

9-Megapixel Fizeau Interferometer

Accurate Mid-Spatial Frequency Surfaces on Curved or Flat Optics

System Overview

Measurement Capability	Mid-Spatial Frequency Surface Structure
Output Diameter	9 mm (0.35 inch)
Working Distance/ Fixed Focus	Nominally 40 mm
Interferometer Size (L x W x H)	45.6 x 15.3 x 16.4 cm
Weight	TBD
Temporal Coherence Control	Variable down to 100 μ m
Spatial Coherence Control	Virtual extended source, while averaging
Measurement Techniques	Fast/Sensitive Synchronous, and Vibration Tolerant PSI
Three Optional Light Sources	SCI SpectrÄ
Alignment System	Not required with 9 mm Field of View
Measurement Coherence Length	SCI SpectrÄ, < 1 mm
Output Polarization	Circular
Camera Resolution	3000 X 3000 pixels
Camera Frame Rate (max)	\leq 43 Hz (source dependent)
Shutter Speed (shortest)	9 μ s
Digitization	8 bit
Computer & Software	High-Performance PC, Windows 11 64-bit OS & REVEAL Software
Mounting Configurations	Horizontal or Vertical Manual, Semi-Automated or Automated

Performance

Spatial Frequency Range	0.2 l/mm to 120 l/mm
Fringe Resolution	< 1200 fr/aperture
Retrace Error ³ @ 1200 fringes	< $\lambda/15$ ⁴
RMS Simple Repeatability ¹	< 0.03 nm RMS 2σ
Accuracy ²	< 0.15 nm RMS 2σ
Measurable Part Reflectivity	0.5% to 40% Other options available

Environment

Temperature	15°C to 30C
$\Delta T/\Delta t$	< 1.0°C/15 min
Humidity	5 to 95% relative, non-condensing
Vibration Isolation	Isolation System Required

High Resolution with Low Spatial & Temporal Coherence

Ä9|9MP Fizeau interferometer enables practical Mid-Spatial Frequency measurement: Advanced camera limited optical design, controlled spatial and temporal coherence, and rapid data acquisition.

Low temporal and spatial coherence yields a sub-nanometer noise floor with 10's of picometer repeatability.

Temporal coherence control is accomplished using ÄPRE patented Spectrally Controlled Interferometry (SCI). In the short coherence mode interference fringes are isolated to the measurement surface. This eliminates interference fringes produced by other surface back reflections.

A spatial coherence buster minimizes speckles and spurious fringes, and other noise sources to minimize the measurement noise.

Notably, the design achieves retrace error performance approaching 30 nm, even at maximum slopes of 1,200 fringes across the field of view.

Advanced PSD Analysis and filtering reports the surface performance with easy to understand RMS result over a specified spatial frequency band.



¹ RMS Simple Repeatability Test: The RMS variation of 30 sequential measurements with each measurement the average of 30 measurements
² Accuracy Test: Acquire 30 sequential measurements. Average all measurements, subtract each measurement from the average. The mean plus 2 sigma of the subtracted measurements of these 30 is the accuracy
³ Retrace Error is defined as the PV residual error between a nulled measurement (the reference), subtracted from a measurement with 1200 fringes of tilt, and expressed by the first 36 Zernike polynomials
⁴ System resolution proven using commercially available LNL/NIST developed BPRA resolution test artifact

REVEAL

Metrology Software for Interferometers

Introducing REVEAL 23

UNIQUE and NEW!: No interferometer is an island...with REVEAL 23

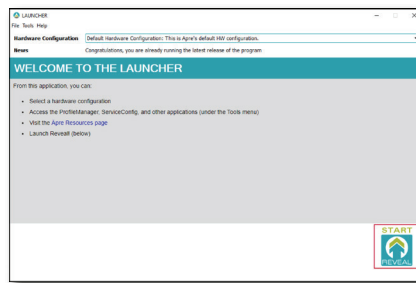
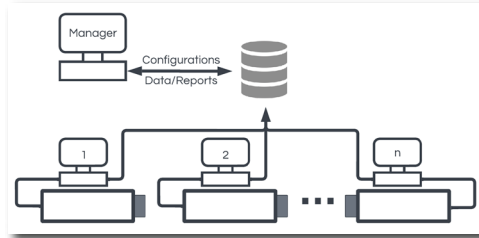
Load measurement recipes and report forms from a central controlled library. Automatically save data to your database. Eliminates setup errors, and user-to-user variations by standardizing the entire measurement process from a central, password controlled location.

NEW! Setup user access and passwords:

In the Profile Manager grant or restrict global or individual access to measurements. Assign what can be edited, where data is saved, and then password (encrypted) protect.

NEW! Configure your hardware with a click:

ÄPRE state-of-the-art interferometers use multiple sources, which means multiple hardware configurations. Just switch the source, click the hardware configuration and launch REVEAL 23 to start measuring.



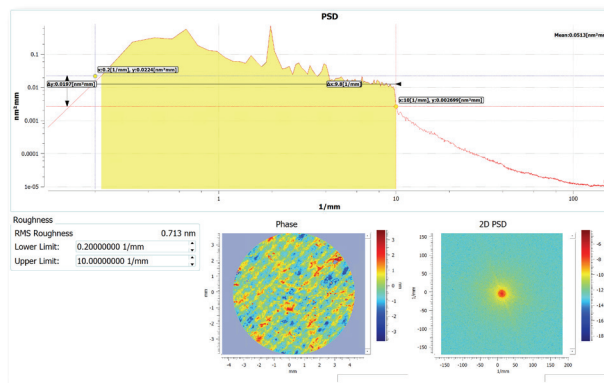
Inside REVEAL 23

REVEAL functionality is maintained:

All the menus, results, screens, data and setups are maintained. So there is no learning curve.

More Analyses are Standard:

Standard analysis, Optical Shop Testing and Fourier Analysis are included in the standard package so licensing is easier.

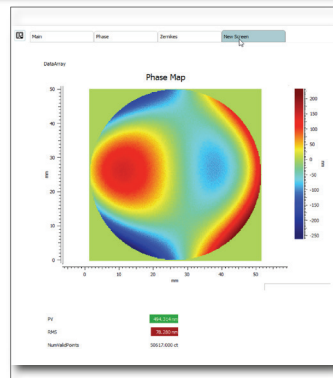


NEW! Create Your Own

Custom Screens: With an easy to use editor, display the graphs and results required and even set GO/NOGO tolerance flags on important results. Then save your custom screen for future use. The screen at the right was configured in five minutes! It's that easy.

NEW! "Undo" mask shapes. You're in the middle of creating a mask and you want to make a change. The new Undo function takes you back one step to retry. Less time lost, and more freedom to experiment.

NEW! Event Log: Sometimes "things" happen. To correct an error and to get production up and running the



Over nine years ago REVEAL innovated interferometer software

- Traceable metrology via the analysis tree, saved with as-measured (.rvl) data
- Data analysis based on international standards and leading laboratories worldwide
- Apply filters/masks to data along the entire analysis tree
- Fast, consistent reporting via a default, and customizable report library
- 64-bit operation to handle modern 9-Megapixel and larger cameras without crashing
- Remote training and debugging via TeamViewer
- Clean, browser like, non-overlapping screens
- Compatible with historic .dat data files

Now REVEAL 23 tightens QC with enterprise control, increases security, and lets you customize screens



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