Step Beyond Infinity

Discover entirely new worlds of research. Leica M165 FC and M205 FA fluorescence stereomicroscopes





Bring your ideas into the light

Fluorescence techniques are critically important elements for studying the functions of organisms in modern developmental, molecular and cellular biology. They provide researchers with a vast range of options for gaining insights into a world that is normally hidden from human sight. Structures and dynamic processes in the organism can be deliberately targeted with fluorescence dyes to render them visible even at the subcellular level. Accordingly, they represent a significant contribution to our understanding of the molecular principles and complex relationships on which life itself is based.

For a long time, researchers directed their efforts mainly towards understanding microstructures and isolated processes, but now in the fields of cellular and developmental biology they are turning their attention increasingly to the complex interrelationships in organisms. Sophisticated genetic studies and cellular examinations must be carried out so that networks as complex as the nervous or vascular systems, for example, can be studied and the principles of positioning and interaction of these vital networks can be understood. Capturing every aspect of the overall picture demands a flexible microscope system that combines excellent optics with supreme, contrast-rich fluorescence technology to enable a view over a wide magnification range, down to the tiniest of details.

From preparation and manipulation tasks to screening and evaluating genetically engineered mutations to high-resolution documentation and long-term studies of living models: with its new M-Series, Leica Microsystems offers a revolutionary stereomicroscope system that is equal to the demands of modern science.

Research is an intellectual pursuit

FusionOptics[™]

 » Highest possible resolution with outstanding depth of field

Largest zoom range in stereomicroscopy

» A single microscope for preparation tasks and documentation

The smallest details

 » Discover details hitherto invisible in stereomicroscopy

FusionOptics™ makes the impossible possible

Until now, high depth of field and maximum resolution were always considered to be irreconcilable opposites. With FusionOptics[™], Leica Microsystems has succeeded in overcoming these limitations. Scientific studies conducted at the Institute of Neuroinformatics, a department of the ETH Zürich, confirm that the human vision system is capable of drawing the maximum information content from each eye individually and merging it to create a three-dimensional image. In the same way, the new Leica M205 FA uses the two beam paths for different tasks: the right channel delivers a high-resolution image at the largest possible numerical aperture, while the left channel presents an image with high depth of field. As a result, two apparently irreconcilable worlds are merged in the human brain: the observer receives an image with outstanding richness of detail and outstanding depth of field at the same time.

- Vascular anatomy of a Zebrafish embryo as revealed by GFP expression driven by the Fli-1 promoter. Courtesy: Brant Weinstein, National Institutes of Health, Bethesda, MD
 - Zebrafish embryo expressing GFP under the control of the beta-actin promoter. Courtesy: Prof. Dr. Stephan C. F. Neuhauss, Professor for Neurosciences ETH Zurich and Institute for Brain Research at the University of Zurich
 - Periferic and central nervous (ventral cord) system of a drosophila embryo, salivary gland
 - O Drosophila melanogaster. Dorsal view, Pupa; Green: Venus. Transgenic fluorescent protein in posterior compartment of each segment. Courtesy of Dr. Kuranaga, Dept. Genetics, Graduate School of Pharmaceutical Sciences, The University of Tokyo





The art of creating brilliant images

Art is born of mastery. Leica Microsystems has a long tradition of demonstrating its mastery time after time. Accordingly, the results you obtain with stereomicroscopes from Leica Microsystems are not merely superior, but brilliant.

Illuminated specimens with patented third beam path

The TripleBeam[®] principle, with its patented third beam path reserved exclusively for fluorescence illumination, delivers evenly illuminated, reflex-free fields of view at all zoom settings. This separation of illumination and observation beam paths guarantees brilliant fluorescence images, rich in detail and contrast, with optimal light efficiency. This means that even weak fluorescence signals can be displayed in remarkable image quality.

FluoCombi III™ for brilliant documentation of even the smallest details

For those who want to go one step further, Leica Microsystems has built the FluoCombi III[™] objective revolver, with the unique capability to exploit all the advantages of both stereo and high-resolution micro-objectives on one instrument, with a simple switch. In stereo mode, specimen manipulation is aided by large object fields, working distances and depth of field. Then simply rotate the parcentric, parfocal micro-objective into position to

observe even the smallest fluorescing structures, with a resolution performance up to 1500 lp/mm while retaining the exact focusing position. At the same time, you can capture parallax-free Z-series with maximum optical precision to obtain highly detailed 3D information about your specimens. From the smallest detail to the total picture, always in focus: the FluoCombi IIITM enables you to present the results of your research in brilliant images.

Separate illumination path

- » Brilliant fluorescence
- » Optimum light efficiency

FluoCombi III™: Stereo and macro views in one instrument

- » Stereo and macro views in one instrument
- » Parallax-free documentation of the total picture down to the smallest detail
- » Precisely detailed 3D information

Microscopes that grow with your requirements

- » Adaptability through maximum modularity
- » Optimal interaction of all system components

Leica M165 FC: Stereomicroscopy of the highest order



M165 P

With an encoded zoom, filter changer, iris diaphragm and objective revolver, the microscope configuration and optical data can be read out from the computer at any time: even with a manual microscope, you can be assured that your experiment procedures will be reproducible and consistent. FusionOptics™ Zoom Zoom range Max. magnification* Max. objective aperture **

Classic stereomicroscopy

Max. resolution **

Object field \varnothing^{***}

Working distance ***

TripleBeam® principle

Encoding ****

Complete automation

Four parfocal objectives

Objective nosepiece

FluoCombi III™

- With eyepieces 40× and planapochromatic objective 2×
- * Planapo objective 2×
- *** Data with standard optics (objective 1×/eyepieces 10×)
- **** Readout of settings for iris diaphragm, magnification, filter and objective in the objective revolver per LAS

Leica M205 FA: new standards in fluorescence microscopy

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16.5:1	20.5:1		
7.3×-120×	7.8×-160×		
960×	1280×		
0.301	0.35		
906 lp/mm	1050 lp/mm		
31.5 mm	29.5 mm		
61.5 mm	61.5 mm		
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The combination of proven TripleBeam[®] technology with the unique FusionOptics[™] concept opens up new dimensions in fluorescence stereomicroscopy. The fully apochromatically optics system, the largest zoom range available on the market, 20.5:1, and a resolution to 1050 lp/mm will provide you with a view of details hitherto unknown in stereomicroscopy.

Time-intensive studies of living organisms and documentation of complex image series and multiple fluorescence images are made possible and instantly reproducible by motorizing the focus, zoom, filter changer and iris diaphragm.



Concentrate on what's important



Zebrafish larva fin



With the colored touch screen of the Smart Touch[™] Control Unit, you can control your experiment procedures with a few hand movements and never lose sight of all your important optical parameters. The most important control functions on the control unit can be adjusted to your specific needs with freely programmable rotary knobs and function buttons. Operation is intuitive, so you can concentrate entirely on your research, not on the microscope.

Convincing experiments

Control the IsoPro[™] motorized cross-stage with the SmartTouch[™], the Leica Application Suite (LAS), or the Leica AF6000 software. You can move to any stage position and program repeating processes. This way, Leica stereomicroscopes can be expanded into complete documentation systems that satisfy every requirement, from simple fluorescence photographs to intricate, multidimensional fluorescence experiments.

Investment for the future

Particularly in multiuser environments, adaptability is an important characteristic for satisfying all the requirements posed by various fields of research. To meet this demand, Leica Microsystems offers a stereomicroscope portfolio with unrivaled modularity and continuity. The components of different stereomicroscope generations can be used together in practically any combination. This means that you will find a combination that is tailor-made for almost any project, and you will have the confidence that existing Leica systems will keep pace with scientific advances.

The basis for successful documentation

Leica Microsystems offers you a selection of powerful transmitted light bases that always present your specimens in the best light, with brightfield illumination with high or low diffusion, oblique transmitted light illumination, and darkfield. The Rottermann Relief contrast method also ensures excellent display even of unstained living cells.



Automated specimen scans are child's play with the IsoPro™ motorized cross-stage



With the touchscreen display, you have all important information and functions literally at your fingertips

Flexible solutions for all your needs

Filter your specimens for best results

Leica Microsystems offers a wide range of fluorescence filters for microscopes that you can use in conjunction with your existing filters to create the best spectral properties for your specimens. The filter changer of the new M series can accommodate up to four filter combinations (excitation and blocking filters). The fluorescence shutter does not open until a filter has been identified on the basis of its transponder in the observation channel. The shutter can also be closed at any time with the press of a button to protect your specimens, and in software-controlled imaging series, it only remains open while the image is being captured. This abbreviated shutter time and a filter change time < 500 ms are especially valuable for speeding up intensive fluorescence experiments.

Heat for life

Working with living cells demands carefully control to ensure that culture conditions for the organisms remain optimal for the duration of the experiment. The Leica MATS thermoplate radiates heat uniformly over the entire stage surface and precisely maintains the preset temperature. This means the highest possible reliability for your experiment results.

Let there be light

With the EL6000, Leica Microsystems offers an external light source equipped with a long-life metal halide lamp – a cost-effective and timesaving alternative to mercury vapor lamps. Since this lamp does not need adjustment, you can be sure of uniformly illuminated, contrast-rich fluorescence images: your research will always be presented in the best possible light.



Construct your own fluorescence filter set according your application

Humans as the reference

You can take advantage of an unsurpassed range of observation tubes and ergomodules in the configuration of your Leica microscope system. The new Trinocular ErgoTube[™] (5°-45° observation angle) provides you with an enormous adjustment range for an ergonomic, relaxed seated position. For large and small: the ErgoTube[™] ensures maximum user comfort and staying power for long hours at the microscope.



MATS thermoplate: uniform temperature distribution for reliable experiment results



The sitting position must be adjustable to a few millimeters to ensure tension-free working for hours

Impressive functionality



Overview and detailed image acquisition in one step



Stability and space in all situations



Fluorescence module of the Leica M165 FC



Uncorrected (left) and apochromatically corrected photo of a zebrafish larva

Supreme performance for your research

The stereomicroscopes from Leica Microsystems combine supreme zoom range and resolution performance in a single system, so that you can carry out a broad range of research tasks with just one microscope. For example, you can not only observe organogenesis in an entire zebrafish but also cell diversification and determination in the retina. The Leica M165 FC resolves structures down to a size of 551 nm. The Leica M205 FA advances into magnification ranges previously unknown in stereomicroscopy. With FusionOptics[™] you can also resolve details down to a structure size of 476 nm.

Space for your specimens

With our new generation of high-performance stereomicroscopes, you no longer have to choose between a highly detailed presentation of your specimens and adequate space for manipulating them. Four planapochromatically corrected, parfocal main objectives can be used in any combination on the objective revolver. They provide enormous freedom in terms of magnification and working distance for practically any application field.

Solid basis for your research

High-performance microscopes like those in the new Leica M series also require a solid base. Their construction is extremely stable to effectively absorb impacts and vibrations, so that you barely have to consider impaired image quality even when observing specimens in liquid medium microscopically.

Precision at all levels

You can adjust the focal position of your microscope conveniently and precisely, even in the nanometer range, with the manual coarse/fine focus drive. Z-series and other complex multichannel fluorescence imaging procedures are easy with the automated Leica M205 FA with motorized focus.

APO for all

In order to take advantage of the full performance capabilities of these new instruments, all new M series components are corrected apochromatically – your fluorescence results are not marred by color seams or distortions. The new series M series reflects the superior imaging performance of Leica optical systems.

Fully developed system solutions, tailored to the individual

The control center for your experiments

The automated, software-integrated system solutions from Leica Microsystems provide an unprecedented working convenience and simplify test procedures even in complex fluorescence microscopy applications. From controlling the microscope to capturing and processing images to analyzing and managing data: in Leica systems, the microscope, camera and software are in perfect harmony.

Integrated complete solution

In the Leica Application Suite (LAS), automated stereomicroscopes, digital cameras and software are combined to create one user-friendly, consistent imaging solution. Versatility and a consistent, modular construction mean that you have enormous flexibility in building your microscope system, which in turn is perfectly adapted to your applications. Thus LAS is an intuitive solution that makes both routine and research analysis easier.

The expert in fluorescence applications

Leica Microsystems has cooperated with leading scientists to develop AF6000, an exceptionally ergonomic fluorescence software program that satisfies every possible need. The intuitive operating concept guides you reliably and easily to brilliant results. For simple documentation, image superimposition and time series, Leica Microsystems offers AF6000 E, designed as an introductory software package for fluorescence applications. The modular design of the AF system family means that you can add to your system at any time as your needs grow and change. Thus, AF6000 fulfills all the requirements of fluorescence applications: from multichannel fluorescence to time series, Z-series with parallax correction, to 3D reconstruction of image information. The use of a motorized stage also enables documentation of images on several selected areas of interest in your specimens. With a large number of functions for documenting images, quantifying, optimizing and analyzing, AF6000 turns your microscope into an integrated, high-performance system that is able to grow with your research needs.



LAS Multifocus module



LAS Image Overlay module



AF6000: Settings for complex t and z series



AF6000: Image gallery in acquisition mode

Highlights of the Leica M165 FC & M205 FA



Leica FusionOptics™ for never-before achieved depth of field and brilliance



All data at a glance the display of the Leica M205 FA



Switching between overview and parallax-free detailed view



Variability for different users and setups: the new Trinocular ErgoTube™



Fast & precise with reproducible zoom adjustment, thanks to the new motorized focus

Never before seen: 3D images of highest resolution, brilliance and depth of field

- FusionOptics[™] with one channel for high resolution and one channel for high depth of field
- The human brain merges information to create a picture impression of unprecedented richness of detail and outstanding depth of field

Largest zoom range in stereomicroscopy

• The 20.5:1 zoom enables a wide range of research tasks to be carried out with just one microscope

Brilliant fluorescence images, rich in detail and contrast

- Patented TripleBeam[®] technology
- Optimization of UV transmission of the illumination path
- Filter properties adapted precisely to your specimens
- FluoCombi IIITM: Sample manipulation with large working distance, depth impression and field of view in stereo mode, capture of pallax-free Z-series with the micro-objective for highly detailed 3D information about your specimens

Microscopes that grow with your requirements

- Maximum modularity of the Leica stereomicroscope portfolio
- Wide selection of accessories for maximum flexibility
- Composition of individual filter combinations
- Combination of the new Leica M-series with existing system components
- Trinocular ErgoTube: optimum viewing comfort for different microscope users

Operating comfort and reproducibility through motorization

- Leica M205FA: Easier documentation of complex image series and multiple fluorescence photos with motorized focus, zoom, filter changer and iris diaphragm
- Motorized IsoPro[™] cross-stage for carrying out complex, multidimensional fluorescence experiments



Intelligent control with SmartTouch™

- External control unit with clearly organized, colored touchscreen
- Continuous status monitoring and convenient control of all settings and functions
- Individual programming of the most important control functions
- Intuitive operation in 7 different languages

Encoding for reproducibility and consistency in experiment procedures

- Leica M165 FC: Encoding of zoom, filters and iris diaphragm
- Configuration of the microscope and optical data can be read out at the computer at all times

Optimal display of your specimens with high-performance objectives

- High resolution and precisely detailed display together with large working distance and room for specimen manipulation
- · Four planapochromatically corrected parfocal main objectives
- Objective revolver for convenient, flexible enlargement of the field of application

Solid foundation for your research: a stable mechanical construction

- Stable mechanical construction supports superior optical performance
- Impacts and vibrations absorbed reliably to ensure outstanding image quality even when observing specimens in liquid medium

Integrated system solutions make life easier

- Microscope systems combine seamlessly interacting components in systems tailored to an application
- From microscope control to image capture and processing to data analysis and management: flexibility, user friendliness and reliable documentation of your research results





With the SmartTouch[™], all motorized functions are at your fingertips with a few clicks



Contacts of internal instrument encoding



Faster objective change with the new objective turret



Stable mechanical construction to support superior optical performance



Integrated and complete solutions, by Leica Microsystems

Leica Microsystems – the brand for outstanding products

Leica Microsystems operates internationally in four divisions, where we rank with the market leaders.

• Life Science Research Division

Leica Microsystems' Life Science Research Division supports the imaging needs of the scientific community with advanced innovation and technical expertise for the visualization, measurement and analysis of microstructures. Our strong focus on understanding scientific applications puts Leica Microsystems' customers at the leading edge of science.

• Industry Division

The Leica Microsystems Industry Division's focus is to support customers' pursuit of the highest quality end result by providing the best and most innovative imaging systems for their needs to see, measure and analyze the microstructures in routine and research industrial applications, in materials science and quality control, in forensic science investigations, and educational applications.

• Biosystems Division

The Biosystems Division of Leica Microsystems brings histopathology labs and researchers the highest-quality, most comprehensive product range. From patient to pathologist, the range includes the ideal product for each histology step and high-productivity workflow solutions for the entire lab. With complete histology systems featuring innovative automation and Novocastra[™] reagents, the Biosystems Division creates better patient care through rapid turnaround, diagnostic confidence and close customer collaboration.

• Surgical Division

The Leica Microsystems Surgical Division's focus is to partner with and support micro-surgeons and their care of patients with the highest-quality, most innovative surgical microscope technology today and into the future. Leica Microsystems' mission is to be the world's first-choice provider of innovative solutions to our customers' needs for vision, measurement and analysis of micro-structures.

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

Leica Microsystems – an international company with a strong network of customer services

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and representatives of Leica Microsystems in more than 100 countries.

