

## DHM® R1100 series

**The ultimate optical profiler with sub-nanometer resolution and no vertical scanning needed up to 10 µm**

Lyncée Tec's DHM R1100 series of reflection configured high precision optical profilers offers the ultimate technology based on Digital Holographic Microscopy. It keeps the features, the versatility and ease-of-use of the DHMR1000 series. In addition to the single wavelength mode that gives these instruments the same real-time performances, the DHM R1101 and R1102 have two additional operating modes:

- the alternate dual wavelength mode for fast measurements of steps up to 10 µm and smooth samples up to the objective's depth of field
- the vertical coherence scanning mode for vertical dimensions up to 10 mm

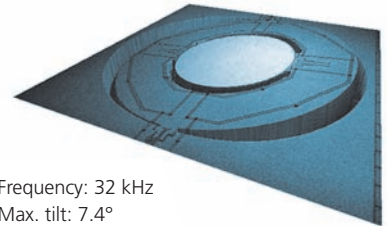
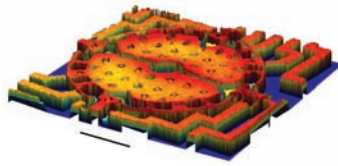
DHM R1100 series is compatible with the optional Lyncée Tec stroboscopic module for intuitive investigation of MEMS / MOEMS. The signal generator is integrated into the module, allowing the powerful Koala software to drive your sample and synchronize the acquisition in order to retrieve its full-field topography along the complete cycle, in a similar way to the real-time mode.

The off-axis holographic principle ensures the vertical calibration is only determined by the wavelength. No mechanical movement needs to be calibrated. DHM's single and dual wavelength modes are thus the optical profiler modes with the least systematic error sources on the market. DHM thus not only ensures high accuracy, but also ultimate precision.

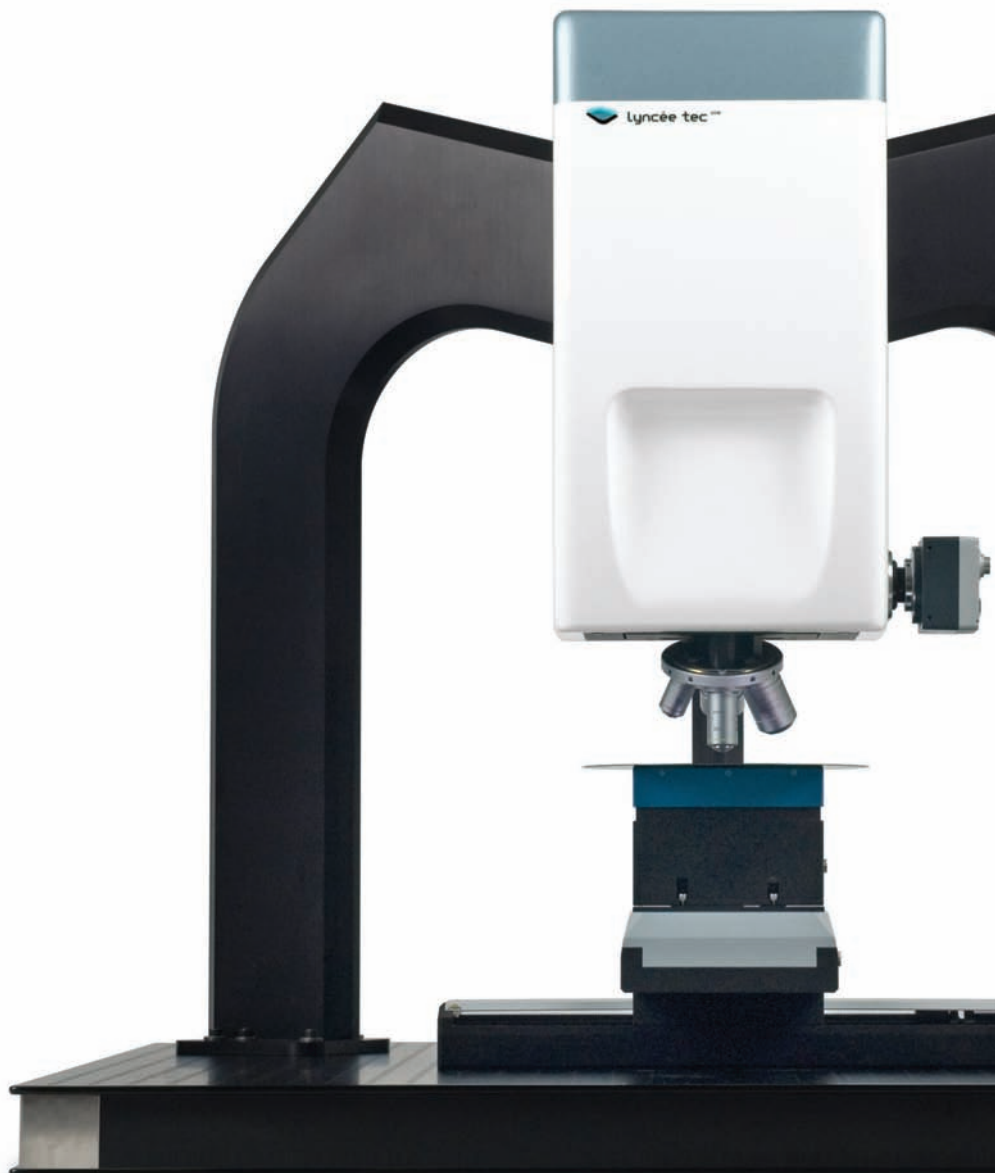
The DHM R1100 series is composed of two models:

- the DHM R1101 may be fitted with manual or motorized stages up to 150 mm × 150 mm travel range for sample with dimension up to 415 mm
- the DHM R1102 may be fitted with larger motorized stages up to 300 mm × 300 mm travel range for samples with dimensions up to 530 mm × 870 mm

The R1101 can be upgraded to the R1102.



Frequency: 32 kHz  
Max. tilt: 7.4°



## Technical specifications

System	
Measurement techniques:	single and dual wavelength digital holographic microscopy in reflection and vertical coherence scanning
Image types:	intensity and quantitative phase contrast image (DHM mode), optical topography (vertical scanning)
Light sources:	two monochromatic laser sources
Sample stage:	manual or automated XYZ stages up to 300 × 300 × 12.5 mm travel range
Camera:	1392 × 1040 pixels, 8 bits
Available objectives:	standard, high NA, long working distance, water/oil immersion microscope objectives
Objective mounting:	4-position turret
Computer:	Dell workstation with latest Intel® processor, optimized and configured for DHM, with 19" SXGA monitor
Software:	Lyncée Tec proprietary Koala classic software based on C++ and .NET
Optional working mode:	stroboscopic mode

## Performance

Measurement mode:	Single wavelength	Dual wavelength	Vertical scanning
Accuracy <sup>1</sup> :	0.1 nm	25 nm (0.1 nm) <sup>4</sup>	0.5 μm
Vertical resolution <sup>2</sup> :	0.2 nm	50 nm (0.2 nm) <sup>4</sup>	1.0 μm
Repeatability <sup>3</sup> :	< 0.01 nm	0.25 nm (< 0.01 nm) <sup>4</sup>	< 0.05 μm
Vertical calibration:	determined by the wavelength, no mechanical movement calibration		
Vertical measuring range in single wavelength:	up to depth of field for smooth samples, up to 340 nm for sharp edge samples		
Vertical measuring range in dual wavelength:	up to depth of field for smooth samples, up to 10 μm for sharp edge samples		
Vertical measuring range in vertical scanning:	up to 10 mm, z-stage dependent		
Lateral resolution:	objective dependent, down to 300 nm with oil immersion objectives (1.4 NA)		
Field of view:	objective dependent, up to 4.4 mm		
Working distance:	objective dependent, from 0.3 to 18 mm		
Digital focusing range:	up to 50× depth of field (objective dependent)		
Grabbing time (1 hologram):	down to 1 μs in a single image grab		
Spatial sampling:	1024 × 1024 pixels (hologram)		
Acquisition rate:	15 fps (1024 × 1024 pixels) (optional up to 300 fps)		
Single wavelength reconstruction rate:	15 fps (512 × 512 pixels), 4 fps (1024 × 1024 pixels)		
Dual wavelength acquisition time:	1.5 s		
Vertical scanning acquisition time:	scanning speed: 6 μm/s, reconstruction time: 6 s		
Min. sample reflectivity:	less than 1%		
Sample illumination:	down to 1 μW/cm <sup>2</sup>		

## Power requirements

Input voltage:	85-260 VAC - 50/60 Hz
Power requirements (w/o computer):	max. 480 W

## Dimensions & weight

Microscope:	R1101	R1102
Dimensions (L × W × H):	600 × 600 × 800 mm	900 × 900 × 850 mm
Weight:	45 kg	80 kg
Maximum sample size (L × W):	∞ × 415 mm	530 × 870 mm

<sup>1</sup> As demonstrated by taking the temporal standard deviation on 1 pixel over 30 measurements\*.

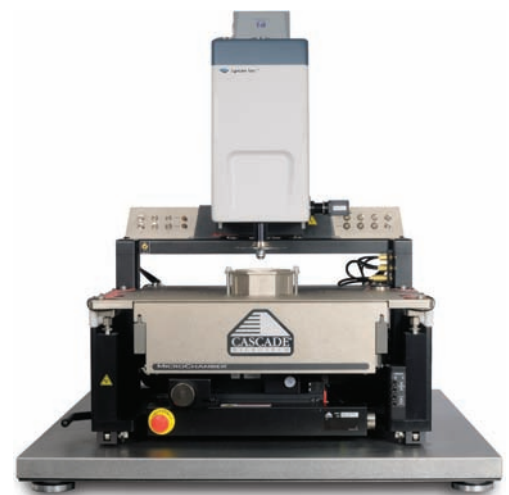
<sup>2</sup> Defined as twice the accuracy.

<sup>3</sup> As demonstrated by taking the one sigma Rq value of 30 repeatability measurements\* on SiC reference mirror.

<sup>4</sup> When combined to single wavelength measurements.

\* For single wavelength, 1 measurement is the average of 10 acquisitions.

Specifications are subject to change without notice.



DHM R1100 system on Cascade probe station