



CREST•OPTICS

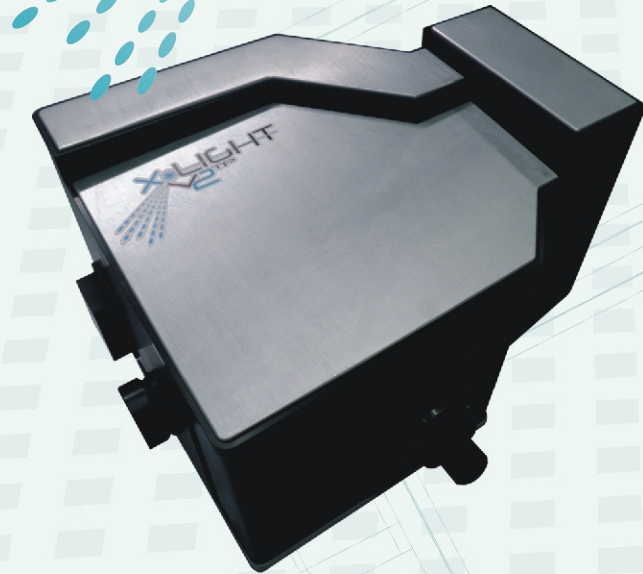


The Spinning Disk Solution

X-LIGHT

Top Performance

V2



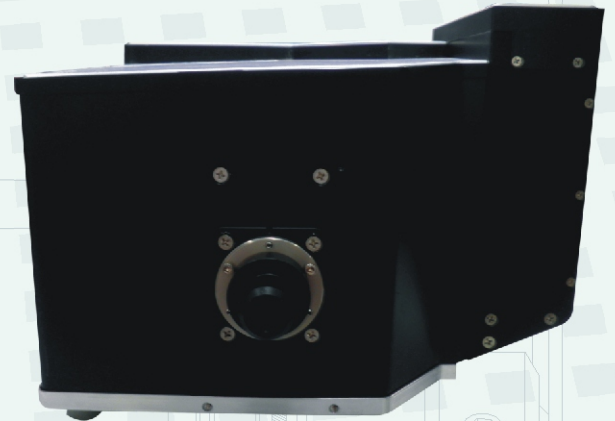
Description

The X-Light V2^{Top Performance} Confocal Imager offers:

- Full compatibility with all inverted and upright Microscopes
- Plug-in Spinning Disk Box (possibility to change pinhole pattern in few seconds)
- Use of Custom Relay Lenses for large Field of view aberrations mitigation
- Full compatibility with Crest VCS (Video Confocal Super-resolution) module for 3D resolution enhancement

Technical Specifications

- Double Pinhole Pattern Spinning Disk, on same physical disk
- Single Pinhole Pattern Spinning Disk for large Field of View
- Acquisition Modes:
 - WideField (with fast disk out motorized function),
 - Confocal (single or double pattern)
- CCD/sCMOS Field of View:
 - 12mm x 12mm FOV in double pattern configuration (each pattern)
 - Up to 22mm FOV in single pattern configuration
- Pattern Configuration:
 - CrestOptics Proprietary Disk Pattern Design for high confocal resolution, improved Out of Focus rejection and higher S/N
 - Confocal resolution <using a 100X plan Apo lambda NA 1.45> :
 - X-Y resolution 260-250nm
 - Z resolution : ~650nm
 - 40 micron pinholes
 - 70 micron pinholes
 - Custom pinholes diameters are available on request
- 30mm diameter Custom Relay lenses
- Fast spinning disk 15.000 RPM disk rotation speed
- Excitation Gimbal mount for easy alignment on custom microscope setup and for best S/N
- Motorized Dichroic Five positions Filter Wheel
- Standard Eight positions Motorized Emission Wheel
- Plug-in spinning disk
- Extraction tools for easy insertion and removal of both dichroic filter and emission filter
- CCD focal plane easy focusing without moving the CCD Camera
- Adapter for Multimode Laser or LED SMA-905 fiber excitation



Principles of Operation with VCS (Video Confocal SuperResolution)

Video-Confocal Super-resolution Microscopy (VCS) is based on narrow-field illumination using scanning patterns and wide-field collection of raw images.

Detection algorithms [1] already developed are able to super-resolve 3D structures in both compact and sparse specimens.

Although other techniques proposed and industrially developed mainly dedicate their efforts in extracting information from a relatively low spatial frequency range, VCM detection methods harness non-linear calculations exploiting the tops more than the belly of the raw signal intensity, collected as a function of illumination and detection positional parameters.

In a schematic diagram for a basic VCS microscopy system, the light source is focused onto a specified pattern that is optically conjugated to the microscope conjugate focal plane through a relay system. The mask is moved in the optical path with an x-y piezo motor system at each camera acquisition. The emission is collected widefield.

Calculations are performed in parallel during images acquisitions through CUDA technology exploiting Gpu processors.

[1] - "Improved confocal microscopy methods and devices" patent WO2013/44891 (2013)

X-LIGHT

Top Performance

with
VCS

Description

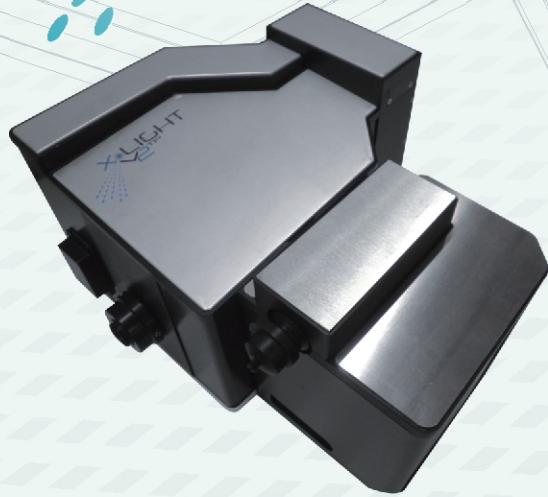
VCS (VideoConfocal super-resolution) module is a new system developed as an add-on for the X-light V2.

Using an approach based on Prof. Pier Alberto Benedetti's works and patent from Pisa CNR (which assume the 2-dimensional scan of the sample with a pinhole pattern and several algorithms application), Crest-VCS enhance 3D resolution of the standard light microscope.

Moreover, parallel calculation is heavily used exploiting CUDA technology for a very fast processing time.

The full system X-Light V2 + VCS is thought to work in three configurations:

Widefield mode
Confocal mode
Super-resolution mode



Technical Specifications

- Standard and custom pattern*
- Two patterns on the same physical mask
- Pre-aligned module with integrated LED or LASER launcher
- Bypass mode for widefield illumination and acquisition
- Up to 22mm field of view
- LED and LASER source compatible
- Piezo motors system for faster structured illumination scan
- Motorized control for VCS pattern focusing and color correction
- Motorized mask positioning from VCS mode to Widefield/Confocal mode
- Maximum lateral resolution up to 115nm measured, limited by pixel size and depending on pattern, algorithm and number of sub frames**
- Immersion objectives compatible***
 - 60x
 - 100x
- 3D axial range: up to 110 micron tested ****
- Time resolution: ~ 5 sec/frame calculation included
- Camera specification:
 - EMCCD/CCD camera
 - sCMOS camera
 - Resolution increase requires camera pixels = 6.5um
- Software ***** :
 - Nis-Elements
 - Metamorph

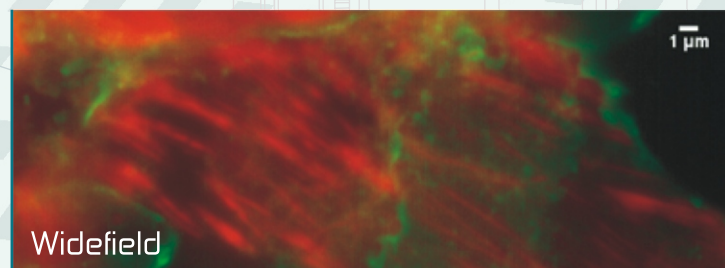
* Patterns differ from each other in holes diameter and spacing. Parameters best choice is mostly based on microscope configuration and sample characteristics.

** Measured on 100nm beads, 100x Oil objective NA 1.45, 470nm wavelength excitation. Axial resolution data are to be published yet.

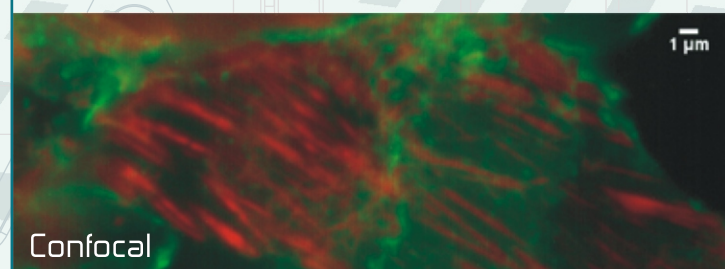
*** Low magnification/high NA objectives are under testing and will be updated soon.

**** Axial range limit is under testing.

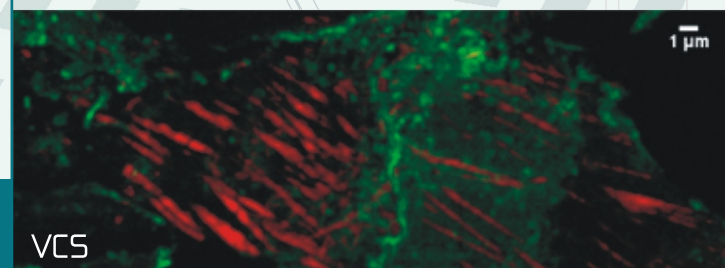
***** Software is under integration



Widefield



Confocal



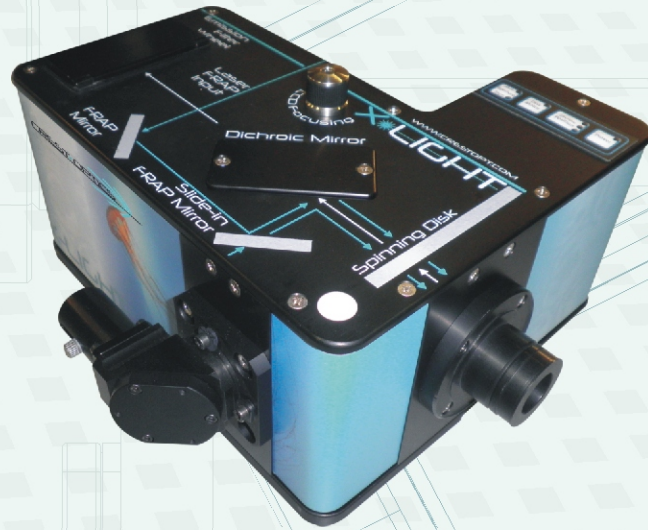
VCS

Description

Spinning Disk Confocal System LED and LASER Sources compatible.

The X-Light Confocal Imager offers:

- Unsurpassed optical performance with selected/high quality low autofluorescence optical components and anti reflection coating treatments
- Full compatibility with all inverted and upright Microscopes
- Full compatibility with third party components such as:
 - External automated filter wheels
 - Optical Splitters
 - Dual Head attachments
 - FRAP system



Technical Specifications

- Double Hole Pattern Spinning Disk on same physical disk
- Acquisition Modes:
 - WideField (with fast disk out motorized function),
 - Confocal (double pattern)
- CCD/sCMOS Field of View:
 - 12mm x 12mm FOV in double pattern configuration (each pattern)
 - Up to 22mm FOV in single pattern configuration
 - Ultra-fast spinning disk 20,000 RPM rotation speed available on request for sCMOS (single pattern) units
- Pattern Configuration:
 - CrestOptics Proprietary Disk Pattern Design for high confocal resolution, improved Out of Focus rejection and higher S/N
 - Confocal resolution <using a 100X plan Apo lambda NA 1.45> :
 - X-Y resolution 260-250nm
 - Z resolution : ~650nm
 - 40 micron holes
 - 70 micron holes
 - Custom micron holes are available on request
- Fast spinning disk 15,000 RPM disk rotation speed
- Excitation Gimbal mount for easy alignment on custom microscope setup and for best S/N
- Motorized Dichroic 3 positions Filter Wheel (optional 5 positions filter wheel)
- Standard Manual 4 positions Emission Wheel (optional 8 positions Motorized Emission Wheel)
- Extraction tools for easy insertion and removal of both dichroic filter and emission filter
- C-mount thread on excitation and emission ports for motorized external filter wheels easy mount
- CCD focal plane easy focusing without moving the CCD Camera
- Adapter for Multimode Laser or LED SMA-905 fiber excitation

Description

The X-Light-PRO Confocal Imager offers:

- FRAP operation and Confocal acquisition at same time (0ms delay time, no moving optics for FRAP and Confocal)
- Motorized FRAP dichroic mirror between Confocal Head and Microscope
- Unsurpassed optical performance with selected/high quality low autofluorescence optical components and anti reflection coating treatments
- Full compatibility with all inverted and upright Microscopes
- Full compatibility with third party components such as:
 - External automated filter wheels
 - Optical Splitters
 - Third party FRAP system



Technical Specifications

- Single Hole Pattern Spinning Disk on X-Light sCMOS for large 22mm Field of View
- Acquisition Modes:
 - WideField (with fast disk out motorized function),
 - Confocal (double pattern -CCD- or single pattern -sCMOS)
- FRAP operations and Confocal acquisitions at same time (0 ms time delay between FRAP action and Confocal acquisitions)
- Motorized Dichroic Mirror between Confocal Head and Microscope
- Pattern Configuration:
 - CrestOptics Proprietary Disk Pattern Design for high confocal resolution, improved Out of Focus rejection and higher S/N
 - Confocal resolution <using a 100X plan Apo lambda NA 1.45> :
 - X-Y resolution 260-250nm
 - Z resolution : ~650nm
 - 40 micron holes
 - 70 micron holes
 - Custom pinholes are available on request
- Fast spinning disk 15,000 RPM disk rotation speed
- Excitation Gimbal mount for easy alignment on custom microscope setup and for best S/N
- Motorized Dichroic 3 positions Filter Wheel (optional 5 positions filter wheel)
- Standard Manual 4 positions Emission Wheel (optional 8 positions Motorized Emission Wheel)
- Extraction tools for easy insertion and removal of both dichroic filter and emission filter
- C-mount thread on excitation and both emission ports for motorized external filter wheels easy mount
- CCD focal plane easy focusing without moving the CCD Camera
- Adapter for Multimode Laser or LED SMA-905 fiber excitation

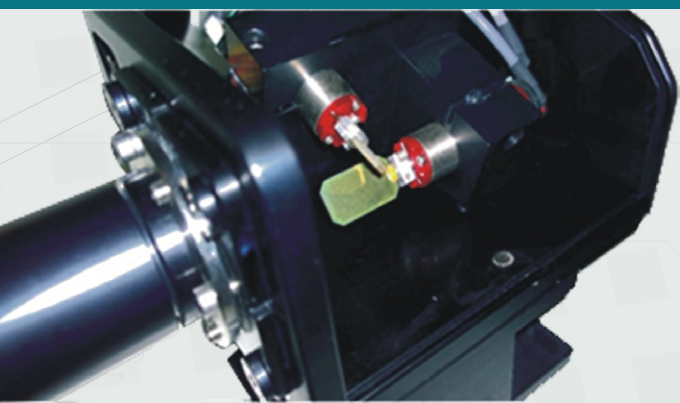
CrestOptics Integrated FRAP module

Description

- For FRAP operation and Confocal acquisition at same time (0ms delay time, no moving optics for FRAP and Confocal)
- Operated with single mode Laser Heads 380-780nm wavelength range
- Diffraction limited spot at sample level (<900 nm spot diameter @ 473nm)
- FRAP software included for line, simple shapes, area (XY), freehand.

Technical Specifications

- Operated with single mode Laser Heads 380-780nm wavelength range
- Dual Fast Galvo Mirrors configuration
- 1.5ms sweep time
- 256x256 and 512 x 512 points scanning resolution
- Diffraction limited spot at sample level (<900 nm spot diameter @ 473nm)
- Scan regions: line, simple shapes, area (XY), freehand
- Molecular Devices MetaMorph Fully Compatible
- On-Board Firmware and Fast RAM for automated operations



WorldWide Distribution

EASTERN AMERICA, CENTRAL AMERICA, WESTERN AMERICA, SOUTH AMERICA

Chris Baumann - Sales Manager

89 North

Toll free 1.877.417.8313

Office +1.802.881.0302 ext. 101

Mobile +1.520.495.9661

Fax +1.802.881.0308

E-mail: cbaumann@89north.com

www.89north.com

Michael A. Davis - Bioscience System Product Manager

Nikon Instruments Inc.

Office: 631-547-8544

Fax: 631-547-4033

Mobile: 214-282-3837

E-mail: mdavis@nikon.net

www.nikoninstruments.com

JAPAN, KOREA, TAIWAN and SINGAPORE

Molecular Devices

Tokyo head office

Office: +81-3-6362-5260 (main), 5264(UIC team)

Osaka Office

Office: +81-6-7174-8831

E-mail: MetaMorph.Japan@moldev.com - Yasutomo.Kubota@moldev.com

www.moleculardevices.com

CHINA

Junjun Yao - Sr. Procurement & Logistics Specialist

Molecular Devices

Office: +86-21-3372-1067

Fax: +86-21-3372-1066

Cell: +86-137-6452-2574

E-mail: junjun.yao@moldev.com

www.moleculardevices.com

INDIA

Sanjeev Kumar

Towa Optics (I) Pvt. Ltd.

Office : 011-26831936/4304

E-mail: sanjeev@towaoptics.com

www.towaoptics.com

UNITED KINGDOM

Jeremy Graham - Managing Director

Cairn Research (UK) Ltd.

Toll Free: 0845 330 1267 (UK Only)

Office: +44 (0) 1795 590140

E-mail: j.graham@cairn-research.co.uk

www.cairn-research.co.uk

ITALY

Roberto Becattini - Life Sciences Manager

Crisel Instruments s.r.l.

Office: +39 06 35402933

E-mail: becattini@crisel-instruments.it

www.crisel-instruments.it

AUSTRALIA and NEW ZEALAND

Con Sapounas

SciTech Pty Ltd - Imaging Spectroscopy Nanotechnology

Melbourne office

Office: +61 3 9480 4999

Mobile: +61 4 0044 0499

Sidney office

Office: +61 2 9705 8059 (Sydney)

Mobile: +61 3 9416 9959

E-mail: con@scitech.com.au

www.scitech.com.au

EUROPE (Germany, Switzerland, France, Spain), ISRAEL, RUSSIA, AFRICA,

Nikon Instruments Europe BV

Phone: +31207099500

E-mail: crest.nikon@nikonbv.com

www.nikoninstruments.eu

For further information please visit our website:

www.crestopt.com

Crestoptics s.r.l. - Via Mattia Battistini, 184/D - 00167 Roma - ITALY

Tel. 0039.06.61660508 - FAX 0039.06.61662738

E-mail: info@crestopt.com