

Leica TCS SP2

Spectral Confocal & Multiphoton System

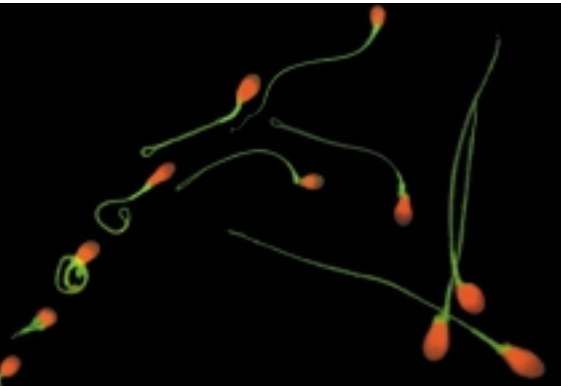
Leica

Superior Image Performance, All the

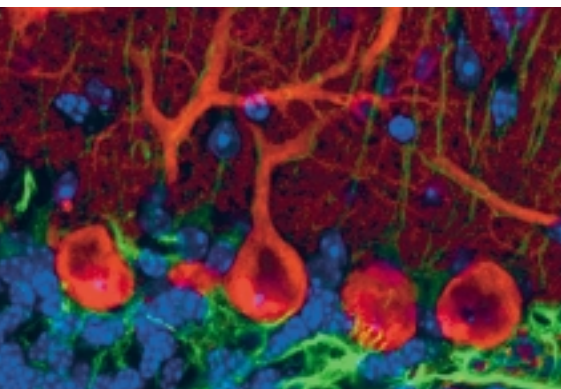
- Configurable as a personal, multi-user or advanced imaging center
- Multiple innovations from the pacesetter in confocal microscopy
- Prepared for the future!

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
- Wavelength switching line scan for crosstalk reduction
- Region of interest scan for minimal bleaching



Human sperm. Labels: Propidium iodide, Mito Tracker



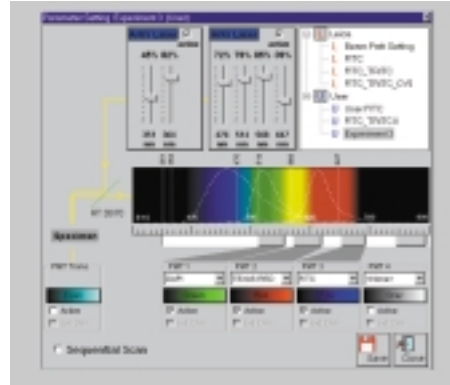
Mouse cerebellar cortex. Labels: Hoechst 33258, anti-GFAP/Cy5, anti-calbindin-D28k/Cy3



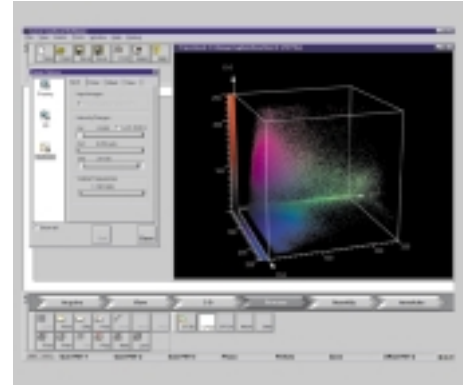
Features You Want – With a Future!



Image acquisition



Spectral Detector Interface



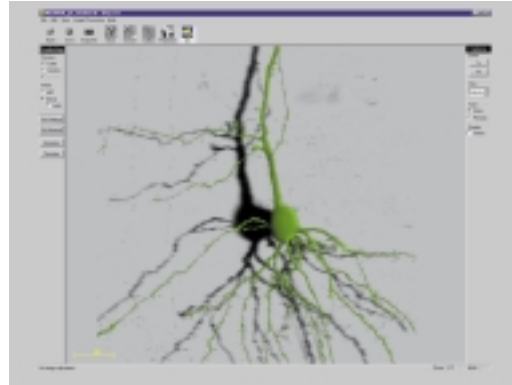
Multi-color analysis



NEW!

LCS Software:

- Fully operator configurable user interface
- Intuitive and guided
- Context-sensitive online help system
- 7 dimensional image series recording ($\chi y z t \alpha \lambda i$)
- 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:

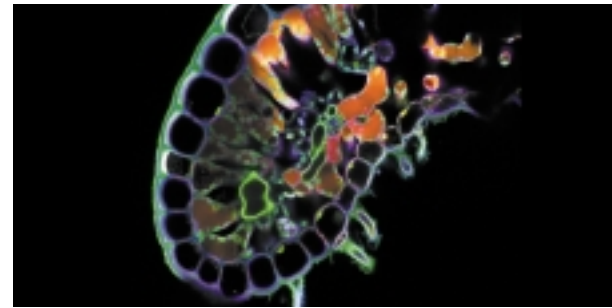
- Filter-free SP head: a spectrophotometer for each detector channel: design your own filters, maximize sensitivity, minimize cross-talk, record emission spectra
- Great images
- Minimal bleaching
- Realtime x-z scanning
- Long term stability
- Tactile feedback
- Easy to use Multiphoton System

... plus:

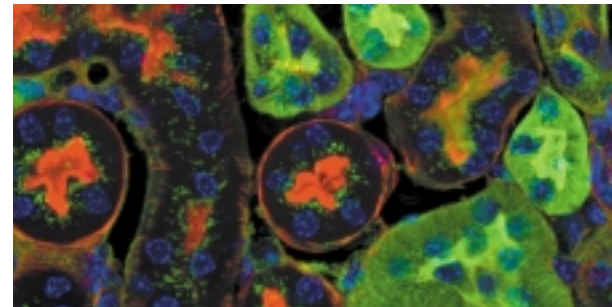
- More detection range (12 bit)
- Better illumination (Adjustable pupil illumination)
- More image (field size, resolution)
- Scan rotation
- Region of interest scan
- Wavelength switching line scan
- Configured your way



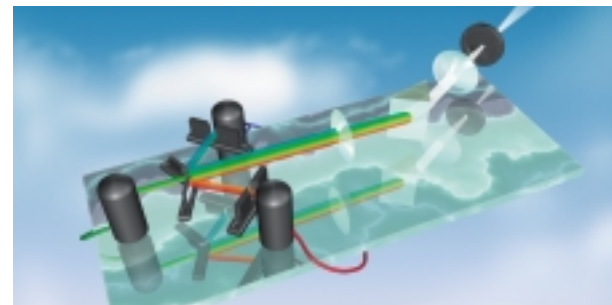
Obelia (medusa). Label: Azan staining



Erica. Label: Safranin Fast Green



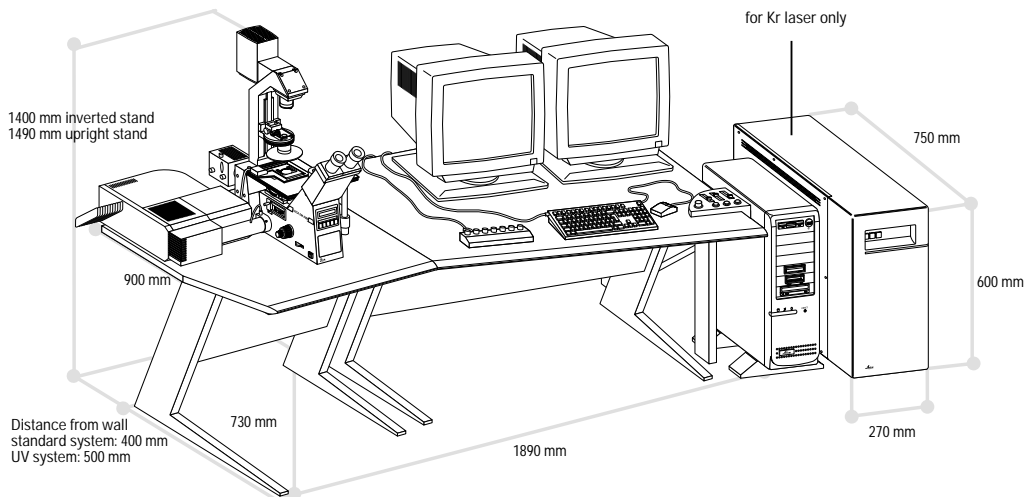
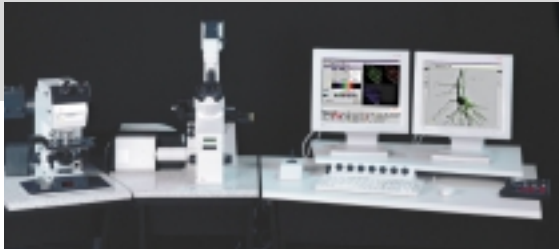
Mouse kidney section: Labels: Alexa 488, Alexa 568, DAPI



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
Heart load max.:	<ul style="list-style-type: none"> • VIS: 5 kW • UV: 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 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 E• 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 1.2 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• Optical Port for external devices• 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), 25 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

The Leica logo is displayed in a red, stylized script font. It is positioned in the bottom right corner of the page, to the left of a vertical black bar.

Confocal Unit:	<p>Detectors:</p> <ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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

December 1999

