

Intellium™ H2000

FIZEAU INTERFEROMETER



Simultaneous Phase-Shifting for Vibration Intensive & Turbulent Environments

SPARC® Technology Insures Measurement Errors of Less than $\lambda/100$ with NO Vibration Isolation

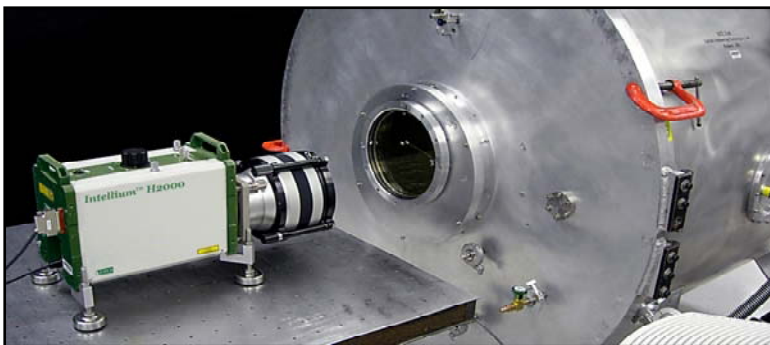
The **Intellium™ H2000** Simultaneous Phase-Shifting Fizeau Interferometer is a real-time, high-speed, truly vibration-insensitive metrology instrument with shutter speeds as fast as 10 μ s. Ideally suited for shop/production floors and other vibration or turbulent environments, the **Intellium™ H2000** offers unsurpassed measurement accuracy, versatility, stability and repeatability for analyzing optical, machined and semiconductor wafer surfaces.

APPLICATIONS

- Measure flat, concave and convex surfaces, small to astronomical size
- Long optical path length and remote Fizeau cavity measurements
- Vacuum/cryogenic chamber measurements
- In-situ measurements of optical, machined & wafer surfaces
- High-speed measurements for fluid flow and thermodynamic events
- Characterization of birefringence

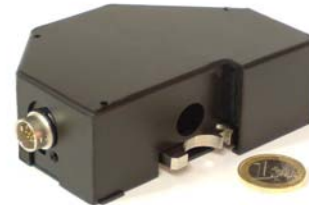
MAIN FEATURES & BENEFITS

- Absolute vibration insensitivity
- Common path Fizeau geometry
- Measure surfaces with 0.1% to 100% reflectivity
- Remote Fizeau cavity applications
- 10 μ s exposure times
- True 1k x 1k resolution, fringe density equivalent to ≥ 250 fringes of tilt
- Uses Industry Standard 100 mm (4") bayonet reference optics

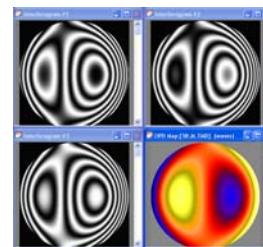


How it Works

Simultaneous phase-shifting inside the **Intellium™ H2000** is accomplished by replacing the standard camera with ESDI's patented **HyperPhase™** module.



The **HyperPhase™** module produces three ultra precise phase-shifted interferograms, which are simultaneously acquired and processed into a 3D surface map.



The **HyperPhase™** module is so robust it is backed by a **lifetime** alignment and phase-shift warranty.

Surface & Wavefront Metrology Beyond Compare

Engineering Synthesis Design, Inc.

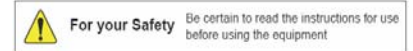
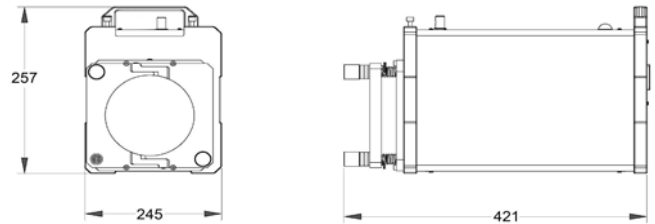
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Intellium™ H2000 Specifications	
Technology	Patented simultaneous phase - shifting
System	
Test Beam	102 mm (4.0")
Zoom	1X to 6X with remote option
Focus	+/- 4.0 m with remote option
Attenuation	Adjustable with remote option
Alignment	Simple two spot alignment
Alignment View	± 1.5 degrees
Part Viewing	Live video with two monitor option
Performance¹	
Repeatability 3-Flat ²	$\lambda/300$ PV
RMS Repeatability ³	< 1 Å
Calibrated Accuracy	< $\lambda/100$
Uncalibrated Accuracy	$\lambda/15$ (no reference subtract required)
Height Resolution	$\lambda/8000$
Spatial Resolution	1k x 1k True Resolution
Fringe Resolution	Fringe density equivalent to ≥ 250 fringes of tilt
Digitization	8 bits
Recording Speeds	15 Frames/Sec. (faster frame rate options)
Exposure Time	10 μ s minimum
Averaging Modes	Intensity and Phase
Sample Reflectivity	0.1 to 100% with no attenuation or special coatings required (1.0 to 100% with HeNe)
Laser Beam	
Source	632.8nm HeNe Laser, < 2mW 633nm Laser Diode, <5mW 1064nm, <5mW
Polarization	Linear Linear
Coherence	>100 m >100 m 300 m
Electrical	
Power	110/240 Volts, 50/60 Hz, <25 Watts
Mechanical	
Dimensions	337 x 190 x 254 mm (13.3" x 7.5" x 10")
Weight	14 kg (31lb); \leq 19kg (42lb.-remote options)
Environmental Requirements⁴	
Temperature	15 to 30°C (59 to 82°F)
Rate of Temp. Change	<1.0°C per 15 min
Humidity	Relative 5% to 95%, no condensing
Vibration	NO vibration isolation required
Computer	High Performance – Current Technology

- 1) Performance in a lab with temp change < 1°C/15 min between 20-23°C.
- 2) 3 sigma repeatability of 3-Flat Test with 32 averages per set.
- 3) 3 sigma of the rms for 128 data sets, each an average of 32 measurements.
- 4) These parameters state conditions which the system can operate; they do not represent the environmental stability required to meet performance.

Intellium™ H2000 Interferometer



Configurations

- Operates in ANY orientation
- Long Optical Path and Remote Fizeau Cavity
- OEM Integration

Accessories

- Full set of reference optics (see lower left)
- 100 mm (4") to 33 mm (1.3") beam reducer
- 100 mm (4") to 150 mm (6"), 200mm (8") and 300mm (12") beam expanders
- Compatible with all industry standard 4" reference optics

Computer Workstations

- High performance computer with **IntelliWave™** software pre-installed
- All hardware interfaces pre-installed for complete **Intellium™ H2000** interferometer data acquisition

IntelliWave™ Software

- Multiple fringe unwrapping algorithms
- Multiple aberration polynomial sets for analysis
- Diffraction and geometric analysis
- Derivatives and Integrals
- Complex masking including unlimited mask groups
- Fiducials and image transformations
- Measurements: Wavefront, Wedge, Angle, Prisms, 3-Flat Test, Two Sphere Test, Homogeneity
- Interface to MATLAB™, IDL™, LabVIEW™, Excel™
- **IntelliPhase™** – static spatial carrier analysis

Reference Optics (partial list)					
F/#	TS				TF
	0.75	1.5	3.3	7.0	
Diameter (mm)	130				126
Height (mm)	93	88	70	92.5	30
Weight (kg)	3	2.9	2.1	2	0.7
Radius of TS	47	120	299	665	-
Accuracy	$\leq \lambda/10$				$\leq \lambda/20$



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