



# Leica DM IL

Inverted Microscope –  
for all Routine and Laboratory Applications  
in Biology and Medicine

*Leica*  
MICROSYSTEMS

# Leica DM IL – compact routine inverted microscope for laboratory

The new inverted Leica microscope blends ergonomics, a compact design and effective contrasting methods into a system for unlimited life science applications.

The integration of Leica HCS\* optics extends the range of objectives for inverted microscopy with the Leica DM IL.

For the first time, high-quality Hoffman Modulation Contrast can be produced without special objectives with our new Integrated Modulation Contrast (IMC) technique.

Optimized phase contrast and brilliant incident light fluorescence make the Leica DM IL the number one choice in contrasting microscopes.



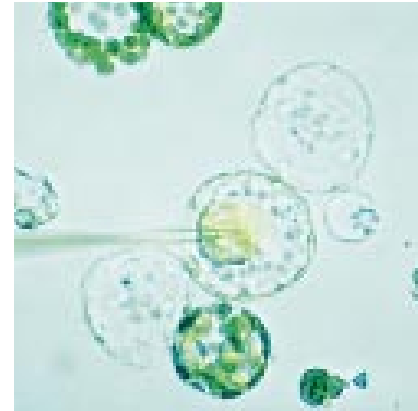
Leica Design by Ernest Igl/  
Christophe Apothéloz

With its unbeatable modularity, ergonomcy and free view of the specimen, teamed with newly developed and optimized contrasting techniques, the Leica DMIL offers you a top level introduction to inverted microscopy.

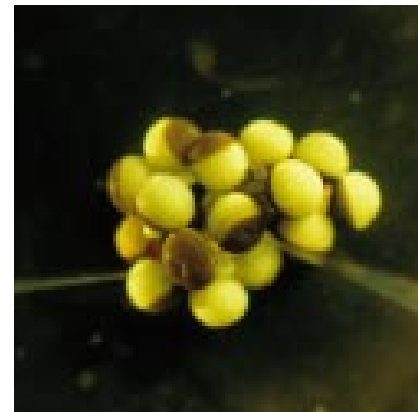
The adaption of the Leica DMIL to infinity optics allows the integration of Leica HCS\* components for superb image resolution, brilliant contrast and precise color rendering. The DMIL is the inverted equivalent of our successful upright DML microscopes.

The Leica DMIL is a microscope for all applications in microbiology or the cell culture laboratory. A universal inverted microscope for routine use: stable and space-saving, flexible and upgradable with optics from Leica's research microscopes.

\* Harmonic Component System



Microinjection of oocytes in mouse



RNA microinjection of frog oocytes (Xenopus)

# The System



The Leica DMIL contrasting microscope

## **The stand**

The stand of the Leica DMIL microscope is stable, aluminium-cast and excellently designed. There are two versions for biological applications:

## **The DMIL for brightfield, phase and modulation contrast**

and

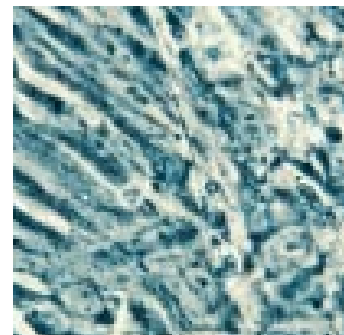
## **the DMIL with additional incident light fluorescence unit.**

Appreciated by users for many years, the stable T-shaped microscope base offers plenty of valuable space round the microscope and ensures comfortable, fatigue-free microscopy. The microscope's footprint is optimized to provide the necessary room for experiments, and all controls are ergonomically located. Many different components can be adapted to suit individual requirements. The high stability, low center of gravity and four vibration damping feet eliminate vibrations even in extreme conditions. The excellent stability of the DMIL also makes it the ideal solution for photography with long exposure times.

In addition, finite element calculations and thorough practical testing in a wide variety of applications provides stable focusing.



Discussion unit



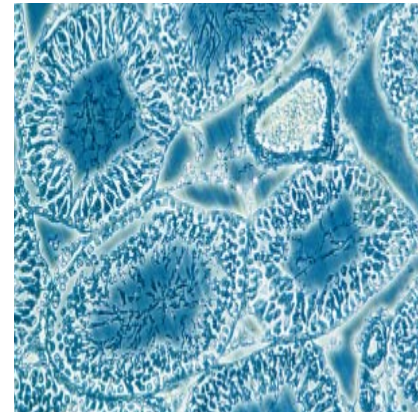
Cardiac muscle cells

Due to its modularity, the Leica DM IL is particularly suitable for living cell microscopy.

Its modern, practical design, the integration of state-of-the-art, top quality optics and adaption of contrasting techniques prove useful in research tasks as well as routine applications.

You will be convinced by the DM IL technology and many innovations.

We at Leica believe microscopy should be a pleasurable experience and have designed the DM IL to be associated with enjoyment in the laboratory.



Rat testicles, Phase contrast



Leica DM IL with illumination column the other way round



Trinocular tube with Leica DC300



Ergonomic phototube

# The Technology



Leica DMIL with 3-plate mechanical stage



Leica DMIL with fixed stage plate and object guide

## **Nosepiece focusing**

Samples are focused with the quadruple objective nosepiece. The reliability, stability and precision of the focusing is not influenced by the microscope stage and the samples on it or by accessory components such as the object guide or manipulators.

## **Illumination system**

The compact brightfield illumination unit is attached to a column and can be comfortably adjusted. Setting the correct height for the condenser used or the specimen on the stage is facilitated by markings along the column. The pre-centered, extremely powerful 6 V 35 W halogen lamp provides optimal illumination even of critical specimens. The transmitted light illumination system includes the integration of the contrast slide (for phase and modulation contrast), the module for light filters with 32 mm diameter and the aperture diaphragm. The microscope stage with illumination arm can be turned 180° and is freely accessible for sample positioning from three sides.

## **Light filters**

The filter module on the illumination column accommodates 32 mm diameter filters in a holder. We are constantly adding to our wide range of filters, enabling you to selectively optimize the illumination for observation and image documentation.

## **Built-in 6 V 35 W power supply**

The 6 V 35 W power supply, which provides the full lamp power including on/off switch, status indicator and brightness adjustment, is fully integrated in the microscope stand. Apart from the ergonomic advantages, this saves space on the microscope desk and allows the microscope to be easily picked up as a unit and moved elsewhere.

### Condensers

The Leica DM IL offers you a choice of two condensers.

The S 90/0.23 condenser, with a free working distance of 90 mm and a numerical aperture of 0.23 is designed for brightfield and phase contrast and is particularly suitable for specimens in bulky laboratory vessels.

The S 55/0.35 condenser, with a free working distance of 55 mm and a numerical aperture of 0.35 for bulky containers, is designed for brightfield, phase and integrated modulation contrast (IMC) and is particularly suitable for higher magnifications or thick specimens.

Without a condenser, the maximum free working distance is 200 mm.

### Stage and accessories

The DM IL offers a wide variety of stages with an array of accessories and different inserts for your specimen vessels:

The standard stage is a fixed stage plate of 252 x 212 mm. The stage can be widened by 70 mm on both sides by adapter plates. The interchangeable stage inserts (20 and 40 mm) allow smaller petri dishes to be used as well without losing focus when the objective nosepiece is rotated.

Object guides can be attached to both the left and right of the stage and have a minimum adjustment range of 83 x 127 mm. The control of the coaxial drive is in an ergonomically low position so that you can rest your hands on the desk while scanning specimens. The object guides accommodate special and multi-purpose frames for all types of culture vessels.

A heating stage up to max. 45°C, a 3-plate mechanical stage and scanning stages complete the range of stages for the DM IL.



Micromanipulation...



...and scanning stage



Leica DM IL with 3-plate mechanical stage and Leica Micromanipulators

# The Optics



Eyepieces and objectives



Binocular tube DM ILB

The optics are the heart of every microscope and decisive for the quality of information. We have set new standards by introducing our HC optics.

The Leica DMIL is designed for brightfield, phase contrast, Integrated Modulation Contrast (IMC) and incident light fluorescence.

All infinity-corrected high performance objectives in the Leica range with 25 mm screw thread are compatible with the DMIL microscope.

Even earlier Leica objectives can be adapted for use on the DMIL. We offer a wide range of special objectives for inverted microscopy applications with long free working distances (L objectives) and/or with correction mounts (Corr objectives) to compensate for different vessel thicknesses. The latest Leica optics brochure features our exclusive range of objectives.

Depending on the tube configuration, there is a wide choice of eyepieces with magnifications 10x, 12.5x, 15x, 16x or 25x, suitable for fields of view up to 20 mm. Besides special high-point eyepieces for eyeglass wearers, we also supply eyepieces with adjustable eyelens (M eyepieces), into which different types of graticules can be inserted.

The DMIL range also comprises many different observation and photo tubes. The tubes are interchangeable and can be individually rotated 360° in the tube mount and then fixed in position. All tubes are fitted with an infinity tube lens 1x.

## **The following tubes are used on the DMIL:**

- Binocular tube ILB, with 45° viewing angle, for eyepieces with 23.2 mm outer diameter.
- Trinocular (photo)tube ILT, with 45° viewing angle, for eyepieces with 23.2 mm outer diameter, with vertical photo/TV exit with switchable light path for either 100% visual or 100% photo/TV. The position of the photo/TV exit 88 mm to the side of the tube has the special advantage that it allows an unobstructed view of the specimen.

## **Other tubes from the Leica DML range can be used via an IL/L adapter:**

- Binocular tube HC LB 45° viewing angle
- Binocular tube HC LVB 0 – 35° ergotube
- Trinocular (photo)tube HC L1T 45° viewing angle
- Trinocular (photo)tube HC L3T 45° viewing angle
- Trinocular (photo)tube HC LV1T 0 – 35° ergotube

Developments in diagnostics and medical/biological research (e.g. fluorescence applications) and the increasing use of video technology and electronic image processing have to be paralleled by intelligent technical adaptations of the microscope system.

The new HCS optics concept, introduced with the Leica DMR microscope, meets this requirement. It is the result of an integral system consideration, harnessing all technological potential.

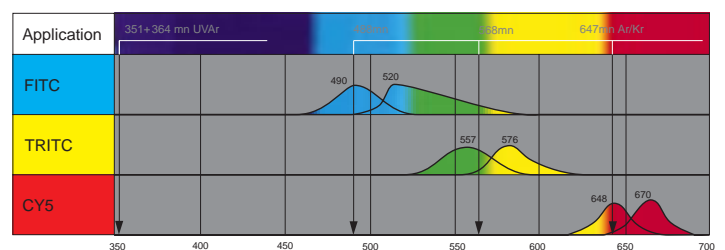
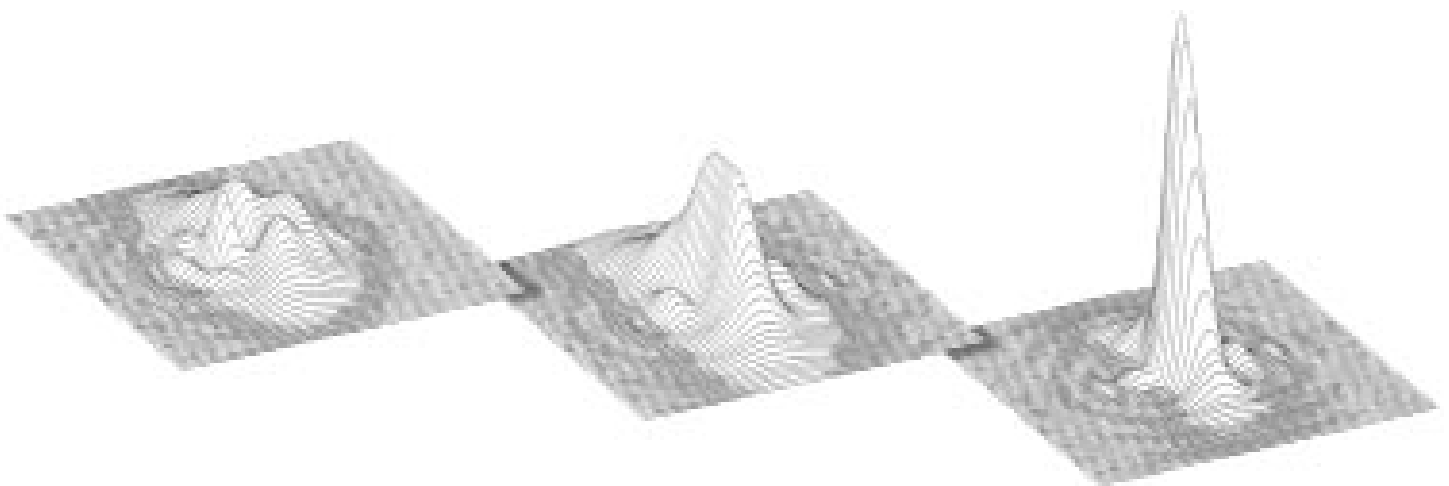
The abbreviation HCS stands for Harmonic Component System. Its special features are:

- well-balanced optical and mechanical fitting dimensions
- harmonious balance of all optical system components, i.e. the parameters contributing to the microscope's performance (objectives, tube lenses, tubes, eyepieces, TV cameras/adapters, etc.) have been harmonized throughout the entire optic system. This has created scope for even greater optical opportunities.

The HCS system is the answer to your application requirements not only today, but in the future, too.



Rat testicles, IMC



# Contrasting

The Leica DM IL is the microscope for all requirements in the cell culture lab. A universal inverted microscope for routine application: stable and space-saving, flexible and upgradable with optics from Leica research microscopes.

## Brightfield

The whole range of objectives from 4x – 100x magnification can be used for brightfield applications. Samples in almost any kind of vessel can be examined with or without a condenser, while a 6 V 35 W halogen lamp ensures optimal illumination.

## Phase contrast

In vivo/in vitro microscopy specimens are mostly living cultures or microorganisms and are examined under sterile conditions. Contrast of the transparent tissue can only be enhanced by optical methods.

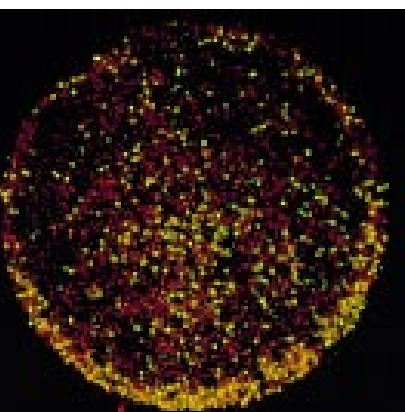
Phase contrast is a useful technique for high-contrast imaging of unstained specimens. The phase contrast technique used by Leica on the DM IL has been optimized for inverted microscopy applications and produces equally excellent contrast in watery solutions and of dry preparations in petri dishes.



Spinal cord, cat



Lymphocyte toxicity test  
double staining, strongly positive



Lymphocyte toxicity test  
double staining, weakly positive

### **Integrated Modulation Contrast – Leica IMC**

The innovative technique of Integrated Modulation Contrast (IMC) now introduced by Leica in the DM IL produces Hoffman Modulation Contrast without the need for special objectives – ordinary brightfield or phase contrast objectives can be used. The Leica IMC provides a high-contrast, 3D image of transparent objects similar to that of interference contrast. Plastic culture vessels do not impair the quality of the image as the technique is polarization-neutral.

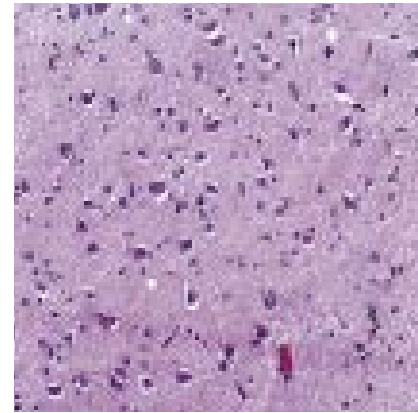
The diaphragm slide on the side of the illumination and the switchable modulator in the intermediate image of the pupil produce a type of modulation contrast without modifying the objectives. High contrast, high resolution, a halo-free relief image of either stained or unstained specimens make Leica's IMC a new standard in the class of inverted routine microscopy.

### **Fluorescence**

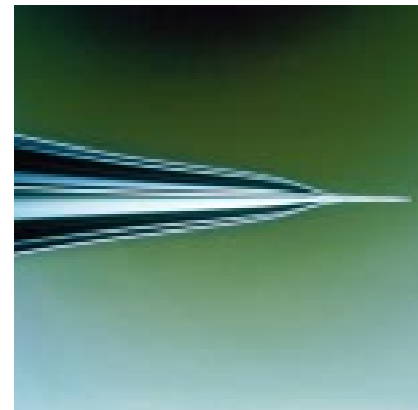
The fluorescence model of the DM IL reflects the growing significance of fluorescence for in vivo/in vitro microscopy. The main components of this configuration are an incident light axis integrated in the microscope stand, incorporating a fluorescence slide for three filter cubes. A wide range of light sources with multi-lens, chromatically corrected collectors brighten up even the weakest fluorescence. The fluorescence filter cubes comprise an optimally matched combination of excitation, reflection, band-pass and barrier filters. We are constantly updating our range of filter cubes to keep pace with the latest challenges in biology and medicine.

Transmitted light techniques can be used simultaneously or alternately in order to clearly co-localize fluorescent and non-fluorescent structures.

The Leica DM IL offers you a powerful system for immunology, cytopathology, virology – in fact wherever fluorescence techniques are used in combination with inverted microscopy.



Human brain



Femtotip microinjection needle  
(Photo: Eppendorf)



Fibroblasts

# Leica Microsystems – the brand for outstanding products

Leica Microsystems' mission is to be the world's first-choice provider of innovative solutions to our customers' needs for vision, measurement, lithography and analysis of microstructures.

Leica Microsystems, 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.

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We specialize in supplying complete solutions for histology and cytopathology.

### Imaging Systems

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Our automated, leading-edge measurement and inspection systems and our E-beam lithography systems make us the first choice supplier for semiconductor manufacturers all over the world.