

Leica TCS SP2

Spectral Confocal and
Multiphoton Microscope

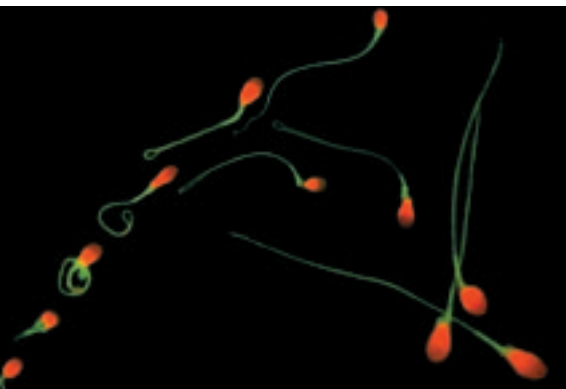
Leica
MICROSYSTEMS

Superior Image Performance, All the

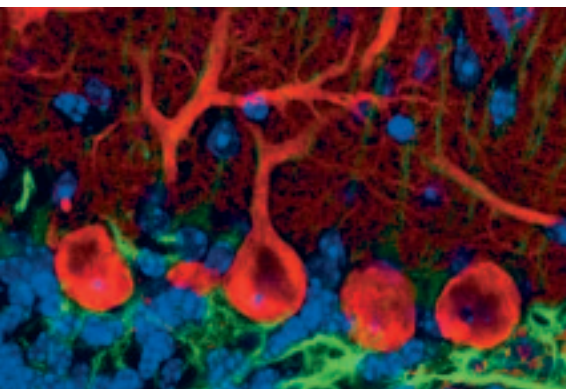
- Configurable as a personal, multi-user or advanced imaging center
- Multiple innovations from the pacesetter in confocal microscopy
- Prepared for the future!

NEW!

- Multiphoton, UV and visible confocal microscopy in one system
- Expanded spectral range – UV to IR
- K scanner enables high frame rates and scan rotation without compromise
- Prepared for new generation lasers
- Adjustable pupil illumination for optimal illumination
- Digital image resolution up to: 4096 x 4096 pixels, 12 bit a/d conversion per channel
- 22 mm scan field enables large field scanning at low magnification
- Excitation line, multiplexing for crosstalk reduction
- Region of interest scan for minimal bleaching



Human sperm. Labels: Propidium iodide, Mito Tracker



Mouse cerebellar cortex. Labels: Hoechst 33258, anti-GFAP/Cy5, anti-calbindin-D28k/Cy3



Leica Design by Christophe Apothélos

Features You Want – With a Future!

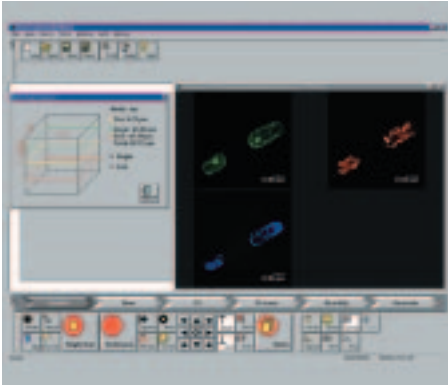
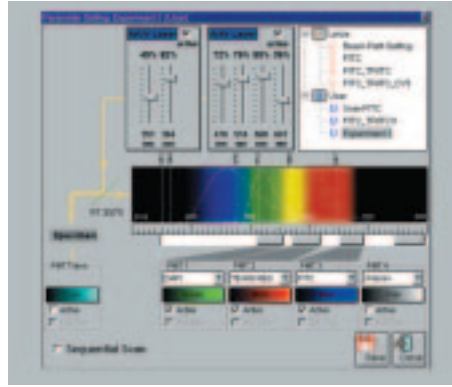
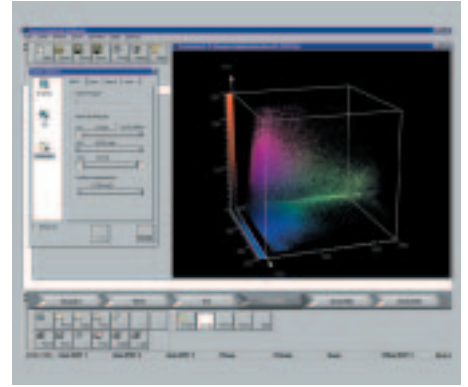


Image acquisition



Spectral Detector Interface



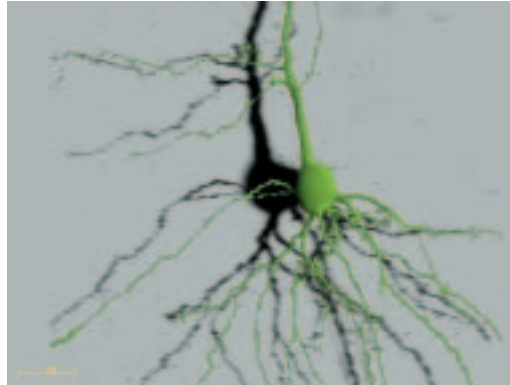
Multi-color analysis



NEW!

LCS Software:

- Fully operator configurable user interface
- Intuitive and guided
- Context-sensitive online help system
- 7 dimensional image series recording ($xyz\alpha\lambda i$)
- Supported by direct-access digital control knobs
- Programmable with VBA(tm) or other programming languages due to standardized COM interface
- Applications packages for physiology, multi-color and surface reconstruction
- New 3D package for superb reconstruction and rendering



3D software. Cortical pyramidal neuron, Label: Biocytin/FITC

... outstanding advantages from Leica:

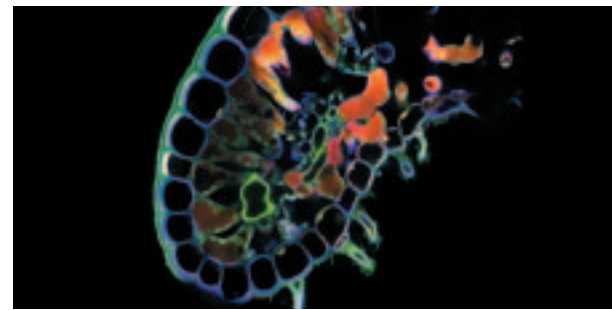
- Filter-free SP head: a spectrophotometer for each detector channel: design your own filters, maximize sensitivity, minimize crosstalk, record emission spectra
- Great images
- Minimal bleaching
- Realtime x-z scanning
- Long term stability
- Tactile feedback
- Easy to use Multiphoton System

... plus:

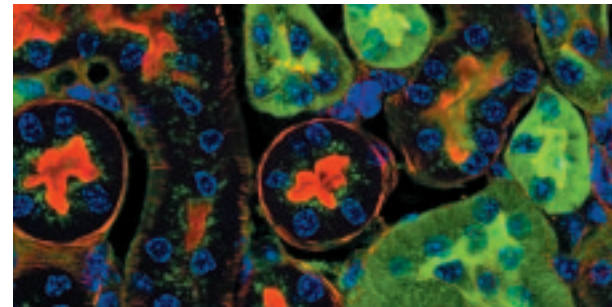
- More detection range (12 bit)
- Better illumination (Adjustable pupil illumination)
- More image (field size, resolution)
- Scan rotation
- Region of interest scan
- Wavelength switching line scan
- Configured your way



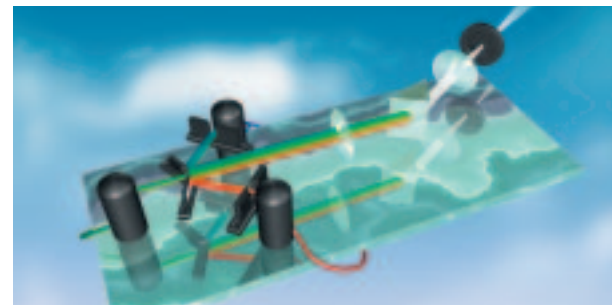
Obelia (medusa). Label: Azan staining



Erica. Label: Safranin Fast Green



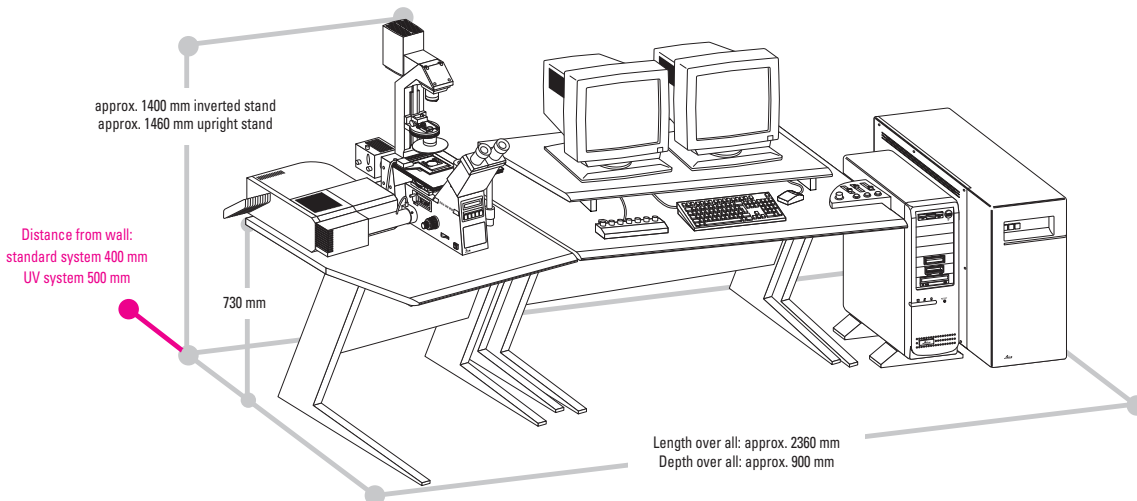
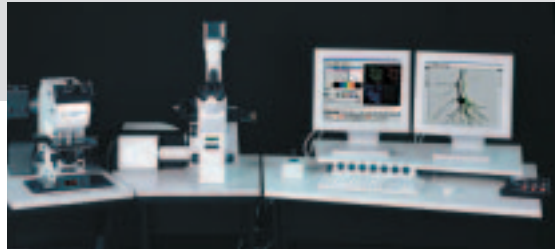
Mouse kidney section: Labels: Alexa 488, Alexa 568, DAPI



Principle of Spectral Detector

Leica TCS SP2 Installation Requirements

Weight base system:	<ul style="list-style-type: none"> • VIS: max. 320 kg • UV: max. 428 kg
Heat load max.:	<ul style="list-style-type: none"> • VIS: 5 kW • UV+VIS: 10 kW
Separate cooling:	UV laser, air-cooled heat exchanger
Electric supply:	<ul style="list-style-type: none"> • Ar, ArKr, HeNe lasers: 2 x 230 V AC/16 A (2 independent lines) +/- 10%, 50/60 Hz +/- 10% • Ar + Kr lasers: 3 x 230 V AC/16 A (3 independent lines) +/- 10%, 50/60 Hz +/- 10%
Environment:	<ul style="list-style-type: none"> • Room temperature: 18 - 25° C • Avoid proximity to air conditioning equipment • Protect from dust • Room darkening recommended



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Leica, the leading brand for microscopes and scientific instruments, has developed from five brand names with a long tradition: Wild, Leitz, Reichert, Jung and Cambridge Instruments. Yet Leica symbolizes innovation as well as tradition.

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With confocal laser technology and image analysis systems, we provide three-dimensional viewing facilities and offer new solutions for cytogenetics, pathology and material sciences.

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Innovative technologies in our surgical microscopes offer new therapeutic approaches in microsurgery. With automated instruments for ophthalmology, we enable new diagnostic methods to be applied.

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The Leica logo is written in a red, cursive script font.

M I C R O S Y S T E M S

Leica TCS SP2 Specifications

(including optional items)

Microscopes:	<ul style="list-style-type: none">• Upright: Leica DM R, RE, RXE, RXA, upright fixed stage: DM LFS A• Inverted: Leica DM IRB, IRBE
Z drive:	<ul style="list-style-type: none">• Precision focusing nosepiece (DM RXE): 2 mm travel, 10 nm resolution• High-resolution z stage: 170 micrometer travel, xyz: 40 nm resolution, xz: < 1 nm resolution• Internal motorization of Leica DM RE, RXE, RXA, IRBE, LFS E
Lasers & Attenuation/switching modules	<ul style="list-style-type: none">• Ar UV 50 mW 351, 364 nm• HeCd 40 mW 442 nm• Ar 100 mW 457 nm, 488 nm, 514 nm• ArKr 75 mW 488nm, 568 nm, 647 nm• Kr 25 mW 568 nm• HeNe 1 mW 543 nm• HeNe 10 mW 633 nm• Ti:Sapphire 1.2 ps, 1 W, 720 - 1000 nm (depending on mirror set) (MP)• AOTF 4 or 8 channels, visible range• AOTF, UV range• EOM, IR range (MP)• Merge module for 4 lasers
Confocal Unit:	<p>Optics:</p> <ul style="list-style-type: none">• User-switchable between Leica microscopes• Alignment-free for lifetime• 3 individual ports for external lasers for up to 6 lasers connected simultaneously• Fiber-coupling and/or direct coupling of low-power lasers to confocal unit• Spectral range of detector optics: 400 - 850 nm• UV and MP possible in one system• Field-upgradable to MP microscopy• UV system with individual objective correction lenses• Adjustable pupil illumination• One pinhole, variable diameter size <p>Scanner:</p> <ul style="list-style-type: none">• K scanner with two independent galvanometers• Line frequency: up to 2000 lines/s• Frame rates: 3 fps (512 x 512 pixels), 20 fps (512 x 32 pixels)• Scan resolution: up to 4096 x 4096 pixels• Scan zoom 1 - 32 x• Scan rotation -5 to +95 degrees• Scan field: 22 mm diagonal in intermediate image plane

Confocal Unit:**Detectors:**

- Highly sensitive spectral detector, 1 - 4 simultaneous channels
- Continuously adjustable bandwidth and center wavelength
- Spectral steepness factor ≤ 1
- Low-noise photomultipliers
- Up to 12 bit digitization per channel
- Transmitted light/DIC detector
- Non-descanned dual channel transmission detector (MP)
- Non-descanned dual channel reflection/fluorescence detectors (MP)

Electronics

- Scanner control with FPGA (Field-programmable gate arrays)
- Trigger-in/out ports
- 8 detector channels, 12 bit digitization, simultaneous
- Ultra-wide SCSI interface to PC
- High-performance PC workstation
- One or two monitors

Software

- Fully operator-configurable user interface
- Intuitive and guided
- Context-sensitive online help system
- Multi-dimensional series acquisition
- Supported by direct-access digital control knobs
- Region of interest scan
- Wavelength switching line scan
- Emission spectrum recording
- Time-lapse recording
- Surface reconstruction
- Multiple measurement functions
- Physiology software
- Multi-color software
- 3D software with multiple reconstruction & rendering functions
- Macro developer software

Abbreviations:

MP = Multi photon microscopy

UV = Ultraviolet microscopy

AOTF = Acousto-optical tunable filter

EOM = Electro-optical modulator

July 2002

