Sapphire™ Biomolecular Imager

THE NEXT GENERATION OF LASER-BASED IMAGING

azure biosystems

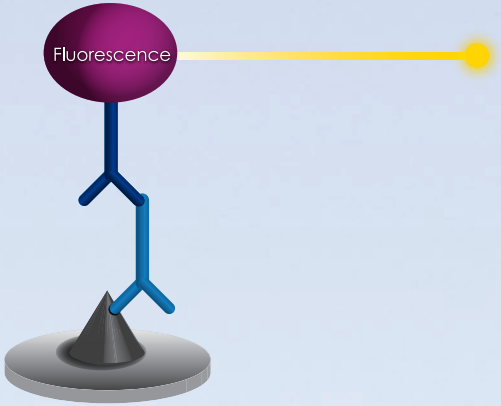
Breakthrough image capture and analysis

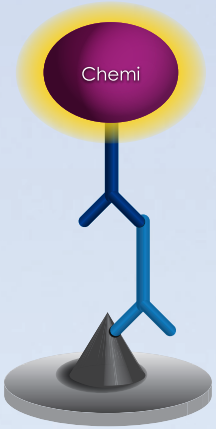
The Sapphire Biomolecular Imager is a next generation laser scanning system that provides you with exceptional data quality through extremely sensitive detection, ultra high resolution and broad linear dynamic range.

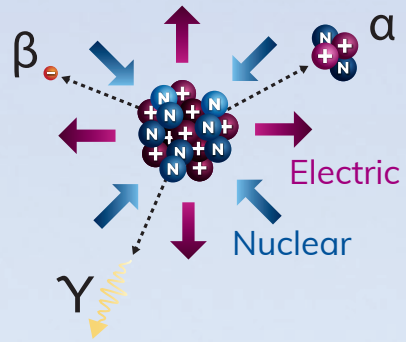
This system supports long and short wavelengths of near infrared fluorescence (NIR), red/green/blue (RGB) imaging, chemiluminescent imaging, phosphor imaging as well as optical densitometry (OD) of proteins in stained gels.*

- Improved multiplex fluorescent detection
- Chemiluminescence imaging, surpassing film
- Higher sensitivity for lower limits of detection (femtograms)
- Broad linear dynamic range for accurate quantitation
- Ease of use with intuitive control software

* Patent pending



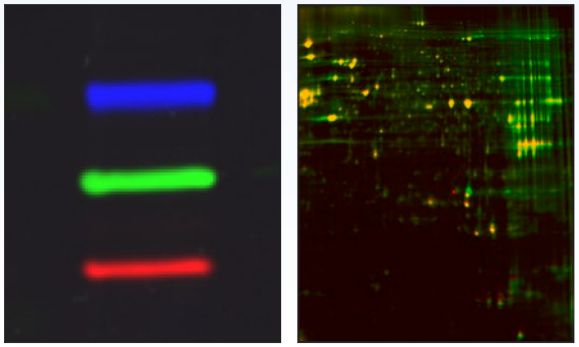




FLUORESCENCE IMAGING

Improve Your Quantitation

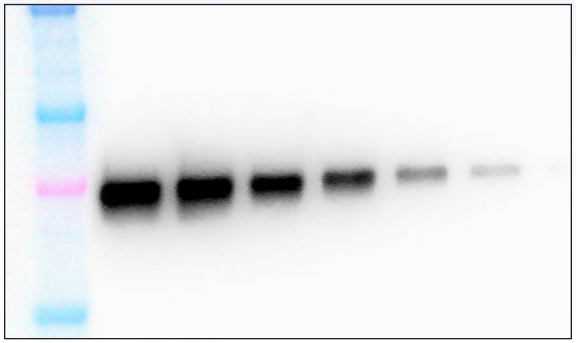
- Stable fluorescent signals enable reliable quantitation of weak and strong bands
- Probe for multiple proteins on a single blot, and get more results from each sample



CHEMILUMINESCENCE IMAGING

Enhance your Detection

- Femtogram detection of protein
- The speed and sensitivity of traditional film with 4X the dynamic range



PHOSPHOR IMAGING

Improve Your Flexibility

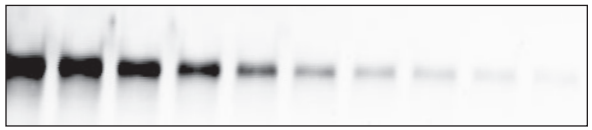
- Scan storage phosphor screens for filmless autoradiography
- Wide dynamic range for sensitive detection

FLUORESCENCE

Fluorescent probes are much more stable than traditional chemiluminescent methods since they do not rely on enzyme activity and substrate breakdown. This makes them ideal for quantitative analysis delivering consistent signal even months after the initial analysis.

Choose from multiple fluorescent dyes for sensitive results. Supporting a wide range of visible and NIR dyes, the Sapphire Biomolecular Imager enables low limits of detection.

371 pg 0.72 pg

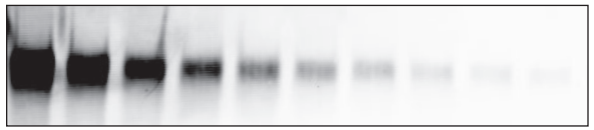


Sample	AzureSpectra 490 labeled purified BSA
Imaging	488
LOD	0.72 pg
DR	6.3
Linearity	R^2=0.99

1484 pg 2.9 pg

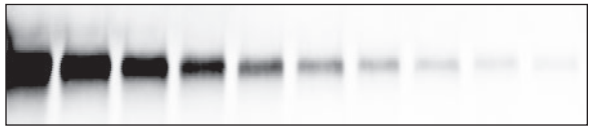
Sample	AzureSpectra 550 labeled purified transferrin
Imaging	520
LOD	2.9 pg
DR	5.7
Linearity	R^2=0.992

1484 pg 2.9 pg



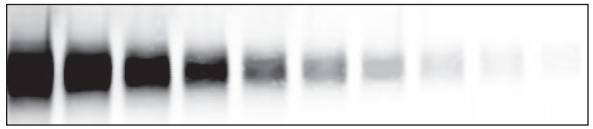
Sample	AzureSpectra 650 labeled purified transferrin
Imaging	658
LOD	2.9 pg
DR	5.7
Linearity	R^2=0.993

742 pg 1.45 pg



Sample	AzureSpectra 700 labeled purified transferrin
Imaging	658
LOD	1.45 pg
DR	6.0
Linearity	R^2=0.999

1484 pg 2.9 pg

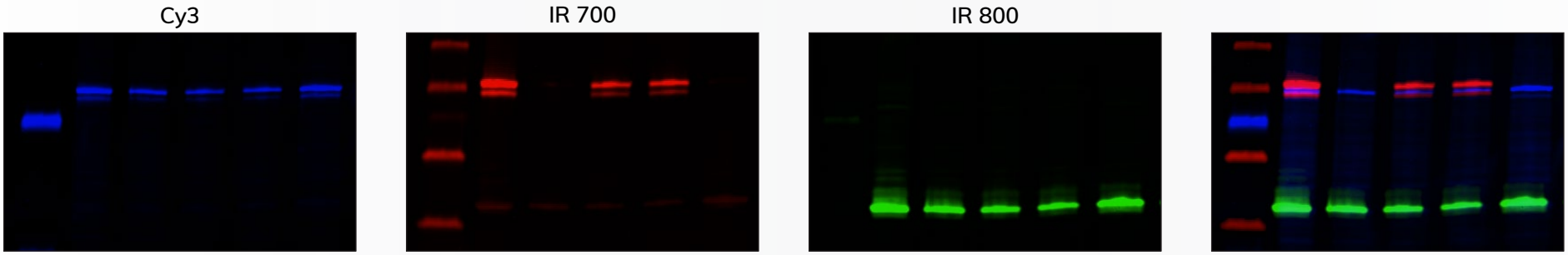


Sample	AzureSpectra 800 labeled purified transferrin
Imaging	784
LOD	2.9 pg
DR	5.7
Linearity	R^2=0.99

FLUORESCENCE: APPLICATIONS

Quantitative Western Blots

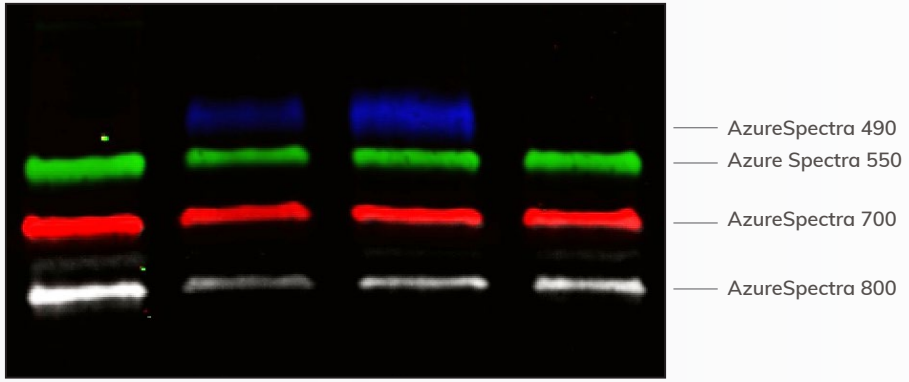
Fluorescent Westerns enable quantification of post-translation modifications without stripping and reprobing. Spectrally separate the channels to resolve protein changes, and use a loading control to normalize for lane to lane loading variation.



Multiplex fluorescent detection of STAT1 (Cy3), Phospho-STAT1 (IR700), and GAPDH (IR800) in HeLa lysates. Composite image shows simultaneous detection of three proteins.

See multiple proteins on the same blot

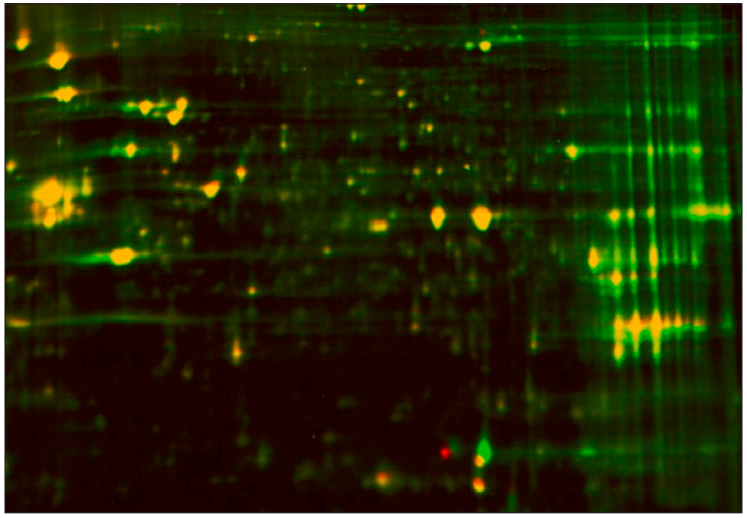
With multiplex fluorescence, you can detect up to 4 targets simultaneously, with a high degree of sensitivity in each channel. Reduce errors from blot to blot variations by probing for multiple targets on the same blot, without stripping and reprobing. With the Sapphire Biomolecular Imager, up to 4 different fluorescent probes can be used and imaged at once.



FLUORESCENCE: APPLICATIONS

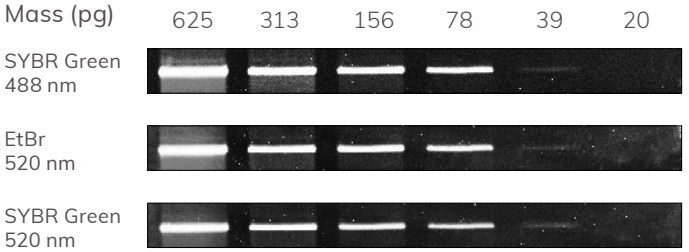
High Resolution Gel Imaging

2D Electrophoresis and 2D-DIGE are used to accurately quantitate subtle changes in protein expression. High sensitivity, broad dynamic range, and resolution down to 10 microns make the Sapphire Biomolecular Imager suited for 2D electrophoresis applications, enabling you to detect changes in complex samples.

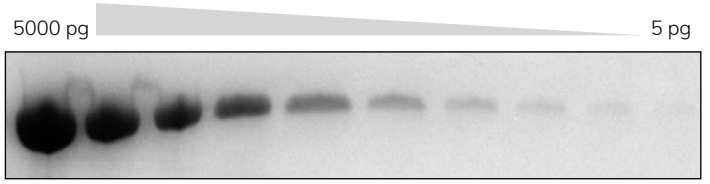


Untreated HeLa lysate was labeled with Cy3. Treated HeLa lysate was labeled with Cy5. Samples were simultaneously separated using IEF in the first dimension and SDS-PAGE in the second dimension.

Laser-based imaging delivers sharp and crisp DNA and protein gel images. Common DNA dyes such as EtBr and SYBR Green allow you to detect your DNA size or concentration. Visible protein stains, such as Coomassie Blue, and fluorescent protein stains, like Sypro Ruby, are also compatible with the Sapphire Biomolecular Imager.



Representative gels showing 3kb of DNA ladder.

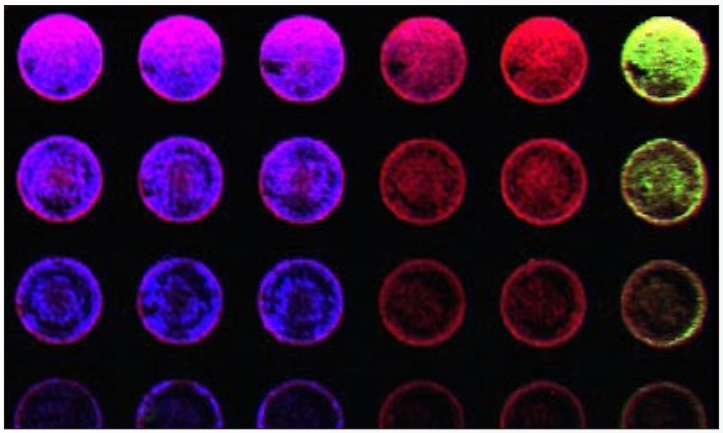


Purified transferrin was serially diluted 1:1 from 5000 pg to 5 pg and separated using SDS-PAGE in a 4-15% Tris-Glycine gel. After separation, the gel was stained using Coomassie Blue and imaged using the 658 laser of the Sapphire Biomolecular Imager.

FLUORESCENCE: APPLICATIONS

Cell–Based Assays in Microplates

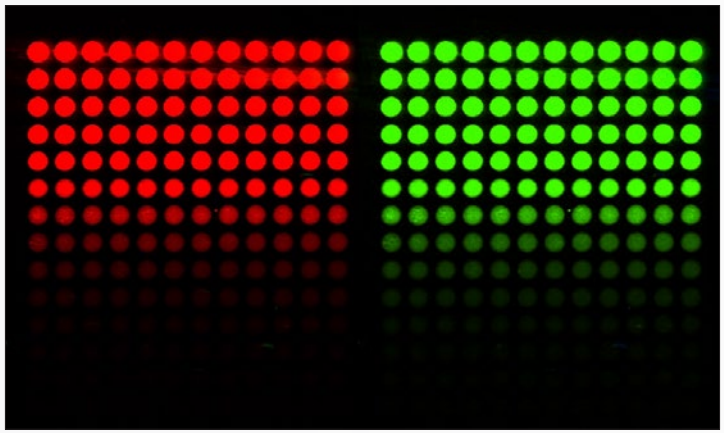
Detect proteins in fixed cultured cells using target-specific primary antibodies and fluorescently conjugated secondary antibodies. Quickly and accurately measure relative protein expression in multiple samples, targeting several proteins with spectrally distinct dyes.



HeLa cells were serially diluted and seeded into a 96-well plate, cultured, fixed and permeabilized, then probed for Tubulin with AzureSpectra 550 (520 channel, green), beta-Actin with AzureSpectra 800 (784 channel, blue) and RedDot™1 Nuclear Stain as a normalization control (658 channel, red).

Slide–Based Imaging

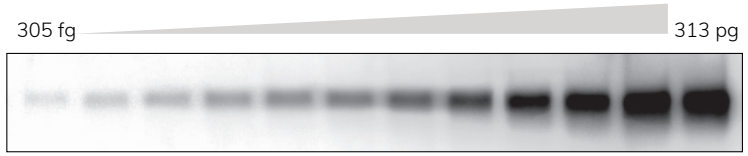
High resolution imaging, down to 10 microns, enables visualization of small features. Image fluorescent DNA and protein arrays, or tissue slides on the Sapphire Biomolecular Imager.



Full Moon BioSystems Scanner Calibration Slide scanned at 10 µm resolution using the 520 nm and 658 nm channels of the Sapphire Biomolecular Imager.

CHEMILUMINESCENCE

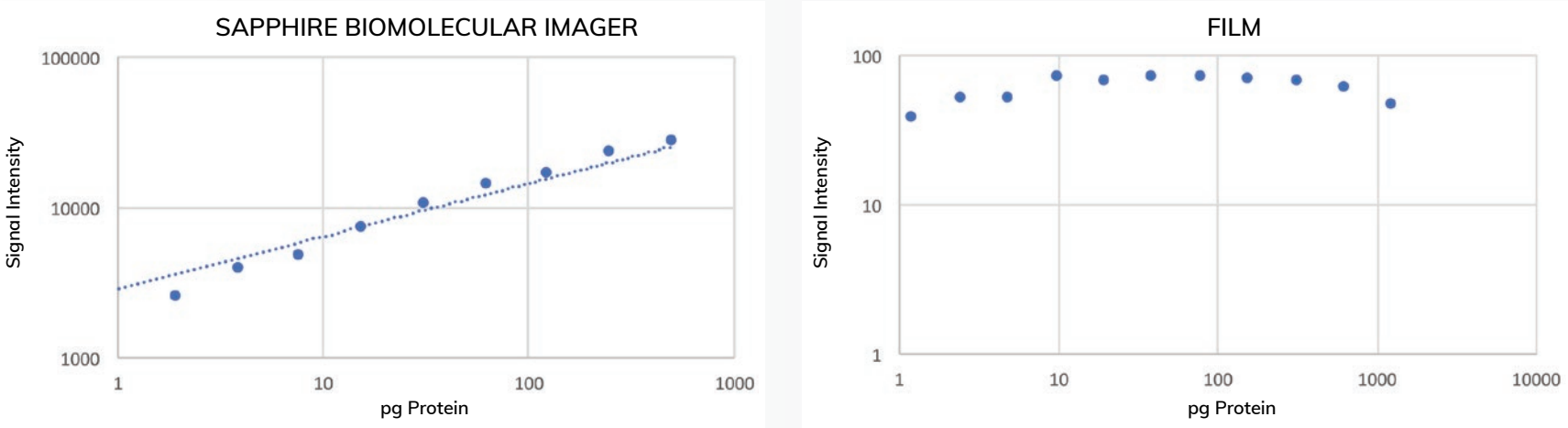
The sensitivity of chemiluminescent detection provides fast detection of low abundance proteins. Chemiluminescence can be more sensitive than other detection techniques due to the amplification of signal by enzyme activity. Additionally, most samples have no “background” signal, and are ideal for researchers who want the cleanest images.



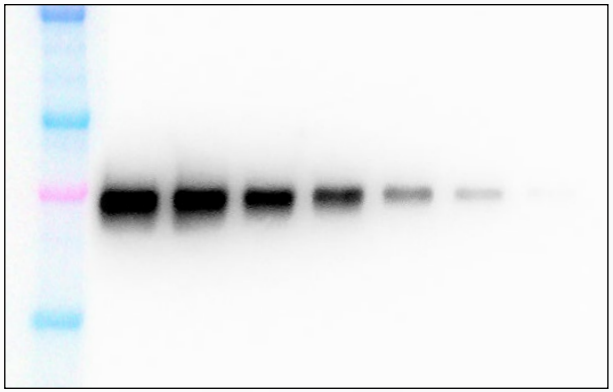
CHEMILUMINESCENCE: APPLICATIONS

Western Blotting

Digital imaging enables a wide dynamic range for chemiluminescent imaging. Traditional film saturates quickly, making it hard to distinguish weak and strong bands simultaneously.



Purified transferrin serially diluted and detected with chemiluminescent Western using Azure Radiance Substrate. Exceptional signal over background ratios allow for detection of small quantities of protein with the Sapphire Biomolecular Imager compared to film.

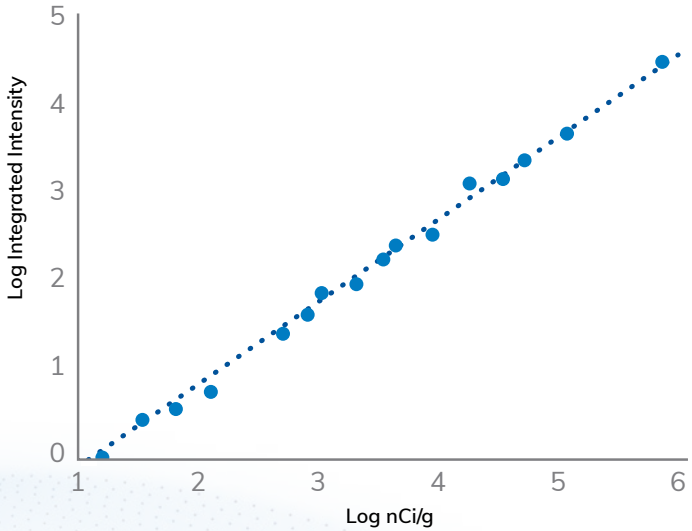


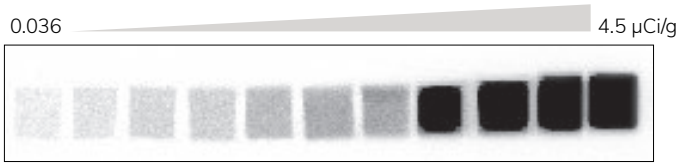
Simultaneous imaging of chemiluminescent samples and colored molecular weight markers. Images are captured serially, and then overlaid within the capture software.

PHOSPHOR IMAGING

To detect radioactive signals using phosphor imaging, samples containing radiolabeled samples are exposed to a storage phosphor screen. Light is emitted from the screen in proportion to the amount of radioactivity in the sample upon laser-induced stimulation.

Filmless autoradiography





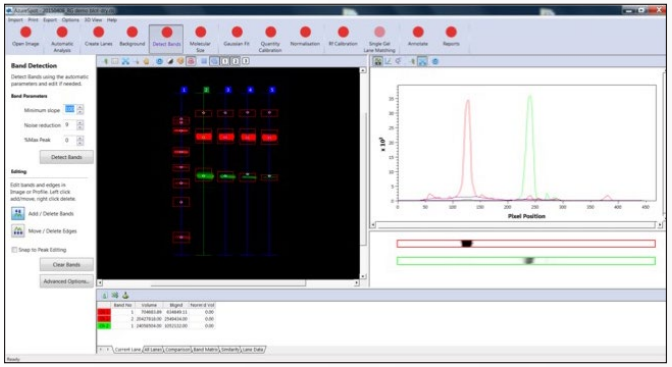
American Radiolabeled Chemicals Carbon-14 standard exposed to Storage Phosphor Screen for three hours then imaged on the Sapphire Biomolecular Imager.

Sample	^{14}C autoradiographic standard
Imaging	Phosphor
LOD	0.036 µCi/g
DR	5.4 orders of magnitude
Linearity	R^2=0.99

IMAGE CAPTURE AND ANALYSIS

Workflow software for gels and blots

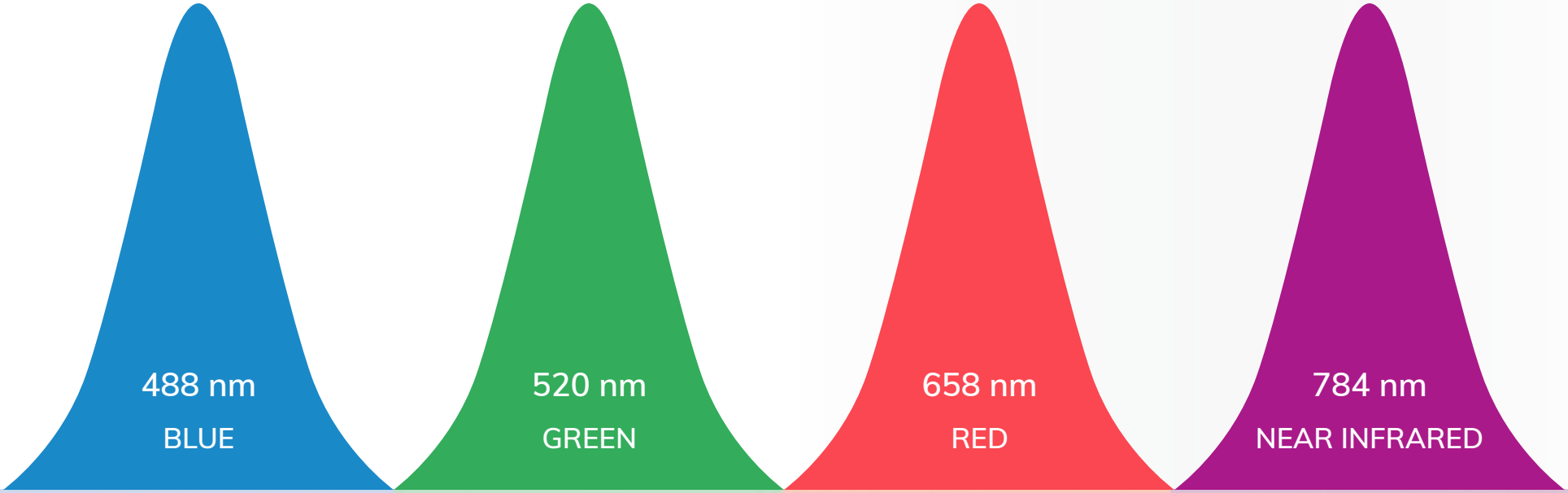
Application driven software makes setting up imaging protocols simple. Sapphire Capture software is designed to walk you through the steps to set up the perfect imaging parameters.



AzureSpot Analysis software designed for quantitation. View and analyze single and multichannel images.

TECHNOLOGY DRIVEN PERFORMANCE

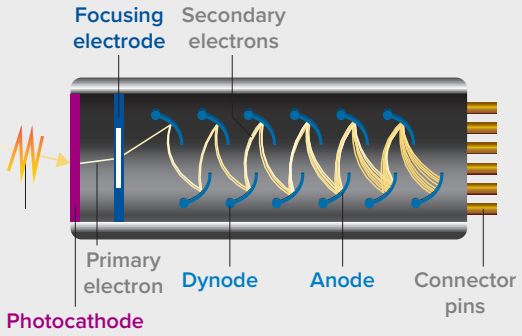
Discover more with a laser-based imager. The quality of excitation light affects image quality and your ability to detect subtle changes. The Sapphire Biomolecular Imager uses up to 4 solid state lasers as excitation sources.



AzureSpectra 490	AzureSpectra 550	AzureSpectra 650 AzureSpectra 700	AzureSpectra 800
Dylight 488 AlexaFluor 488 Cy2	Dylight 550 Alexa Fluor 546 Cy3	Dylight 650 Dylight 680 Cy5 Cy5.5	Dylight 800 Alexa Fluor 790 Cy7
BODIPY 500/510, FL APF Fluorescein (FITC) GFP Rhodamine 110 SYBR Gold, Green, Safe	Rhodamine TAMRA TRITC RFP	SYPRO Ruby IRDye 680	IRDye 800

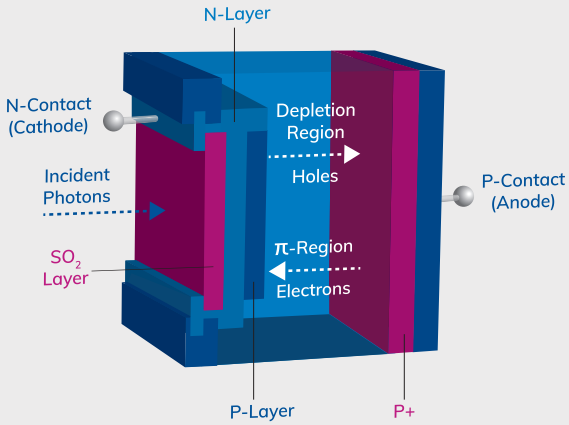
1 PHOTON MULTIPLIER TUBE (PMT)

Highly sensitive photodetector



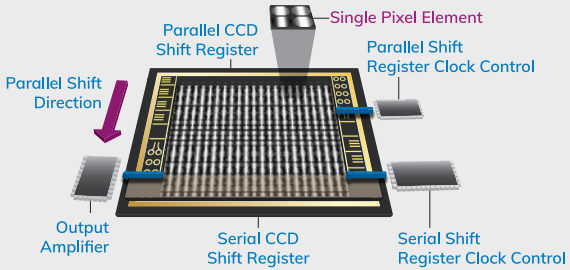
2 AVALANCHE PHOTODIODE (APD)

High quantum efficiency in the NIR



3 CHARGE-COUPLED DEVICE (CCD)

Samples the entire spectrum simultaneously, and allows long integration times



The Sapphire Biomolecular Imager's patent pending design uses 3 different detection modes to deliver ultimate application flexibility. Using PMTs, APDs, and CCD, the Sapphire is a unique system designed for visible fluorescence, NIR fluorescence, and chemiluminescent imaging.

Choose from four models

SAPPHIRE NIR

NIR Fluorescence	✓
Chemi Imaging	optional
Phosphor Imaging	optional

SAPPHIRE RGB

RGB Fluorescence	✓
Chemi Imaging	optional
Phosphor Imaging	optional

SAPPHIRE RGBNIR

RGB Fluorescence	✓
NIR Fluorescence	✓
Chemi Imaging	optional
Phosphor Imaging	optional

SAPPHIRE PI

Phosphor Imaging	✓
Chemi Imaging	optional

Specifications	Sapphire NIR	Sapphire RGB	Sapphire RGBNIR	Sapphire PI
Part number	IS1024	IS1025	IS1026	IS1027
Laser excitation wavelengths	685, 784	488, 520, 658	488, 520, 658, 784	658
Bit depth	16 bit	16 bit	16 bit	16 bit
Scanning area	25 cm X 25 cm	25 cm X 25 cm	25 cm X 25 cm	25 cm X 25 cm
Scanning mode	Simultaneous or Sequential	Simultaneous or Sequential	Simultaneous or Sequential	Phosphor Imaging
Resolution	10 micron – 1000 micron	10 micron – 1000 micron	10 micron – 1000 micron	10 micron – 1000 micron
Detectors	Avalanche Photodiode	Photomultiplier Tube, Avalanche Photodiode	Photomultiplier Tube, Avalanche Photodiode	Photomultiplier Tube
Scanning speed	50 cm/s	50 cm/s	50 cm/s	50 cm/s
Filters	Red 725BP40, IR 832BP37	Blue 518BP22, Green 565BP24, Red 710BP40	Blue 518BP22, Green 565BP24, Red 710BP40, IR 832BP37	390BP40
Dimensions (W X H X D)	75 cm X 45 cm X 70 cm	75 cm X 45 cm X 70 cm	75 cm X 45 cm X 70 cm	75 cm X 45 cm X 70 cm
Weight	140 lbs	140 lbs	140 lbs	140 lbs
Power requirements	100 – 240 VAC ± 10%, 50/60 Hz	100 – 240 VAC ± 10%, 50/60 Hz	100 – 240 VAC ± 10%, 50/60 Hz	100 – 240 VAC ± 10%, 50/60 Hz
Computer options	Windows 10 laptop or Windows Pro desktop PC and 4K monitor	Windows 10 laptop or Windows Pro desktop PC and 4K monitor	Windows 10 laptop or Windows Pro desktop PC and 4K monitor	Windows 10 laptop or Windows Pro desktop PC and 4K monitor
Q-Module	**Optional**	**N/A**	**N/A**	**N/A**
Laser excitation wavelength	520			
Filters	Green 565BP24			
Chemiluminescent Upgrade	**Optional**	**Optional**	**Optional**	**Optional**
Imaging area, chemiluminescent	16 cm X 13 cm	16 cm X 13 cm	16 cm X 13 cm	16 cm X 13 cm
Bit depth	16 bit	16 bit	16 bit	16 bit
Resolution	2688 X 2200	2688 X 2200	2688 X 2200	2688 X 2200
Imaging time	0-60 minutes	0-60 minutes	0-60 minutes	0-60 minutes
Visible imaging	Yes	Yes	Yes	Yes
Phosphor Imaging Module	**Optional**	**Optional**	**Optional**	**N/A**
Sample types	Storage phosphor screen (imaging plate)	Storage phosphor screen (imaging plate)	Storage phosphor screen (imaging plate)	

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