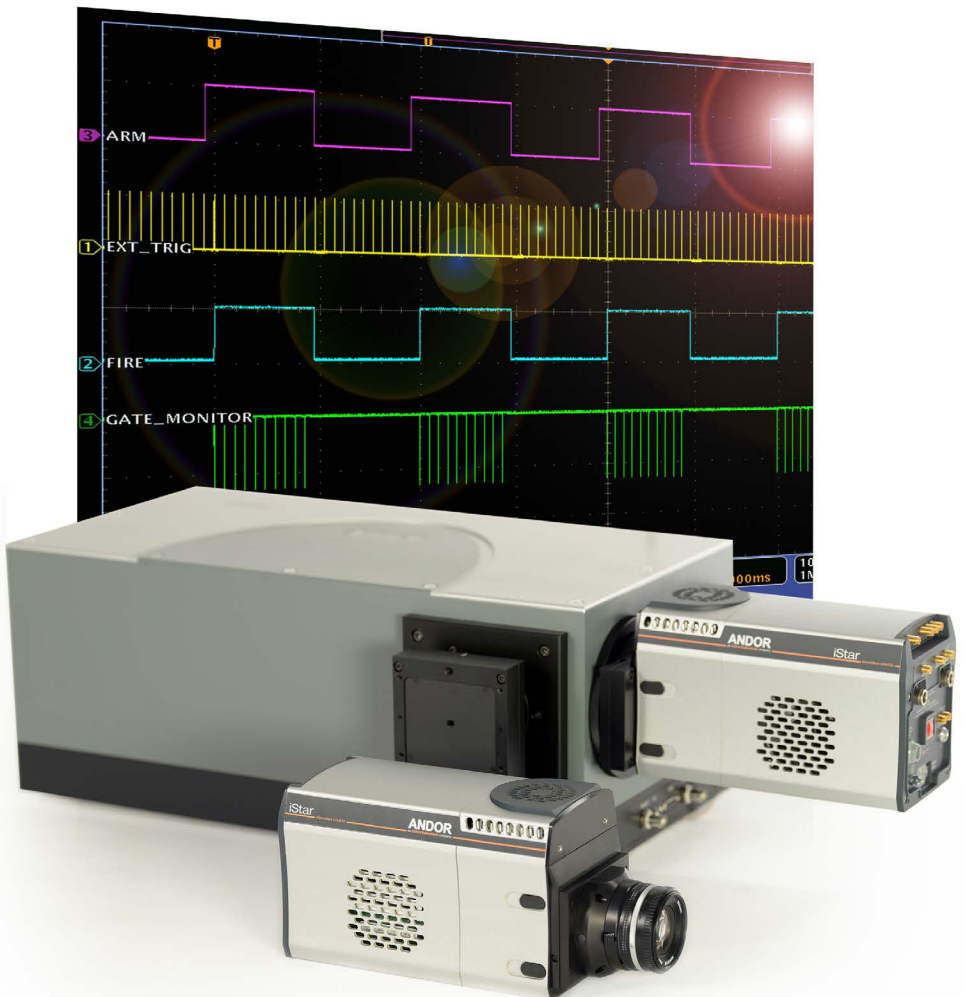


iStar CCD and sCMOS

ns time-resolved imaging and spectroscopy



The iStar family at a glance...

Andor's iStar extracts the very best from CCD and scientific CMOS (sCMOS) sensor and image intensifier technologies, achieving a superior combination of rapid acquisitions rates, high sensitivity and fast, accurate gating performance.

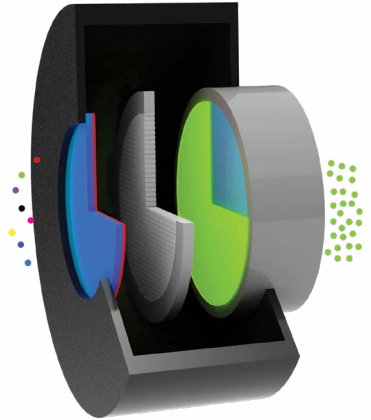


Image intensifier: nanosecond time resolution and single photon sensitivity.

High time-resolution and timing accuracy



- Optical gating < 2 ns - billionth of a second time-resolution for accurate transient phenomena study.
- Low jitter, on-board Digital Delay Generator - highest gating timing accuracy with lowest propagation delay. 3 software controlled triggering outputs with 10 ps setup accuracy for complex experiment integration.

Superb sensitivity and dynamic range



- High QE Gen 2 and Gen 3 image intensifiers - superior photon capture, with peak QE up to 50% and spectral coverage from 120 to 1,100 nm.
- Ultra-low noise floor
 - slow-scan CCD options down to $5 e^-$ read noise or ultrafast sCMOS down to $2.6 e^-$.
 - deep TE-cooling efficiently minimizes dark current contribution.
 - EBI minimization interface for enhanced photon counting capabilities.
- Fiber-coupling design - superior collection efficiency over lens-coupled designs.
- 500 kHz sustained photocathode gating - maximizes signal-to-noise ratio in high repetition-rate pulse laser-based applications.
- 3.3 MHz dual pulse burst mode for time-resolved PIV.

Ease-of-integration



- Plug-and-play USB connectivity.
- Comprehensive SDK for LabVIEW, MATLAB or C/C++ - ideal for complex lab or OEM setup integration.
- Integrated into third party software e.g. EPICs and Micro-Manager.

Lightning speed



- Continuous spectral and imaging rates up to 4,000 spectra/sec (sCMOS).
- Burst modes greater than 55,000 acquisitions/sec (CCD).

iStar spectroscopy solutions

Models	320 CCD	334 CCD	340 CCD	iStar sCMOS
Pixel matrix	1024 x 256	1024 x 1024	2048 x 512	2560 x 2160
Pixel size	26 μm	13 μm	13.5 μm	6.5 μm
Max spectral rate (FVB)	323 sps	145 sps	135 sps	N/A
Max spectral rate (ROI)	3,571 sps	3,450 sps	1,825 sps	4,004 sps
Pixel well depth	500,000 e^-	100,000 e^-	100,000 e^-	30,000 e^-
Lowest read noise	7 e^-	5 e^-	6 e^-	2.6 e^-
Min. dark current	0.2 $e^-/\text{pix/s}$	0.1 $e^-/\text{pix/s}$	0.1 e^-/pix	0.18 e^-/pix
Time-resolution	< 2 ns (Gen 2 and Gen 3 ultrafast models)			

High spectral resolution		✓	✓	✓
Fast spectral rates	✓	✓		✓
Simultaneous broadband Spectroscopy	✓		✓	
High dynamic range	✓			



Research-grade spectrographs

Shamrock Series

Highly modular motorized platforms with dual output ports, dual/triple grating turrets and a wide range of motorized and field-upgradable accessories.

Shamrock 750
Highest resolution modular spectrograph

Shamrock 500i
High resolution modular spectrograph

Shamrock 163
Compact manual benchtop spectrograph

Shamrock 193i
Intelligent, modular and compact imaging spectrograph

Kymera 328i
High resolution, high throughput, high modularity

Resolution Calculator
andor.com/calculators

Mechelle 5000 Echelle spectrograph

- Simultaneous broadband acquisition from 200 - 975 nm with resolution power up to 5,000 and extremely low crosstalk.
- Ideal solution for broadband LIBS acquisitions.
- Compatible with iStar 334 CCD and iStar sCMOS models.



Example of Echellogramme taken with a broadband Deuterium-Tungsten lam

iStar imaging solutions

Models	312 CCD	334 CCD	iStar sCMOS
Pixel matrix	512 x 512	1024 x 1024	2560 x 2160
Pixel size	24 μm	13 μm	6.5 μm
Max frame rate (full frame)	12.8 fps	4.2 fps	40 fps
Max frame rate (ROI)	1,031 fps	333 fps	4,004 fps
Pixel well depth	320,000 e-	100,000 e-	30,000 e-
Lowest read noise	5.4 e-	5 e-	2.9 e-
Min. dark current	0.25 e-/pix/s	0.1 e-/pix/s	0.18 e-/pix/s
Time-resolution	< 2 ns (Gen 2 and Gen 3 ultrafast models)		

High spectral resolution		✓	✓
Fast imaging rates and multi-track			✓
High dynamic range	✓		✓ with 2 x 2 pixel binning

Download the full specification sheet at andor.com/istar



iStar sCMOS - Superfast nanosecond gated detector

NEW

The iStar sCMOS offers a unique combination of superfast frame rate capabilities > 40 fps, < 2 ns nanosecond gating, high dynamic range on a single, fully integrated platform with a high resolution and high accuracy Digital Delay Generator.

It is the platform of choice for fast plasma imaging, combustion studies based on Planar Laser-Induced Fluorescence (PLIF) or nanosecond time-resolved multi-track spectroscopy experiments.

5.5 megapixel sCMOS

40 fps full frame, up to 4,000 fps with ROI

Down to 2.4 e⁻ read noise

Photocathode QE up to 50%

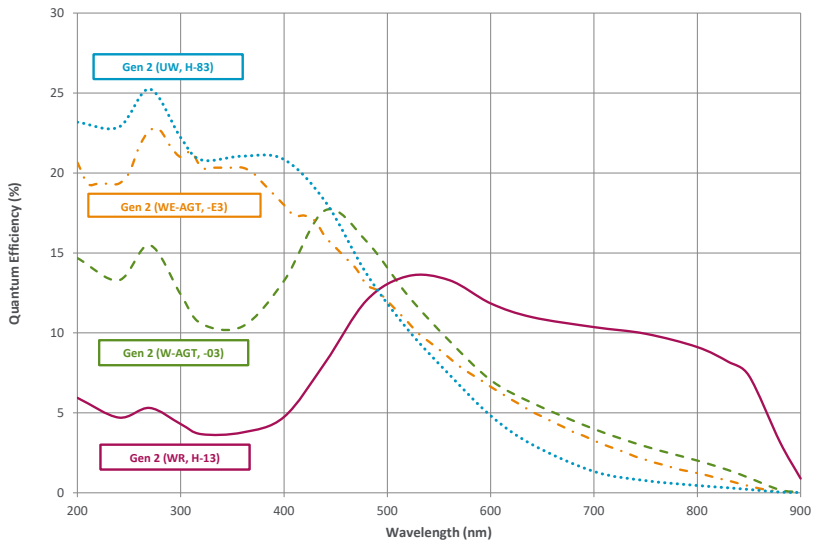
Gating speed < 2 ns

USB 3.0 interface

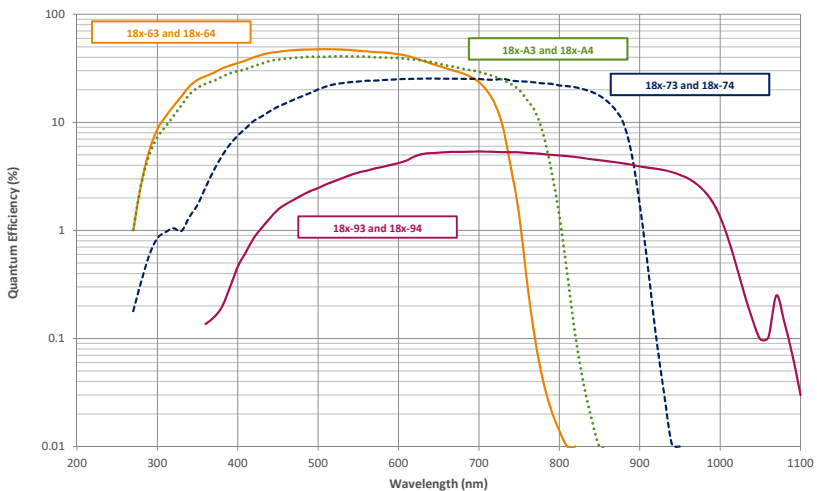


Photocathode quantum efficiency

Gen 2 Photocathodes - Broadband VUV-UV-VIS-NIR

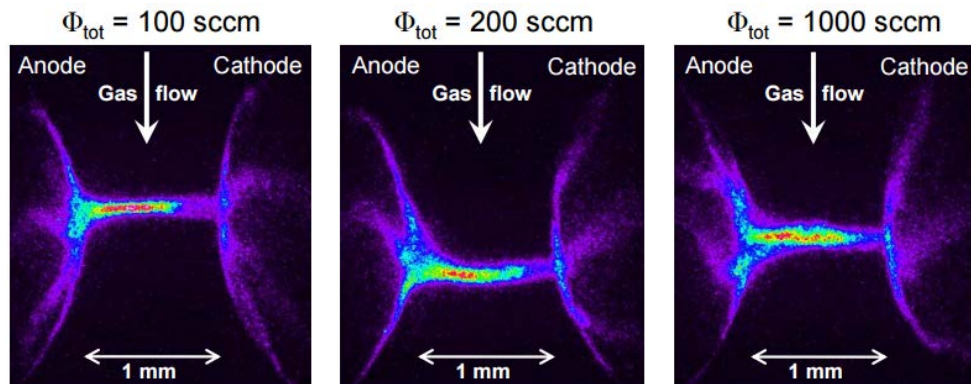


Gen 3 Photocathodes - High QE VIS-NIR



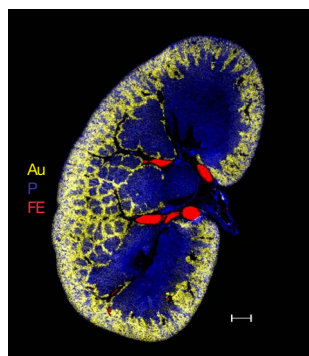
A wide range of applications

Plasma Physics



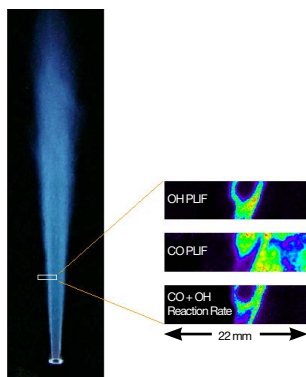
Gas-flow-rate influence on pulsed dielectric barrier discharges stability, courtesy of Dr. H. Höft at INP Greifswald, Reproduced from 'Impact of gas flow rate on breakdown of filamentary dielectric barrier discharges', Physics of Plasmas 23 033504 (2016), DOI: 10.1063/1.4943278 with the permission of AIP Publishing

LIBS



Elemental images obtained by LIBS showing the nanoparticle distribution of iron, phosphorous and gold in a murine kidney, courtesy of Motto-Ros Vincent, ILM / UCBL.

Combustion



CO- and OH- Planar Laser Induced Fluorescence (PLIF).

Other key applications

- Quantum physics
- Time-resolved Fluorescence (LIF/PLIF)
- Non-linear optics
- Transient Absorption
- Photon Counting
- Time-resolved Resonance Raman (TR3)
- Standoff Chemical Detection
- Time-resolved PIV
- Thomson Scattering
- Laser Ablation
- Multi-track Spectroscopy



Discover more in the Learning Center at andor.com/learning

Customer Support

Andor products are regularly used in critical applications and we can provide a variety of customer support services to maximize the return on your investment and ensure that your product continues to operate at its optimum performance.

Andor has customer support teams located across North America, Asia and Europe, allowing us to provide local technical assistance and advice. Requests for support can be made at any time by contacting our technical support team at andor.com/support.

Andor offers a variety of support under the following format:

- On-site product specialists can assist you with the installation and commissioning of your chosen product
- Training services can be provided on-site or remotely via the Internet
- A testing service to confirm the integrity and optimize the performance of existing equipment in the field is also available on request.

A range of extended warranty packages are available for Andor products giving you the flexibility to choose one appropriate for your needs. These warranties allow you to obtain additional levels of service and include both on-site and remote support options, and may be purchased on a multi-year basis allowing users to fix their support costs over the operating life cycle of the products.

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