Innovation is What We Do at ISS

Q2

Modular Confocal Microscope for FLIM and FFS

We have entered the era of quantitative live cell biology; the dynamics of single proteins within the cell are measured and new insights about the cellular environment and inner machinery are revealed.

Q2 is a compact and fast multi-channel multiphoton confocal microscope for quantitative live cell biology applications. The instrument allows for the acquisition of confocal images, FLIM images and all of the Fluorescence Fluctuations Spectroscopy measurements (autocorrelation, cross-correlation, photon counting histogram, scanning FCS, RICS, and Number & Brightness).

Our design maximizes the system sensitivity, because quantitative imaging and analysis is our focus, where every single fluorescent photon is precious. All the optics equipped in Q2 are aligned and tuned by ISS engineers using tools for beam positioning and diagnosis. The design of the system makes these alignments robust and stable, and also makes the system easy for the user to operate.

Intensity & Lifetime Imaging

- 1p or 2p confocal imaging in x, y, z and t
- FLIM in frequency-domain (FastFLIM) or in TCSPC
- Phosphorescence Lifetime Imaging (PLIM)
- Steady-state & time-resolved anisotropy imaging

Fluorescence Fluctuations Spectroscopy

- Fluorescence Correlation Spectroscopy (FCS)
- Fluorescence Cross-Correlation Spectroscopy (FCCS) w/ pulse interleaved excitations & synchronized gating detections
- Photon Counting Histogram (PCH)
- Fluorescence Lifetime Correlation Spectroscopy (FLCS)
- Scanning FCS by orbit scanning
- Number & Brightness (N&B)
- Raster Imaging Correlation Spectroscopy (RICS)

Single Molecule Imaging

- Burst Analysis
- FRET efficiency determination
- Stoichiometry determination w/ pulse interleaved excitations & synchronized gating detections

3D Particle Tracking & Nanoimaging

- 3D particle tracking trajectories
- Nanoimaging reconstruction w/ 20 nm resolution

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Software Specifications

VistaVision – FCS & Confocal Imaging Microscopy Software

Q2 features VistaVision, a comprehensive, user-friendly software package for the acquisition and analysis of FLIM, FRET, FCS, FCCS and RICS data

Image Acquisition

Image Acquisition (Raster Scan)

VistaVision offers the user the flexibility to choose between the following image acquisition parameters:

- Pixels Number: User Selectable From 2 to 8192
- Max Line Frequency: 4 KHz (On 20 Points)
- Min Line Frequency: 0.01 Hz
- Max Frame Rate 512x512: 2 sec
- Max Frame Rate 256x256: 0.4 sec
- Beam Park
- Panning
- Field Rotation: 2000 Optical
- Field Diameter: 18 mm

Scan Modes

VistaVision provides several options for kinetic studies (t, Xt, XYt, XZ, XYZ and XZt), and for optical sectioning (XZ, XYZ) of specimens

Input/Output

- 2 Channels Input
- 5 Channels Output

Image Formats

- Export to ImageJ
- Plots can be saved and exported to GIF, TIFF, JPEG, PNG, Bitmap and Metafile formats

Q2 Design

Ease of Use & Simple Design

The standard configuration includes two detection channels and a multiphoton laser emitting at 780 nm although a Ti:Sapphire laser, the supercontinuum laser and single-photon lasers can be coupled to the instrument too. Detectors are either GaAs PMT, hybrid PMT, or APD. Due to it's compact design the entire system can easily fit onto a 2' x 4' table.

Expandability

- Provides three laser input ports to cover the range from UV, VIS, to NIR
- Mounts high quality & tunable polarization optics built-in as an option to work for the polarization specified applications regardless of the input laser polarization
- Allows multiple dichroics for various laser lines on a computer controlled motorized wheel for a click-and-select operation

Information & specifications are subject to change without notice.

For more information and a complete list of accessories for Q2 please visit www.iss.com.

Instrument Specifications

Microscope & Coupling:

- Evident (Olympus), Nikon, Zeiss & Leica
- Inverted & upright
- Left side port & back port

1p Excitation*:

- ISS laser launcher (models for 3-, 4-, and 6-lasers), wavelengths available from 375 nm to 1,000 nm; pulse interleave excitation (PIE)
- Supercontinuum lasers, wavelength from 400 nm to 950 nm

2p Excitation*:

- Ultra fast femtosecond pulse Ti:Sapphire lasers
- Ultra fast femtosecond pulse fiber lasers

Galvanometer Scanner:

- 2 silver-coated galvanometer scanning mirrors
- Clear optical surface: 3 mm or 5 mm
- Maximum scan rate: 5 KHz for 3 mm and 1 KHz for 5 mm
- Scanning resolution: 64 x 64 to 4096 x 4096 pixels
- Scanning mode: Pt, Xt, XZ, XY, XZt, XYt, XYZ
- ROI scanning: rectangle, ellipse, polygon, line

Positioning Controls**:

- ISS 3-axis control unit
- ISS XY galvo scanning mirrors control unit
- ISS Z-piezo control unit
- Microscope built-in focusing control module
- Automatic XY stages (ASI, Prior)
- XYZ piezo stages (MadCity, PI)

Pinhole: Single, variable-aperture pinhole; diameter from 20 µm to 1,000 µm

Detectors:

- Cooled GaAsP and GaAs PMT
- Cooled Hybrid PMTs
- SPADs

Data Acquisition Unit:

- FastFLIM (Digital Frequency Domain FLIM)
- SWISS TCSPC card (Time Domain FLIM)

Computer & Monitor:

- High-performance Processor, 32 GB RAM
- 32" monitor, 2556 x 1440 resolution

Operating System: Windows 11, 64-bit

Power Requirements: Universal power input (110 - 240 V, 50/60 Hz, 400 VAC)

Dimensions (mm): 420 (L) x 330 (W) x 150 (H)

Weight (kg): 13.5 (without detectors)

Notes:

*Q2 was fully evaluated & validated for using ISS laser launcher, Fianium SC-400 laser & Toptica FemtoFiber Pro 2p laser.

**VistaVision provides utilities for measurements in spectroscopy mode (at a single point), raster or orbit scan mode (2D XY), optical sectioning mode (3D), time-lapse mode, stage scan mode for multi wells, or a combination of them.

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