



# Leica DMIL

Inverted Microscope –  
for all Routine and Laboratory Applications

*Leica*

# Leica DM IL – compact inverted microscope for laboratory routine

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

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

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

Optimised phase contrast and brilliant incident light fluorescence make the Leica DMIL the number one choice in contrasting microscopes.



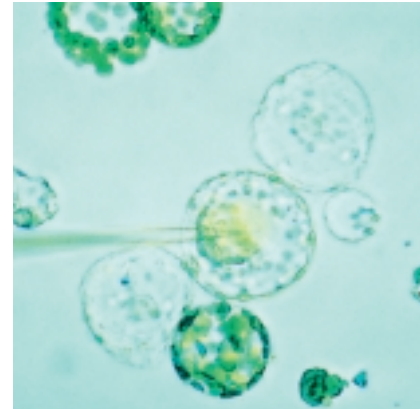
Leica Design by Ernest Igl/  
Christophe Apothéoz

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

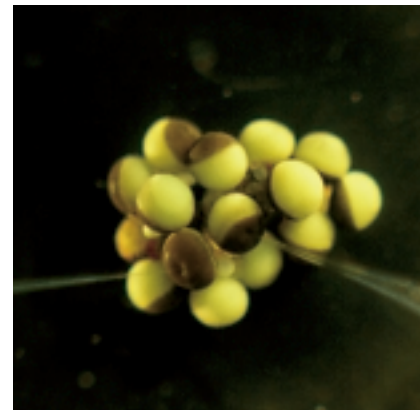
The adaption of the Leica DM IL to infinity optics allows the integration of Leica HCS\* components for superb image resolution, brilliant contrast and precise colour rendering. The DM IL is the inverted equivalent of our successful upright DM microscopes of the L and R class.

The Leica DM IL 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

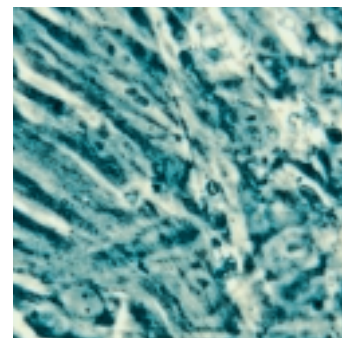
The stand of the Leica DMIL microscope is stable, aluminium-cast and excellently designed. There are two versions for biological applications:

**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 optimised 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 centre 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 guarantee focusing which is not only ultra precise but also stable over long periods of time.



Discussion unit



Cardiac muscle cells

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

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

You will be convinced by the DMIL's first-class technology and many innovative and practical ideas.

We at Leica believe microscopy should be a pleasurable experience and designed the DMIL to be associated with enjoyment at the laboratory workplace.



DMIL with illumination column the other way round



Trinocular tube with MPS



Trinocular tube with DC 100



Ergonomic phototube

# The Technology

## **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 and 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-centred, extremely powerful 6V 35W halogen lamp provides optimal illumination even of critical specimens. The transmitted light illumination concept is rounded off by 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 round by 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 spoon-shaped holder. We are constantly adding to our wide range of filters, enabling you to selectively optimise the illumination for observation and image documentation.

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

The 6V 35W 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 a whole 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 (20-50 mm) allow smaller petri dishes to be used as well without losing the 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 round off the range of stages for the DM IL.



Micromanipulation ...



... and scanning stage

# The Optics



Eyepieces and objectives



DMLB tube

The optics are the heart of every microscope and decisive for the quality of information. We have set new standards here 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-type 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 whole 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 graticule can be inserted.

The DMIL range also comprises many different observation and photo tubes. The tubes are interchangeable and can be individually rotated by 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



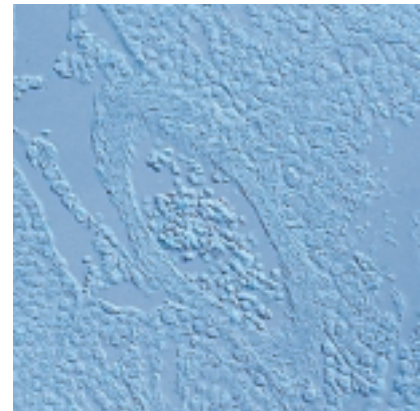
Developments in diagnostics and med./biol. research (e.g. fluorescence applications) and the increasing use of video technology and electronic image processing have to be paralleled by intelligent technical adaptations of the microscope system.

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.

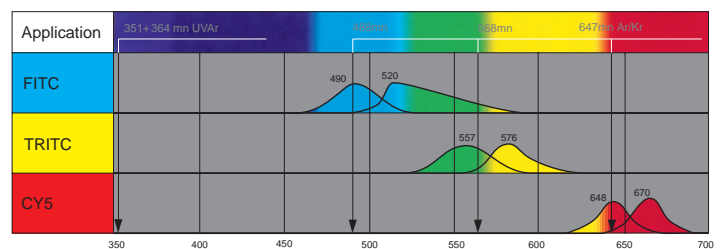
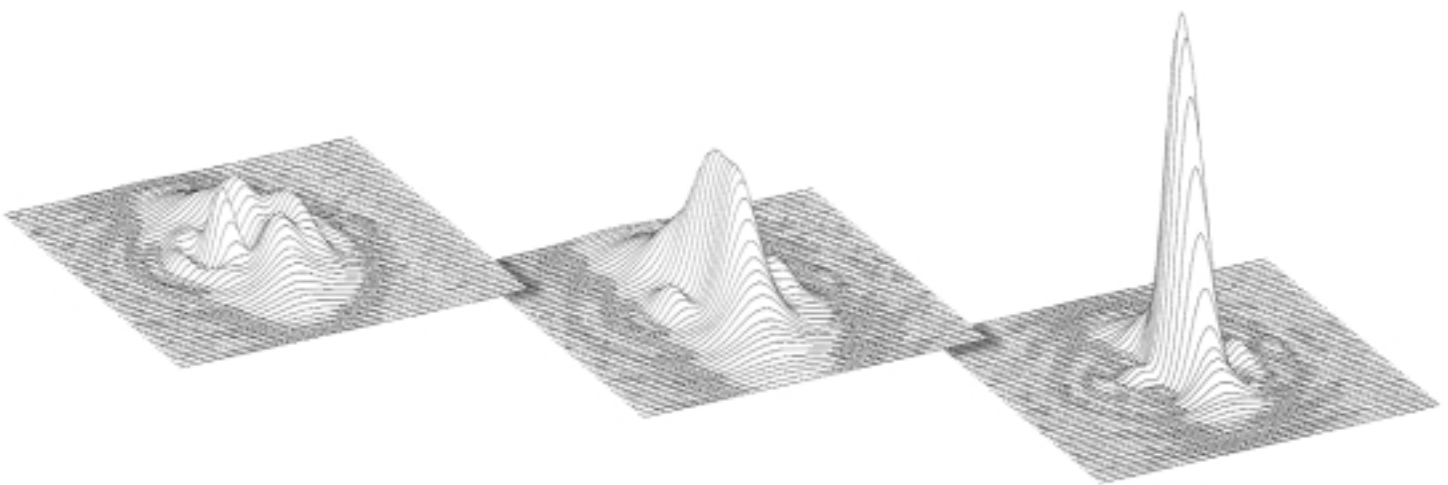
The abbreviation HCS stands for Harmonic Component System. Its special features are:

- 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 harmonised 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 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.

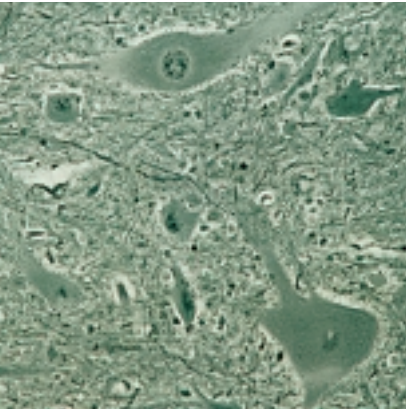
## Brightfield

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 6V 35W halogen lamp ensures optimal illumination.

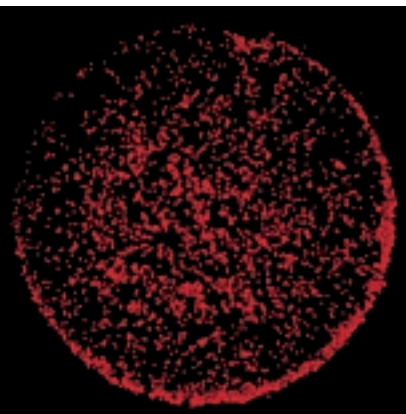
## Phase contrast

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.

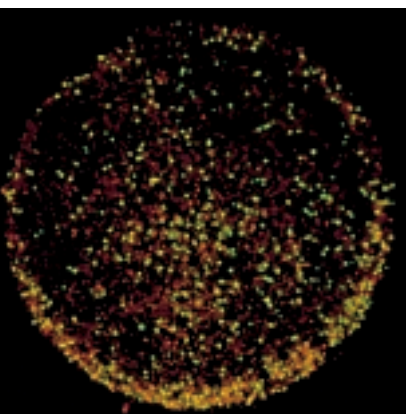
Phase contrast is a useful technique for high-contrast imaging of unstained specimens. The phase contrast technique used by Leica on the DM IL has been optimised for inverted microscopy applications and produces equally excellent contrast in watery solutions and of dry preparations in petri dishes.



Spinal cord, cat



Lymphocyte toxicity test  
double staining, strongly positive



Lymphocyte toxicity test  
double staining, weakly positive

### **IMC (Integrated Modulation Contrast)**

The innovative technique of Integrated Modulation Contrast (IMC) now introduced by Leica in the DMIL is based on Hoffman's principle and produces this 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 polarisation-neutral.

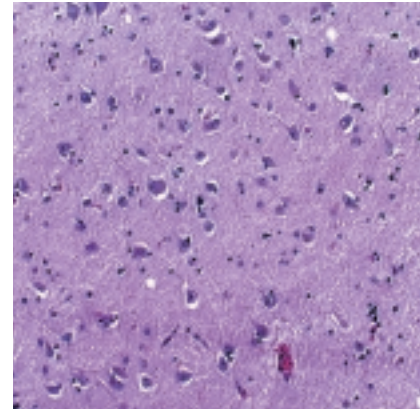
The diaphragm slide on the side of the illumination and the switchable modulator in the intermediate image of the pupil produce the type of contrast named after Hoffman without modifying the objectives. High contrast, high resolution, a halo-free relief image of either stained or unstained specimens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

### **Fluorescence**

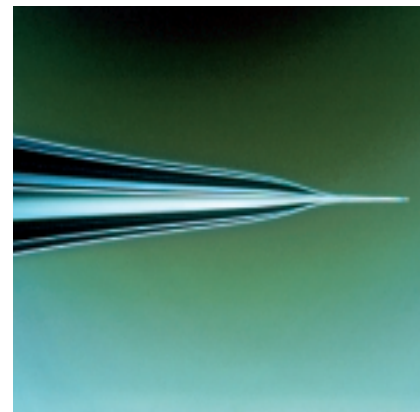
The fluorescence model of the DMIL reflects the growing significance of fluorescence for in vivo/in vitro microscopy. The main components of this configuration are an incident light axis integrated in the microscope stand, incorporating a fluorescence slide for three filter cubes. A wide range of light 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 in alternation in order to clearly allocate fluorescent and non-fluorescent structures.

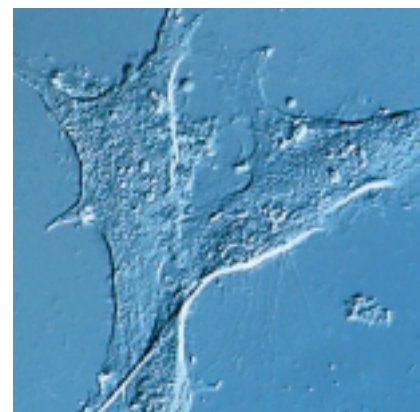
The Leica DMIL offers you a powerful system for immunology, cytopathology, virology – in fact wherever fluorescence techniques are used in combination with inverted microscopy.



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, the leading brand for microscopes and scientific instruments, has developed from five brand names, all with a long tradition: Wild, Leitz, Reichert, Jung and Cambridge Instruments. Leica symbolizes not only tradition, but also innovation.

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