Q2

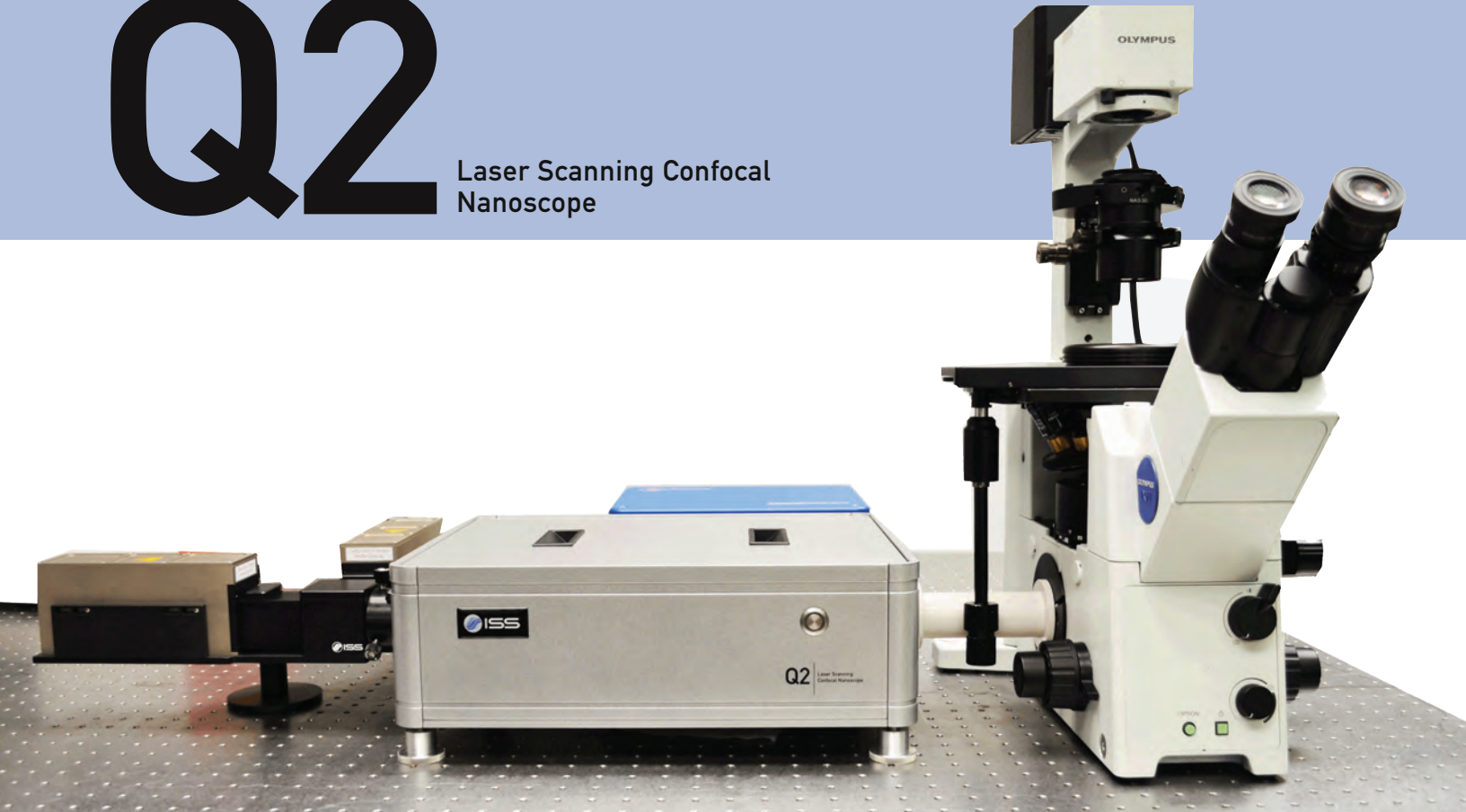## Laser Scanning Confocal Nanoscope

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).

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.

Q2 is powered by the 64-bit VistaVision software by ISS. When equipped with the nanoimaging option it allows for the reconstruction of images of dynamic structures with a resolution of 20 nanometers.

Intensity and 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 and time-resolved anisotropy imaging

Fluorescence Fluctuations Spectroscopy
- Fluorescence Correlation Spectroscopy (FCS)
- Fluorescence Cross-Correlation Spectroscopy (FCCS) with pulse interleaved excitations and synchronized gating detections
- Photon Counting Histogram (PCH)
- Fluorescence Lifetime Correlation Spectroscopy (FLCS)
- Scanning FCS by orbit scanning
- Number & Brightness (N&B)
- RICS (raster imaging correlation spectroscopy)

Single Molecule Imaging
- Burst Analysis
- FRET efficiency determination
- Stoichiometry determination with pulse interleaved excitations and synchronized gating detections

3D Particle Tracking and Nanoimaging
- 3D particle tracking trajectories
- Nanoimaging reconstruction with 20 nm resolution

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Q2 Design

Ease of Use and Simple Design

Q2 is equipped with a Toptica FemtoFiber Pro multiphoton laser, an Olympus IX71 microscope, and two hybrid PMT detection channels. Due to its compact design the entire system can be easily fit onto a 2' x 4' feet table

Expandability

To name a few marks:

• Provides three laser input ports to cover the range from UV to VIS to NIR

• Mounts high quality and 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 controller motorized wheel for a click-and-select operation

Reliability and quality

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 by 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.

Q2 System Configuration

Microscope and Coupling

• Olympus, Nikon, Zeiss and Leica
• Inverted and upright

1p Excitation:

• ISS laser launcher (models for 3, 4 and 6 laser diodes), wavelengths available from 375 nm to 640 nm; pulse interleave excitation (PIE)
• Super-continuum lasers, wavelength from 400 to 700 nm

2p Excitation:

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

Data Acquisition Unit

• FastFLIM (Digital Frequency domain FLIM)
• TCSPC card (Time domain FLIM)

Detectors

• GaAs PMT (Hamamatsu H7421 and H7422P models)
• Hybrid PMTs (Hamamatsu R10467U models)
• APDs

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 stage

Software

• VistaVision on Windows 7 - 64bit

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For more information on our Q2 system, please visit www.iss.com