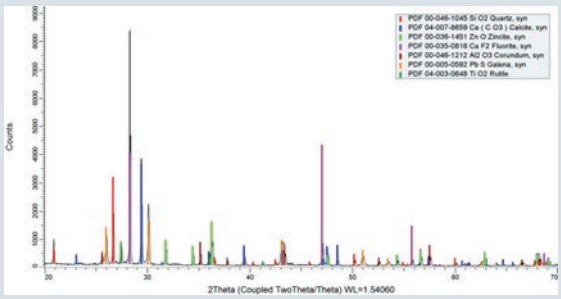
True Multi-Mode Detection

EIGER2 is a multifunctional detector. Customized operation modes are provided to obtain best diffraction data in the most efficient way depending on the sample type and required measurement strategy.

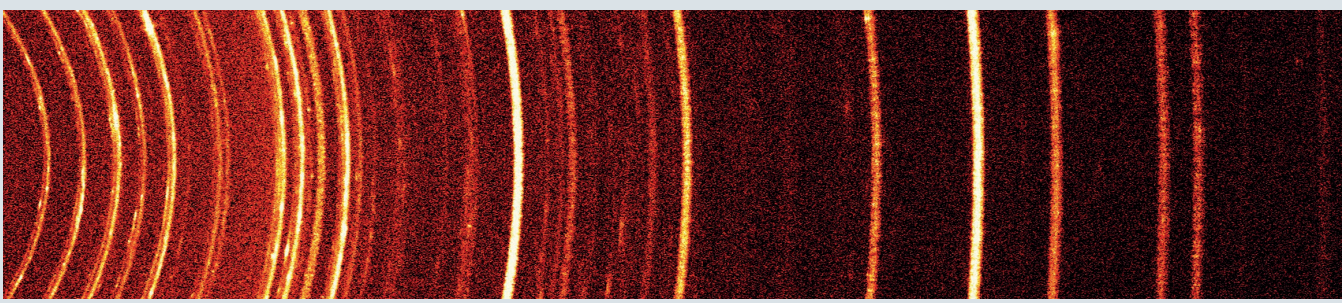
- **0D mode** for samples with rough surfaces, polycrystalline coatings and epitaxial thin films.



Scanning 0D



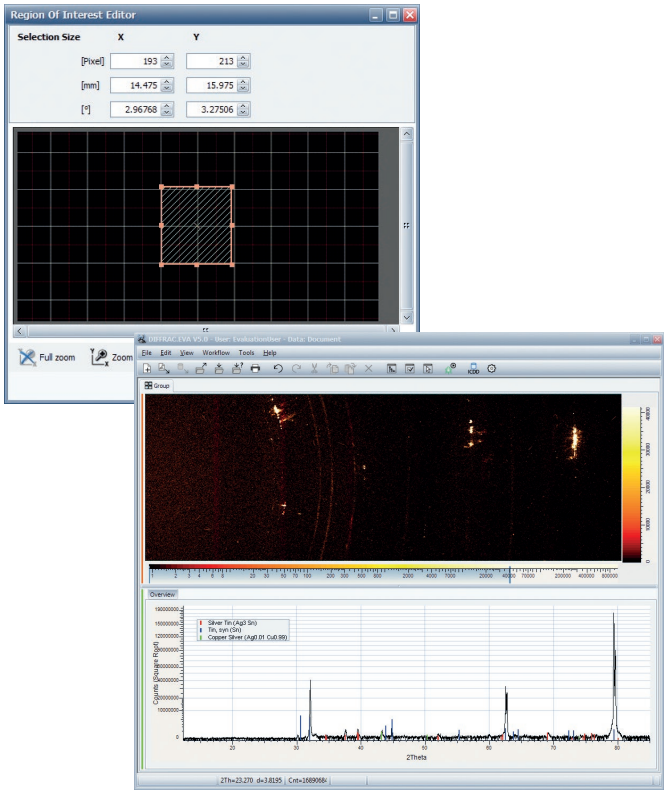
Scanning 1D



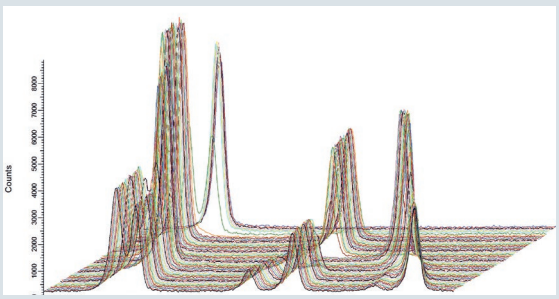
Scanning 2D

- **Seamless addition to the DIFFRAC.SUITE architecture**
  - Detector connects directly to the instrument control software
- **Customized software tools with intuitive graphic interfaces**
  - Defining the 0D/1D/2D region of interest with real time display
- **Consistent and comprehensive 0D/1D/2D implementation**
  - Snap-Shot, step, continuous and dynamically optimized scan types
  - Patented* distortion-free 2D data algorithms
  - Evaluation methods supporting 0D, 1D and unreduced 2D data sets

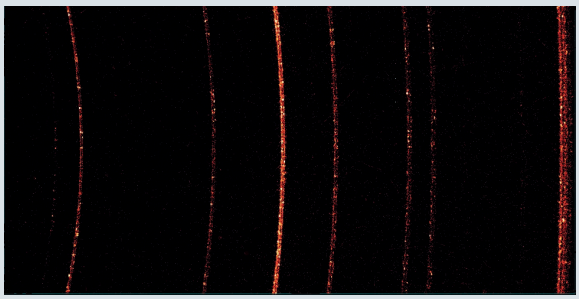
*Patent pending

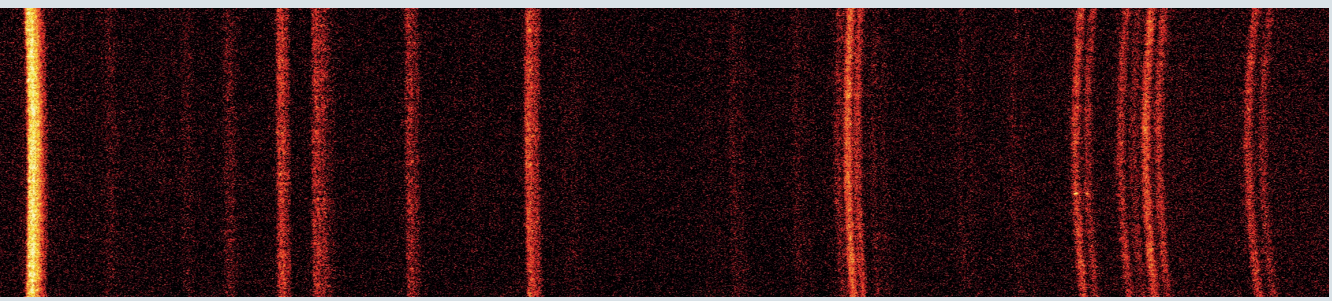


- **1D mode** for ultra fast scans on powders, measured either in reflection (Bragg-Brentano) or in transmission geometry. Reciprocal space mapping of epitaxial thin films.
- **2D mode** for small sample quantities, materials with preferred orientation or large crystallite sizes, or for micro-mapping.



Snap-Shot 1D


Snap-Shot 2D



Next Generation HPC Technology

The EIGER2 R 500K has been specifically designed for laboratory instrumentation and contains the latest innovations in Hybrid Photon Counting (HPC) detector design.

- **Dual Energy Thresholds**
  - Lower threshold reduces background due to sample fluorescence
  - Upper threshold to mitigate cosmic background
- **Ultra high count rate capability**
  - Fast pixel readout ensures no counter saturation
  - High pixel density with independent counting circuits ensures linearity without the need for absorbers
- **Support of a wide range of incident radiation**
  - Suitable for all common X-ray wavelengths, from Cr to Ag radiation
- **Robust design**
  - A solid state, media-free design ensures long detector life without routine maintenance
  - Radiation-hard
- **Perfect pixel size**
  - Matching the intrinsic resolution of a laboratory line focus source for optimal Snap-Shot and continuous measurement mode
  - Minimizing charge sharing impact for XRD applications with photon counting 2D detectors

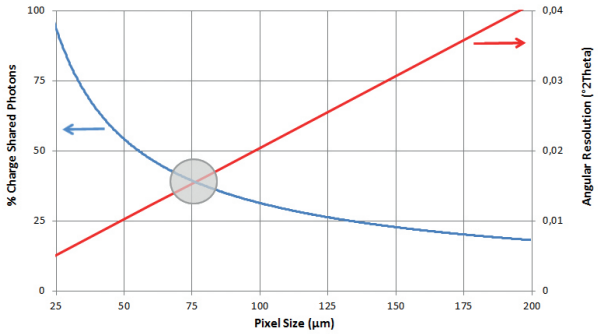
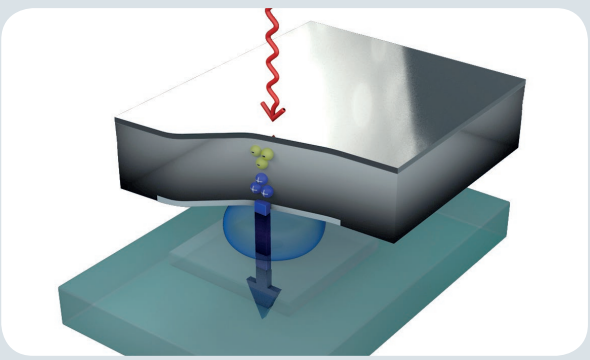


Figure 1: Charge sharing and angular resolution versus pixel size Charge sharing trend line adapted from A. Bergamachi et al., 16th International Workshop on Radiation Imaging Detectors, 22-24 June 2014, Trieste (Italy). Angular resolution calculated for 280 mm sample-to-detector distance.

HPC Technology

Hybrid Photon Counting X-ray detector technology is based on the direct conversion of photons to electrons via the photoelectric effect. Due to the direct nature of this conversion and the small pixel size, the position of the photon interaction is accurately measured, which results in an ideal point spread function.
The fast conversion also allows for highest count rates and dynamic range.



Bruker AXS GmbH

info.baxs@bruker.com

Worldwide offices

bruker.com/baxs-offices

www.bruker.com