DISCOVER WHAT
THE EYE CAN‘T SEE

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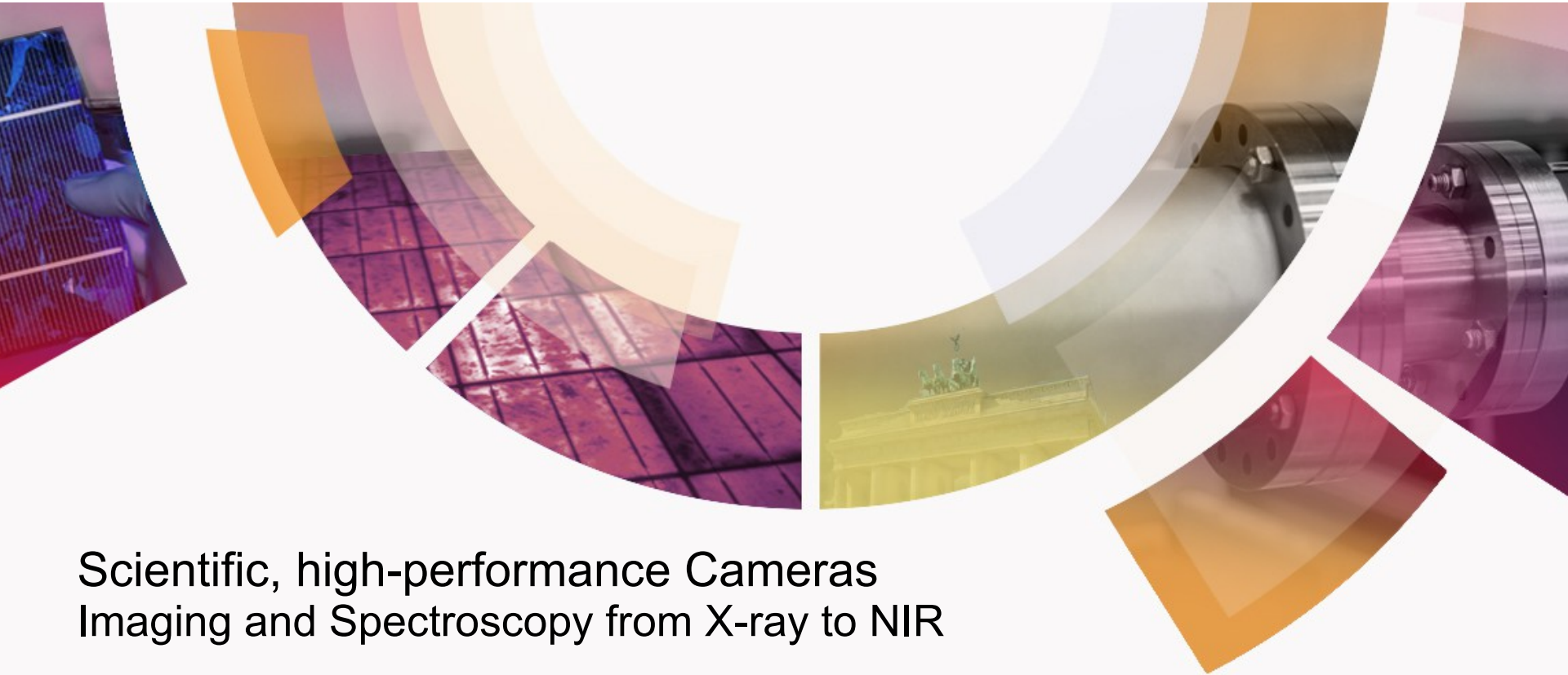


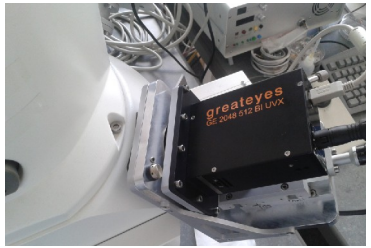
Scientific, high-performance Cameras
Imaging and Spectroscopy from X-ray to NIR

The Science and Business Park Berlin Adlershof

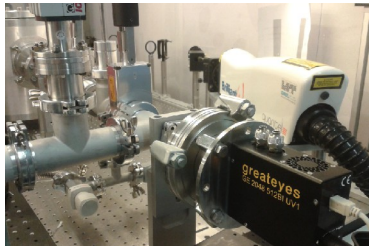
- Compact, cooled cameras for direct, low light level detection
- Spectral ranges: NIR, VIS, UV, VUV, XUV, Soft-X Ray, Hard X-Ray
- Lowest noise, high dynamic range, flexible operation, extensive software support
- Fast spectroscopy detectors, customized cameras

General specifications:

Sensor formats	1024 × 1024 pixels (13µm pixel size) 2048 × 512 pixels (13.5µm) 1024 × 256 pixels (26µm) 2048 × 2048 pixels (13.5µm) 4096 × 4096 pixels (15µm)
Spectral ranges	X-ray up to 20 keV, XUV,VUV, UV, VIS and NIR
Dynamic Range	16bit / 18bit
Readout Noise	min. 2.4e^-, typ. 4e^- @500kHz
Readout frequency	250kHz to 3 Mhz
I/O Signals	Sync and Shutter Out, Trigger In
Interface	USB / Gigabit-Ethernet
Cooling	Peltier cooling down to -70°C / -90°C
Software	greateyes Vision Software DLL for Windows and Linux Labview Drivers EPICS Driver



Industrial Analytics

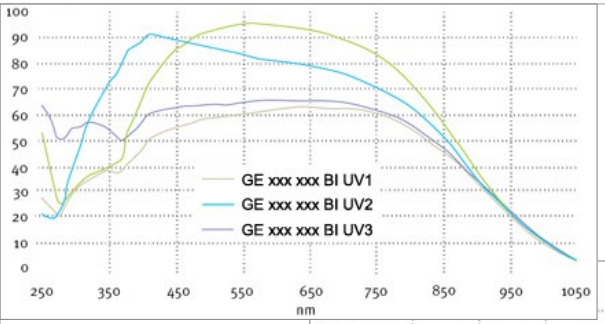


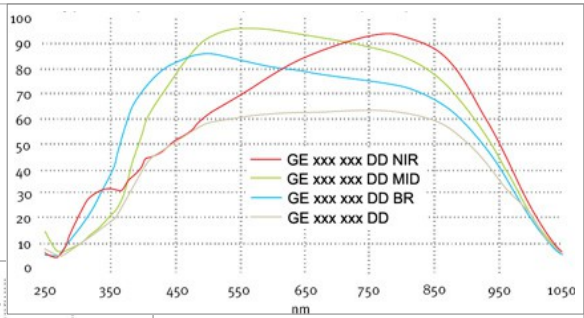
Fundamental research

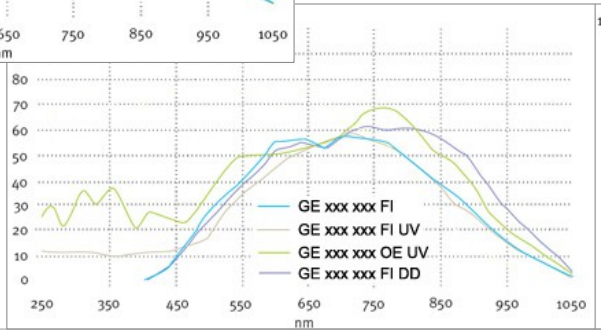
CCD detectors for NIR, VIS, UV

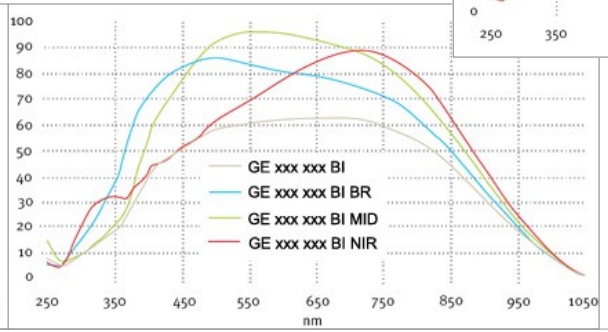
- Quantum efficiency up to 95%
- Full-well capacity up to 700000e$^-$
- 16 bit Dynamic range
- Single Capture, Video and Burst Mode
- Read noise min. 2.4e$^-$
- Flexible binning modes
- Compact design
- Various pixel formats

Quantum efficiencies
UV VIS NIR





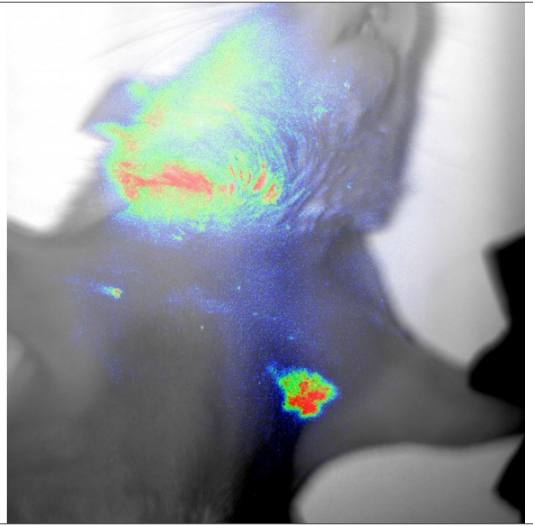




- Variety of sensor technologies: FI, BI, DD, OE UV, BI UV1, BI UV3
- Different coatings: UV, FI UV, BR, MID, NIR
- More then 20 different camera models available

Selected application:

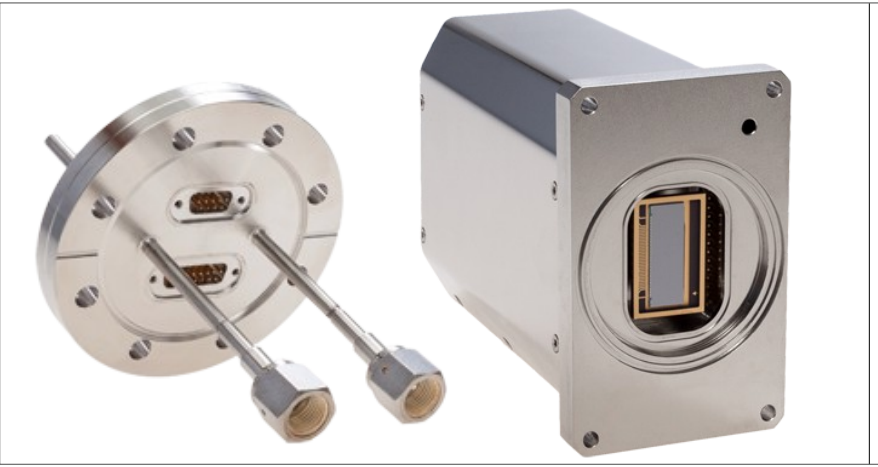
In vivo Imaging
of sentinel lymph node in living rats



- Detection of cancer cells in the lymph nodes of rats
  - Fluorescence labelled dye applied intravenously into rats
  - Emitted fluorescence detected with **GE 1024 1024 DD NIR** and with specific filter

Scientific cameras for VUV, EUV and X-ray imaging and spectroscopy

- Quantum efficiency up to 98%
- Flange choices: CF, ISO-F, KF
- Full-well capacity up to 700000e^-
- Read noise min. 2.4e^-
- Switchable gain
- Temperature of sensor and head
- Forced air and/or water cooling

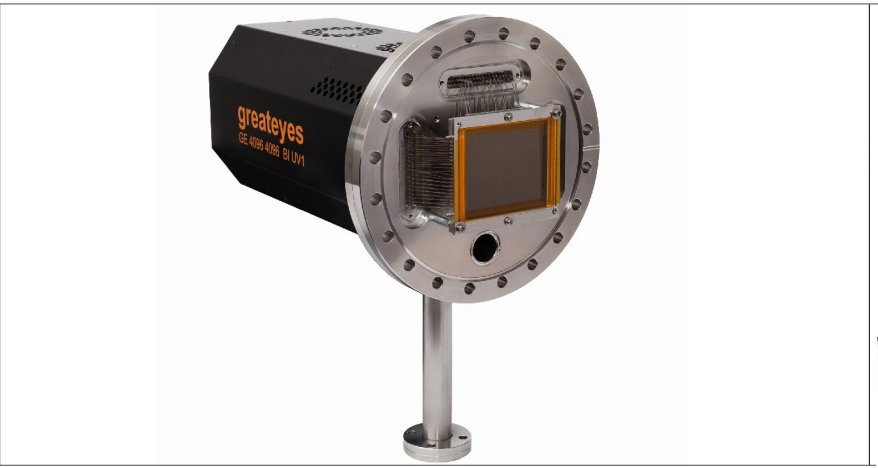


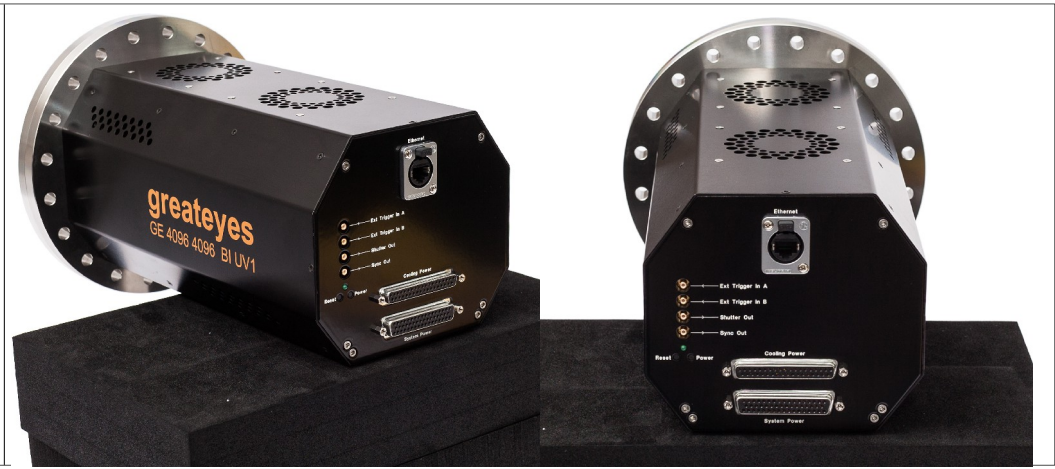
New In-Vacuum CCD cameras:

- Complete stainless steel or aluminium housing
- Vacuum compatibility: 10^{-3} to 10^{-8} mbar
- Combined electrical/cooling feedthroughs

CCD cameras with vacuum flange:

- Flange choices: CF, ISO-F, KF
- Forced air and/or water cooling
- Read noise min. $2.4e^-$

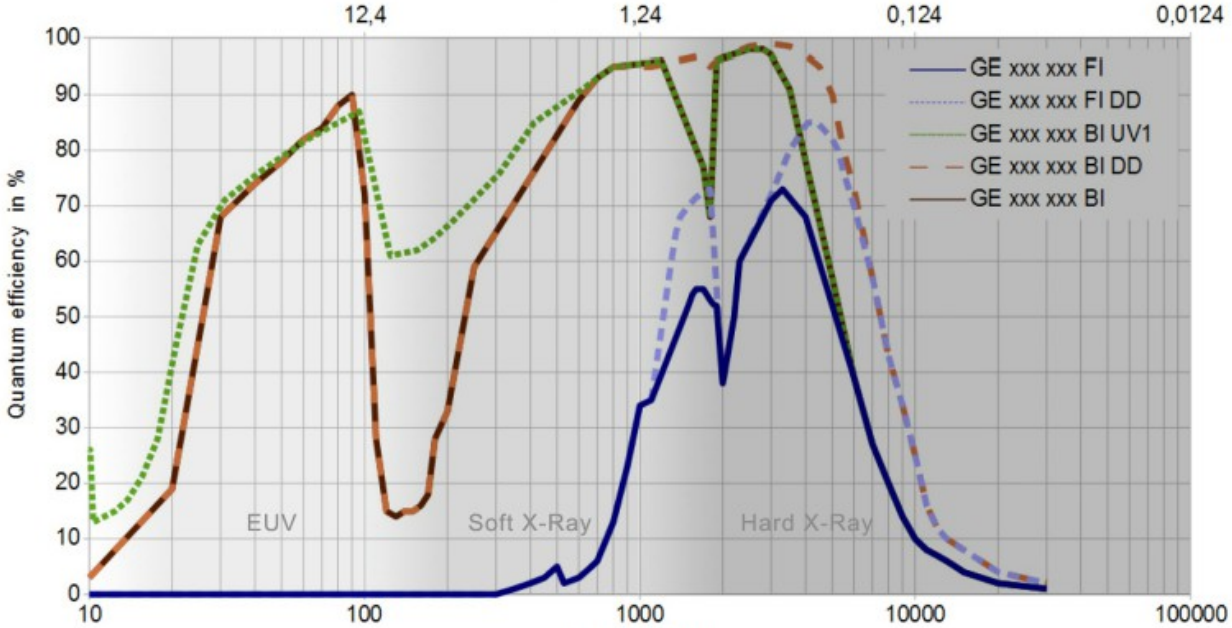




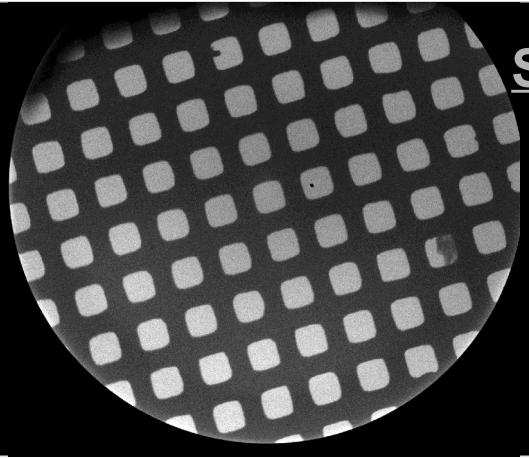
New Wafer Scale 16.8 Megapixel CCD:

- 4096 × 4112 active pixels
- Gigabit Ethernet interface with TCP/IP
- CF DN160 flange with additional port
- Deep cooling to min. -90°C
- Flexible 4-port readout & binning

Spectral sensitivities in the VUV, EUV and X-ray range

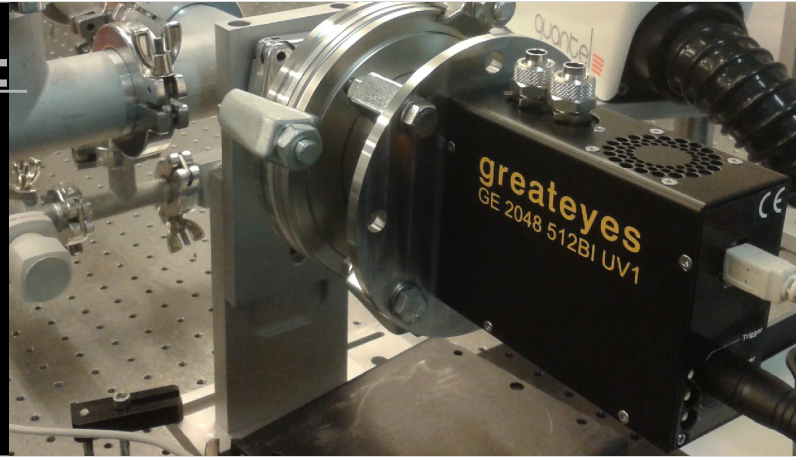


- Up to 98% quantum efficiencies (QE) in EUV and X-ray range up to 20keV
- Over 60% QE between 100eV – 250eV



Selected applications:

EUV & X-ray Imaging and Spectroscopy



EUV/Soft X-ray microscopy using a compact gas puff target Laser plasma source

- Image of the copper mesh shows 200nm wide imperfections
- EUV/Soft X-ray microscope with

  GE 2048 2048 BI

Thickness determination of ultra-thin foils in the EUV spectrum

- Laser induced plasma source
- Transmission measurement with

  GE 2048 512 BI UV1

Customized scientific cameras

- User specific distance and orientation between flange and image focal plane
- Various flange types: e.g. CF DN160 with integrated exhaust tube for UHV applications
- Hermetically sealed cameras with water cooling only
- Special window materials, such as beryllium, aluminium, MgF_2

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