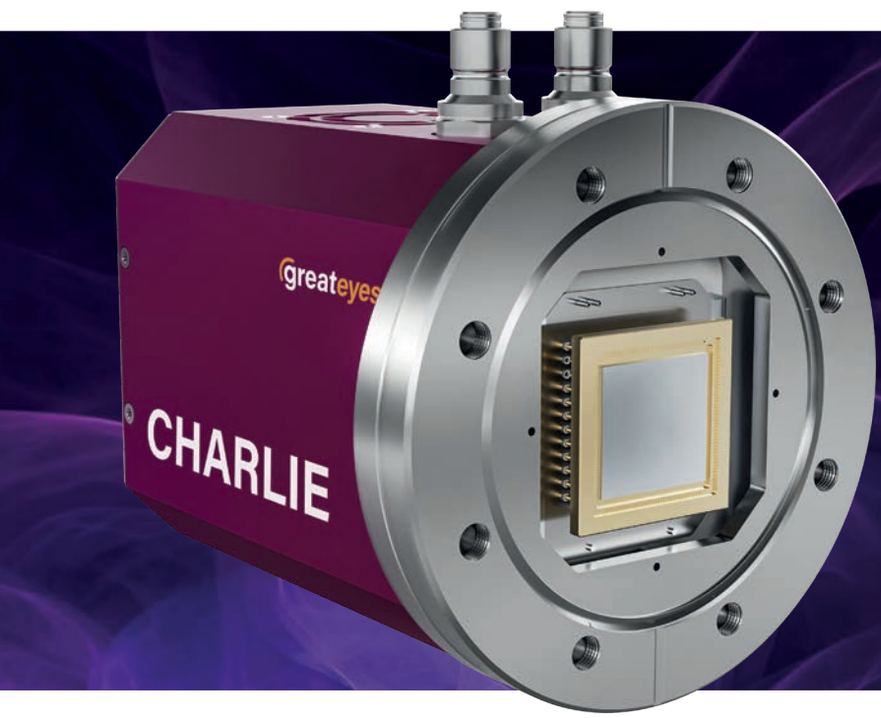
greateyes
EXPAND YOUR VISION

DEEP COOLED DIRECT
DETECTION sCMOS CAMERA



CHARLIE

KEY SPECIFICATIONS

Direct Detection
Ultra Deep Cooling
High Frame Rates
High Quantum Efficiency
Lowest Noise
Single Photon Sensitivity
Compact Design

State-of-the-art scientific camera with back-illuminated sCMOS sensor

VUV
EUV
SXR

Straight out of Berlin comes **CHARLIE**, greateyes' new back-illuminated sCMOS camera that combines cutting-edge technology with innovative functionality, to offer unprecendented opportunities for the measurements of tomorrow.

Built on our decades of experience in ultra high vacuum (UHV), **CHARLIE** is specially designed for a broad range of applications. Ultra low-noise electronics combined with market-leading deep cooling make **CHARLIE** the most sensitive X-ray/EUV/VUV sCMOS camera available.

The detector delivers peak quantum efficiency up to 99%. With direct detection, photon scattering in scintillators does not apply, therefore offering sharper resolution. Furthermore, **CHARLIE** features high full well capacity, high dynamic range, and 12-bit SDR and 16-bit HDR modes.

TYPICAL APPLICATIONS

X-ray Spectroscopy

EUV Lithography

High Harmonic Generation Dectection/Experiments

FEL High Rep Rate X-ray Imaging

Coherent Diffraction Imaging

SAXS

RIXS

NEXAFS Spectroscopy

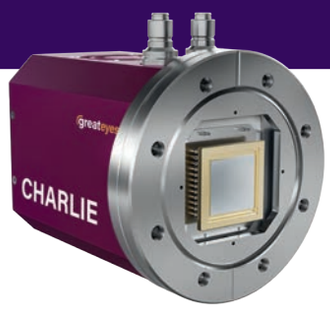
X-ray Ptychography

www.greateyes.de

PRECISOMETER
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CHARLIE





Crossing boundaries in X-ray and EUV imaging and spectroscopy

CHARLIE refers to Checkpoint Charlie, the most famous Berlin border crossing during the division of Germany.

FEATURES & BENEFITS

High QE up to 99%
with single photon sensitivity

Market-leading -50°C ultra deep cooling
with very low dark current for better detection limits and lowest noise

High frame rates
up to 48 fps (full frame)

10 GigE & USB 3.0 data interface
for local or remote network operation – your choice!

Compact design
with various flange options, including rotatable

Flexible software options
greateyes Vision software included; and various SDKs and drivers available

SPECIFICATIONS

Sensor type	Back-illuminated sCMOS
Readout modes	High gain, low gain, HDR mode
Linearity	Better than 99%
Flange types	Knife-edge sealed CF DN63, CF DN100, CF DN160, CF DN200; rotatable CF DN100, CF DN160; ISO-F DN63
Vacuum compatibility	10^{-9} mbar (UHV capability) with CF flange
Bakeout temperature	Max. +80°C
Flange - focal plane	5.0 mm for CF DN 63 / 7.3 mm for CF DN 100
Temperature monitoring	Two thermistors at sCMOS sensor and TEC (hot side)
Data interface	10 Gigabit Ethernet, USB 3.0
Software	greateyes Vision software for Windows 10 / 11
SDK and drivers	DLL for Windows; LabVIEW, EPICS, Linux, Python, Tango, µManger driver (optional)
TTL interface signals	Sync out, shutter out, 2 external trigger in
Operating conditions	Temperature: 0°C to 35°C ambient, relative humidity <80% (non-condensing)
Power supply	80-264 VAC (115/230 typical), 47-63 Hz (50/60), max. 1.1 A (230 VAC), 1.9 A (115 VAC)
Certification	CE
Dimensions (W x H x L)	Camera body without flange: 8.3 cm x 11.8 cm x 12.4 cm (3.27" x 4.65" x 4.88")
Weight	3.1 kg

Included with your camera

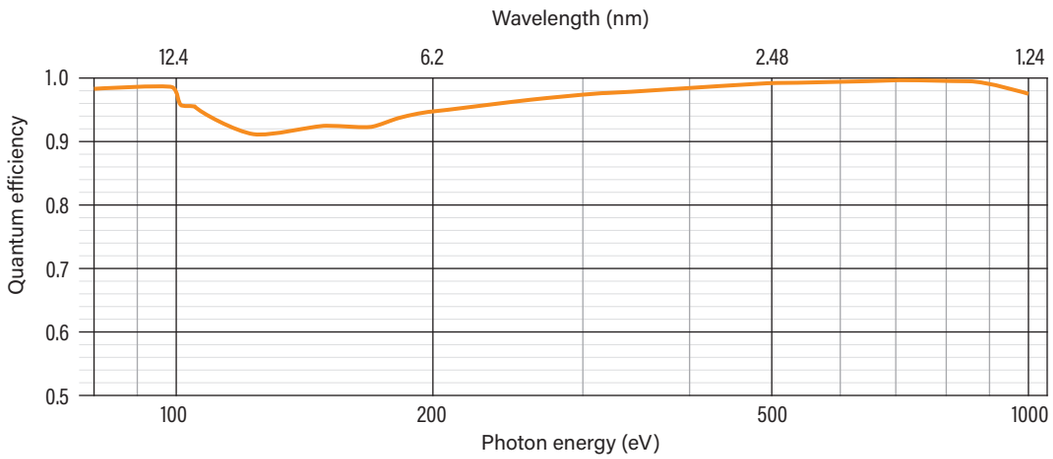
GE-VI01	greateyes Vision software suite for Windows
GE-SDK01	SDK for Windows (C/C++ based)
GE-USB3m3	3 m USB 3.0 cable type A to type C
GE-GigE10m	10 m Ethernet cable
GE-StoB2m	2 m SMB to BNC connection cable x2
GE-POW01	Camera power supply with cabling
GE-ManCam	Camera instruction manual

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DEEP COOLED DIRECT DETECTION sCMOS CAMERA



STEP 1: Camera model

CAMERA MODEL	CHARLIE 2k2k 11
Sensor code	**GSENSE400BSI**
Usable pixels (columns x rows)	2048 x 2048
Active image area	22.5 mm x 22.5 mm
Pixel size	11 µm x 11 µm
AD converter resolution	12-bit (SDR mode) 16-bit (HDR mode)
Frame rate	24 fps (HDR) 48 fps (SDR)
Sensor cooling	down to -50°C
Full well capacity	91 ke$^-$ typ. (HDR mode)
Typical read noise (e$^-$)	1.6 e- (median; HDR mode)
Dark Current @ -50°C	0.2 e$^-$/pixels/s
Low gain mode **High gain mode**	0.04 counts/e$^-$ 1.94 counts/e$^-$
Shutter type	Rolling shutter Global reset (TBD)

STEP 2: Select interface vacuum flange

Order Code	Description
CF1	Knife-edge sealed CF DN63 flange with threaded holes
CF2	Knife-edge sealed CF DN100 flange with through holes
CF4	Rotatable, knife-edge sealed CF DN100 flange with through holes
We also provide quick release, rotatable, and other flanges of various sizes - please let us know your requirements	

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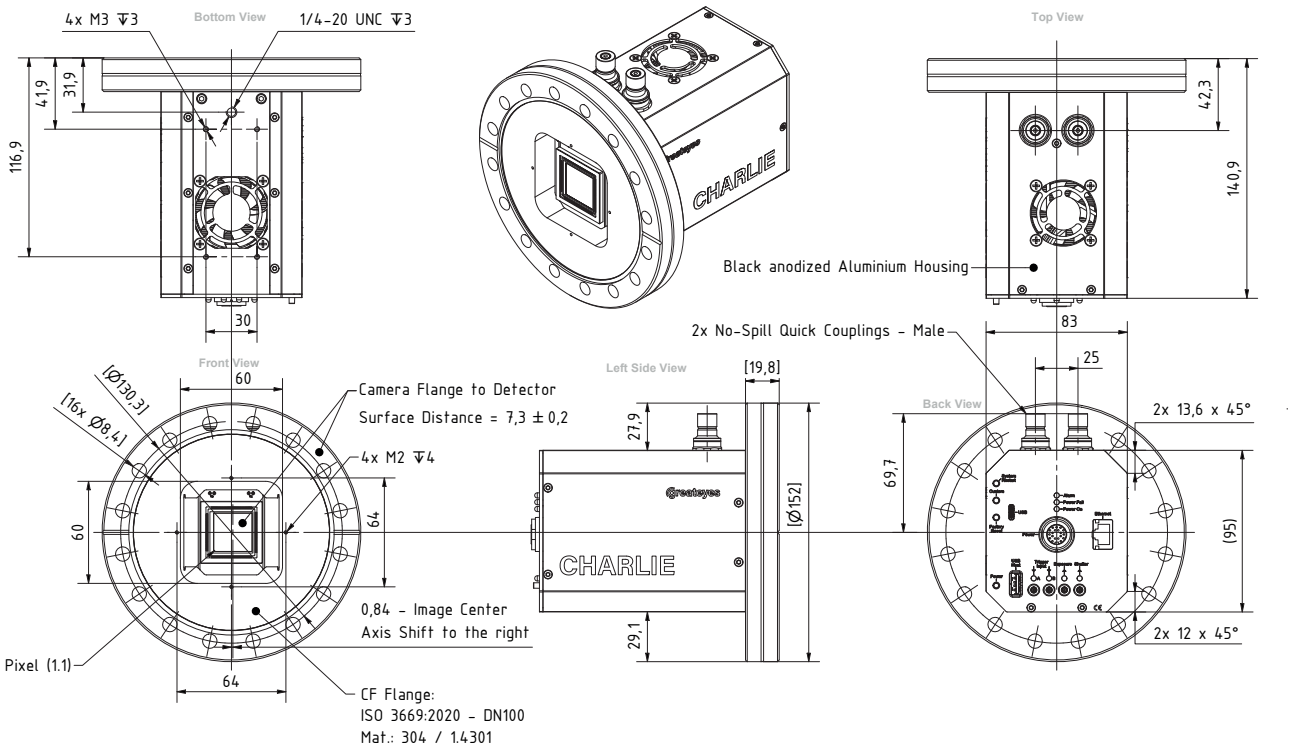
CHARLIE

USB 3.0 Gigabit Ethernet spec EPICS Linux python powered

STEP 3: Choose your accessories and software

Order Code	Description
Accessories for Imaging Purposes	
GE-AE01	Additional CF DN63 flange with a window of Beryllium, MgF_2, UVFS or other materials, can be sealed with the camera flange, with a port for external vacuum pump, enables CHARLIE to be used in air independently
Accessories for Enhanced Cooling Performance	
GE-CR01	Compact liquid cooling, circulating the coolant at room temperature for deep camera cooling
GE-CR02	Recirculating water chiller, PID control with temp. from -5°C to 30°C for ultra-deep camera cooling
Software Development Kit (SDK) and Drivers	
GE-LX01	SDK for Linux (C/C++ based)
GE-PYT01	Python driver
GE-LAB01	LabVIEW driver
GE-EP	EPICS driver
GE-TAN	Tango driver

TECHNICAL DRAWINGS



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DS-CHARLIE / Rev03 / Jan2026

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Explore products & discuss your experiment