

Hinds Instruments has applied the power and versatility of the Photoelastic Modulator (PEM) to produce a birefringence imaging microscope. As the world leader in PEM technology, Hinds has manufactured and developed PEMs for over 50 years. For more than 20 years Hinds has built birefringence measurement solutions, marketed under the Exicor® brand. The superior polarization modulation capabilities of the PEM have delivered the highest sensitivity birefringence measurement solutions on the market.

Birefringence Imaging Microscope

The Exicor Birefringence MicroImager offers researchers in academia and industry the ability to evaluate birefringence of both biological and industrial materials. With a spatial resolution down to $0.7\mu\text{m}$, a detection limit (noise floor) of 2nm and a measurement range of beyond 3500nm , the MicroImager offers quick and reliable measurements in an integrated system package that includes camera, optics, electronics, sample stage hardware and software.

The system offers a choice of 3 or 4 Color configurations: red, orange, green or blue light sources, and a choice of either a 2X (5 micron resolution) or 5X (2 micron resolution) objective. Additional objectives may be added as options, including 2X, 5X, 10X and 20X objectives. The MicroImager turret allows mounting of up to 4 objectives.

The Exicor MicroImager system comes standard with a phase unwrapping solution for determination of magnitude of high birefringence samples (i.e. $>300\text{nm}$). The phase unwrapping software uses a proprietary algorithm to estimate the true retardation magnitude (up to 2400nm for RGB systems and $3500\text{nm}+$ for ROGB systems). The system can also be customized to use other wavelength sources (contact Hinds for details).

The Hinds Birefringence Imaging Microscope is ideal for measuring birefringence in biological structures (see Figure 1), glass, crystals, and many other organic and inorganic samples.

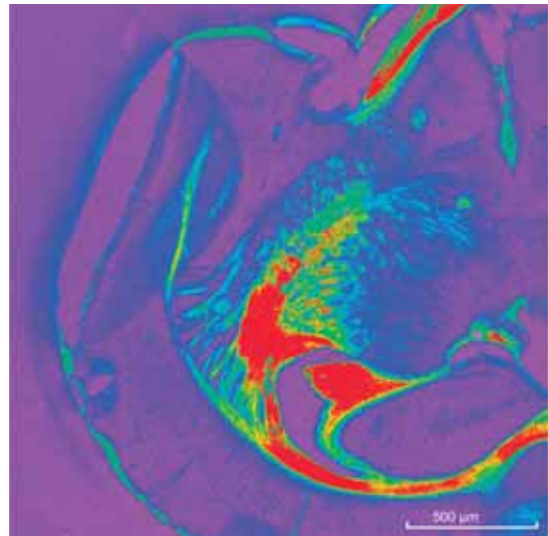


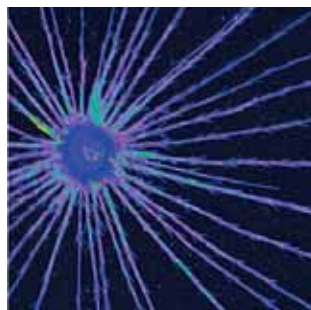
Figure 1. Myelinated White Matter in a mouse brain.



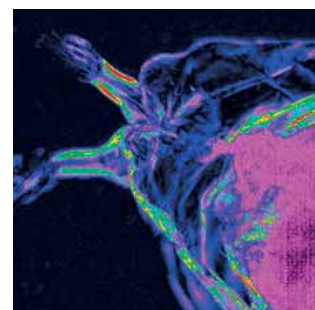
Figure 2. The Exicor Birefringence MicroImager. Now with customer requested turret.

FEATURES

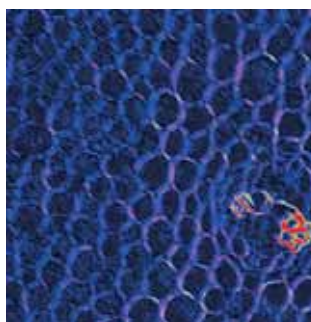
- ♦ No Dyes or Fluorescent labels required
- ♦ Measures retardation, angle and intensity
- ♦ Images retardation, angle and intensity
- ♦ Allows color maps to be customized by user for optimal display of data
- ♦ Allows maximum, average, and standard deviation over entire image and in user-selected areas or lines
- ♦ View data by intensity, birefringence/retardation, angle, or combination
- ♦ Histograms for statistical analysis
- ♦ User calibration
- ♦ Export of data in .csv and binary formats
- ♦ Export of data from user selected areas
- ♦ Export images in bmp, png or tiff formats
- ♦ Compatibility with third party analysis tool, ImageJ
- ♦ Phase Unwrapping. For highly birefringent samples - up to 3500nm with 4 color configuration and up to 2400nm with 3 color configuration



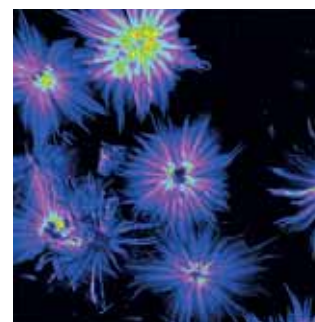
DANDELION FUZZ 10X
RETARDATION AND ANGLE



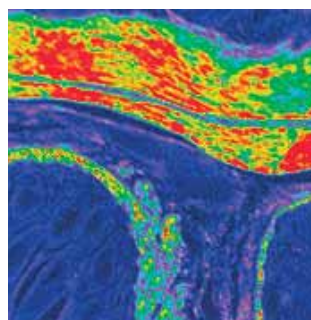
DROSOPHILA 10X
RETARDANCE



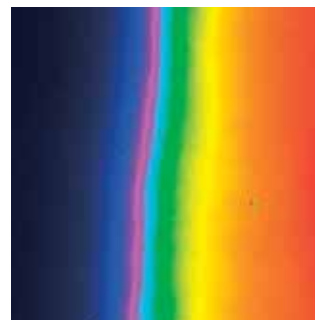
RANUNCULUS ROOT, C.S. 10X
RETARDANCE



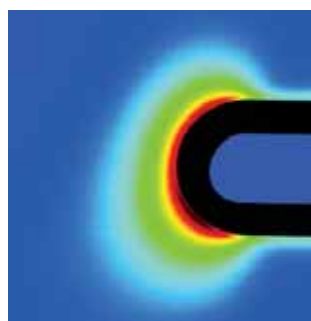
SILVER BERRY SCALY HAIR 10X
RETARDANCE



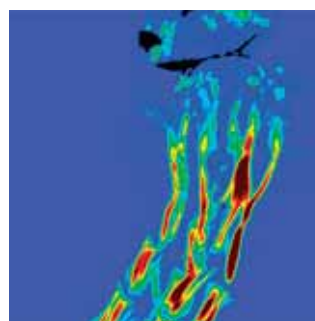
DOG COLUMAR EPIHELUM 10X
RETARDANCE



MULTI TAPE SAMPLE
RETADANCE



CELL PHONE COVER
RETARDANCE



MOSQUITO LARVAE 5X
RETARDANCE

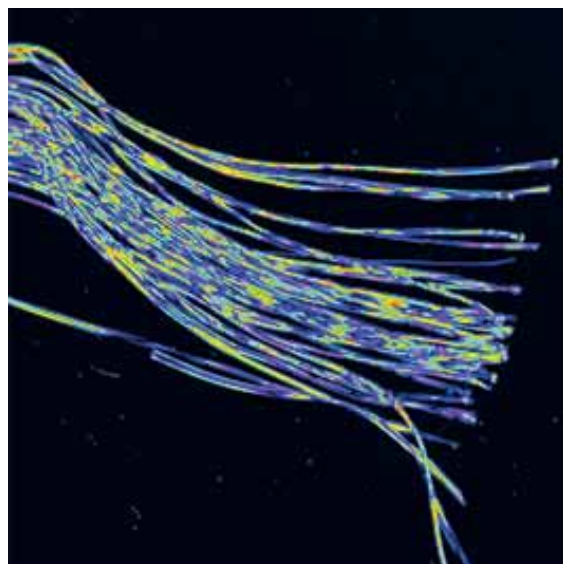
SPECIFICATIONS		RESOLUTION AND FIELD OF VIEW		
Retardation Repeatability ¹	$\leq 0.6\text{nm}$ (3σ)	Imager	Resolution	2048 nm x 2048 nm
Wavelengths	Red (655nm) Orange (615nm) Green (530nm) Blue (475nm)		Bit-Depth	12 bits
Retardation Measurement Range	2nm - 0.5λ above $0.5\lambda^2$, phase unwrapping to 3500nm	Objective ³	Resolution	Field of View
		2X	5 micron	5.6 mm x 5.6 mm
		5X	2 micron	2.2 mm x 2.2 mm
		10X	1 micron	1 mm x 1 mm
		20X ⁴	0.7 micron	0.56 mm x 0.56 mm
Measurement Speed	nominal 7 sec			
Dimensions	Footprint			
	Height			
Stage Travel (x, y)	75 mm, 56 mm			

¹ Magnitude above 2nm

² Phase Unwrapping: 3 color system to 2400nm, 4 color system to 3500nm

³ 2X, 5X, 10X Noise Floor ~1nm. 20X Noise Floor ~2nm

⁴ 20X includes a lens to focus beam on the detector



SILK FIBERS SET
 RETARDANCE

