

Dhyana XF95

# Soft X-ray BSI sCMOS Camera

**~100%** Peak QE

80-1000eV

**22.5mm x 22.5mm**

Imaging Area

**48fps @4MP**

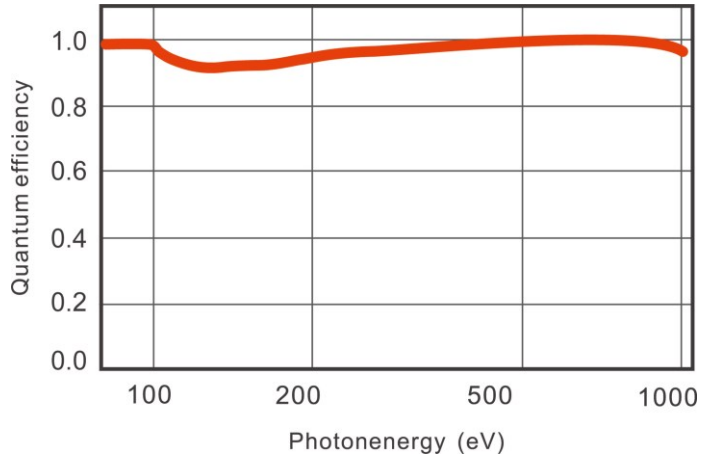
High Frame Rate

Max. **10<sup>-7</sup>Pa**

Vacuum Compatibility

**-50°C**

Deep cooling



## Application

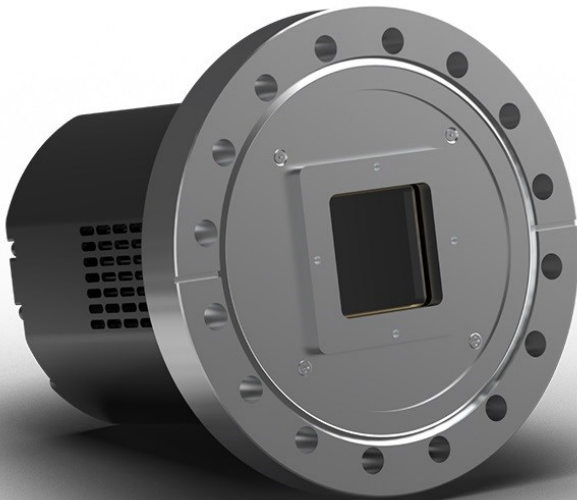
Soft X-ray Scattering

Soft X-ray Spectroscopy

Extreme Ultraviolet Spectroscopy

Stacked Diffraction Imaging

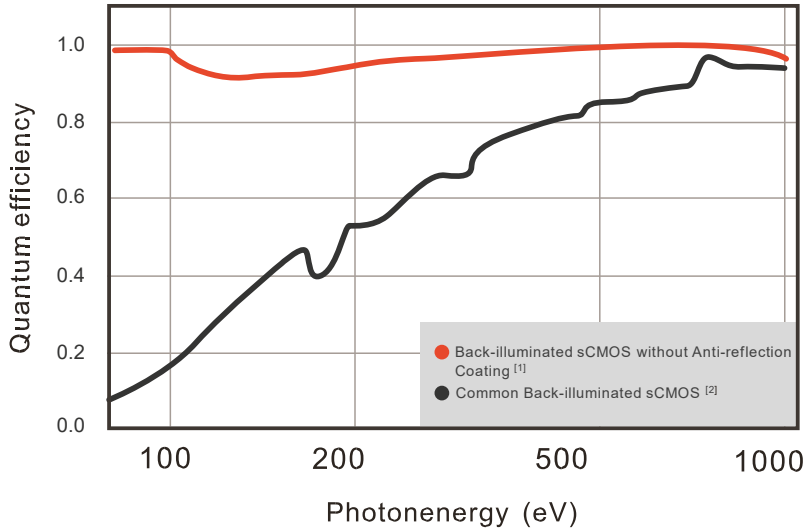
Higher Harmonic Radiation, etc.



Dhyana XF95 (abbreviation: XF95) is a new generation of soft X-ray back-illuminated sCMOS cameras. Line application features have carried out new performance upgrades and technical transformations:

1. Using a new generation of back-illuminated sCMOS chips without anti-reflection coating, the quantum efficiency has been greatly improved in the corresponding 80eV-1000eV photon energy range, which has exceeded 90% as a whole, and some wavelengths have reached nearly 100% ultra-high level, with more professional soft X-ray, extreme ultraviolet imaging performance, and radiation damage resistance. [1]
2. Using the new vacuum refrigeration structure, it can be compatible with  $10^{-7}$ Pa vacuum chamber environment applications, the refrigeration depth can be lower than the ambient temperature by 70 °C, and the deep refrigeration level can be up to -50 °C. Low camera noise floor and thermal noise, improving the camera's long exposure working time.

### Quantum Efficiency



### Applications

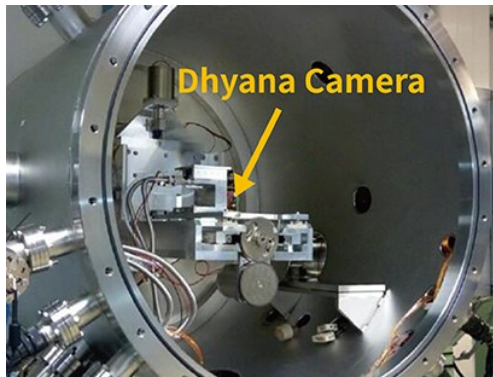


Fig1 French SOLEIL synchrotron beamline chamber [2]

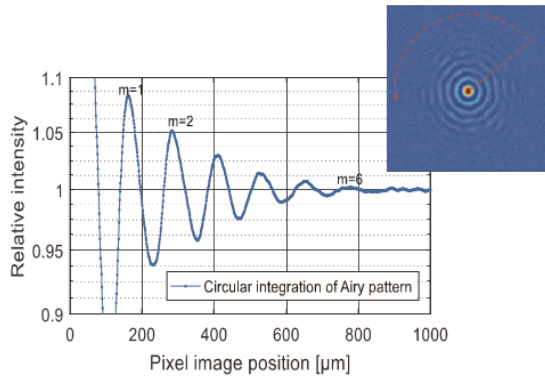


Fig2 Dhyana camera 186 eV beam diffraction pattern [2]

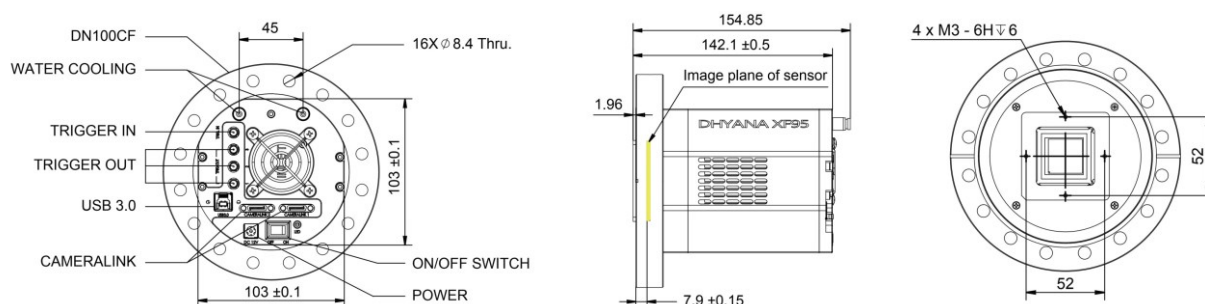
Application comment: "Back-illuminated sCMOS technology can be adapted to specific applications at a more attractive cost, and show overall exhibits a good dynamic range, which can significantly reduce the acquisition for imaging applications compared to commonly used classical back-illuminated CCD cameras time." [3] — Journal of Synchrotron Radiation, 2020.

## Specification

Model	Dhyana XF95
Sensor Model	Back-illuminated sCMOS without anti-reflection coating
Area Array Size	2 inches (22.5 mm x 22.5mm)
Pixel Size	11 $\mu$ m x 11 $\mu$ m
Resolution	2048 x 2048
Spectral Range	80-1000eV; 200 nm -1000 nm
Peak QE*	~100%@ 80-1000eV
Readout Noise	1.6e- (Median)
Full-well Capacity	90ke-
Frame Rate	48fps@4MP
Vacuum Compatibility*	10 <sup>-7</sup> Pa (Max.)
Cooling Temperature	-50°C@20°C room temperature
Data Interface	CameraLink & USB3.0
Flange Interface	Standard DN100CF

\*Remark: 1. The QE value comes from the factory report of the chip. For performance evaluation, please refer to the professional paper. 2. The vacuum tightness data comes from a third-party professional evaluation agency. 3. The evaluation of other photoelectric parameters of the camera strictly implements the EMVA1288 test standard.

## Product Structure



[1] Harada, Tetsuo , et al. "High-exposure-durability, high-quantum-efficiency (>90%) backside-illuminated soft-X-ray CMOS sensor." Applied Physics Express 13.1(2020):016502 (4pp).

[2] Desjardins, K. , et al. "Characterization of a back-illuminated CMOS camera for soft x-ray coherent scattering." PROCEEDINGS OF THE 13TH INTERNATIONAL CONFERENCE ON SYNCHROTRON RADIATION INSTRUMENTATION – SRI2018 2019.

[3] Backside-illuminated scientific CMOS detector for soft X-ray resonant scattering and ptychography[J]. Journal of Synchrotron Radiation, 2020.