# Quantum Design

## LATIN AMERICA

Raising The Science

Materials Science

Spectroscopy

Cryogenics

Optics

Nanoscience

Sample Synthesis

Biotechnology & Chemistry

Industries

Microscopy

Quantum Technology

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Durham Magneto Optics is specialized in advanced scientific instrumentation for nanotechnology research and development, producing equipment in two categories, a family of magneto-optical Kerr effect magnetometers (NanoMOKE3) and a family of direct-write optical lithography machines (MicroWriter ML).

MicroWiter ML3 family is designed for highly demanding individual research groups or for central clean room facilities. The optical microscope contains a full set of high performance bright and sharp infinite conjugate objectives up to x20 with a software controlled automatic lens changer, allowing large substrate areas to be searched rapidly and individual sub-micron objects such as nanowires and crystal flakes to be accurately located. An additional lens offering 0.4 µm minimum feature size and x50 microscope is available as an option.

In addition to the optical surface profilometer tool and automated wafer inspection tool, there is a Virtual Mask Aligner mode in which the pattern to be exposed is displayed on top of the real-time microscope image, allowing the machine to be used like a traditional mask aligner. A backside alignment camera for aligning double-polished wafers is available as an option.

All the machines have fast writing speeds and have an impressive array of advanced features usually only found in high-end machines. Also, they are designed for use by PhD students and post-docs in a research environment and so have an attractive, intuitive and simple Windows® user interface while offering the flexibility and high levels of access to machine operation for those who want to develop new techniques.

The machines handle the small millimetre-size chips often used in R&D, as well as large wafers. By sharing a common technology platform, you can upgrade your system to a more complete version in the future.

## Most common applications:

- Microelectronics and semiconductors
- Spintronics and sensors
- MEMS / NEMS
- Microfluidics and lab-on-a-chip
- Nanotechnology
- Materials science and materials development

**BIG AREAS**

Materials Science | Sample Synthesis
Spectroscopy



Durham Magneto Optics Ltd



## Key features:

- 195 mm x 195 mm maximum writing area
- 230 mm x 230 mm x 15 mm maximum wafer size
- Resolutions: 0.4 um, 0.6 µm, 1µm, 2 µm and 5 µm
- Automatic selection of minimum feature size via software – no manual changing of lens required.
- Long-life lights source: 405, 385 or 365 nm
- Very fast writing speed - up to: 17 mm²/min (0.6 µm minimum feature size) and 180 mm²/min (5 µm minimum feature size)
- Acceptable file formats: CIF, GDS2, BMP, TIFF, JPEG, PNG, GIF
- Grey scale exposure mode for 3-dimensional patterning (255 grey levels)
- Includes on-site installation by trained service technician.
- Competitively priced for University and industrial R&D budgets
- Low ownership cost and easy to operate

# Durham Magneto Optics

## England

Durham Magneto Optics is specialized in advanced scientific instrumentation for nanotechnology research and development, producing equipment in two categories, a family of magneto-optical Kerr effect magnetometers (NanoMOKE3®) and a family of direct-write optical lithography machines (MicroWriter ML).

NanoMOKE3® is a new generation of ultra-high sensitivity magnetooptical magnetometer and Kerr microscope. Building on the success of NanoMOKE2®, it offers high performance laser magnetometry and video-rate Kerr microscopy in a single machine. It is sensitive to the longitudinal, transverse and polar magnetooptical Kerr effects and is ideally suited to measuring the magnetic properties of thin magnetic films and magnetic nanostructures.

LX Pro 3 allows the laser to be moved so as to locate specific areas, allows complex applied field patterns to be easily generated, records hysteresis loops and allows post-processing of the loops to filter noise, remove artefacts and automatically measure key loop parameters such as coercivity and remanence. It also allows real-time display of images during rastering, capture of photographic quality images and basic image processing such as contrast-brightness correction and profile measurement. LX Pro 3 also includes a macro language which can be used to interface NanoMOKE3® to other software routines that you may wish to write and to automate complex measurements.

Auxiliary electronic inputs and outputs allow NanoMOKE3® to be connected to your own experimental control. The auxiliary laser input port allows NanoMOKE3® to use an existing laboratory laser instead of the built-in laser.

## Most common applications:

- Magnetic thin films
- Magnetic nanostructures
- Magnetic tunnel junctions
- MRAM
- Hard disk read / write heads
- Spintronic devices
- Magnetic sensors
- Magnetic material development
- Magnetocaloric and thermomagnetic materials

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## Key features:

- Ultra-high sensitivity and stability
- Very low noise (< 0.5 mdeg)
- Highly focused laser spot (2 µm, in high-mag polar)
- Video-rate microscope to allow precise positioning of laser spot on sample and domain imaging
- Flexible optics and electronics for novel experiments
- 3.3 K-350 K Helium free cryostat or 4 K-500 K cryostat available as options
- 0.26 T applied field in x and y or z; 0.65 T field in x or z available as option
- Sensitive to Longitudinal, Transverse and Polar Kerr rotation and ellipticity
- Supplied with LX Pro, our easy to use and flexible control software