PhaseCam® NIR

Dynamic Near-Infrared Twyman-Green Interferometers

Instantaneous Acquisition

PhaseCam® NIR systems are compact, lightweight, dynamic laser interferometers operating at wavelengths of 1.053 μm to 1.55 μm. With simple, manual controls these systems are ideal for long optical path-length measurement of large, focal optical systems such as concave telescope mirrors and lens systems, and for testing small aperture afocal components such as flat mirrors and collimators.

PhaseCam NIR systems incorporate a single camera, high-speed optical phase sensor that makes a wavefront measurement in less than 30 microseconds—over 5000 times faster than a temporal phase shifting interferometer. Because acquisition time is so short, the PhaseCams can be used under almost any conditions without vibration isolation or turbulence control. This insensitivity to environmental factors makes the PhaseCams ideally suited for use on the production floor, in clean rooms and in environmental test chambers.

Complete Measurement System

The PhaseCam NIR is a turnkey instrument that includes the interferometer, 4Sight™ advanced wavefront analysis software, and complete, high-speed computer system. Samples with any reflectivity from 1% to 100% can be measured with a simple adjustment.

Industry Leading Analysis, Standard

4Sight wavefront analysis software features a user-friendly interface with unmatched simplicity, analysis features and graphical displays. The Measurement Console display aids alignment and execution of single, averaged, burst or continuous data acquisition. The Measurement Flow interface lets you visualize the entire measurement data flow, from raw acquisition through masking, reference subtraction, terms removal, etc. The unique Measurement Stack enables complex data manipulation and comparison. Zernike, Seidel, geometric and diffraction analyses are easy to perform. Comprehensive data sharing capabilities let you read, write, save and print from most file types, including MetroPro IDL®, MatLab®, Opticode®, Vision®, HDF5® and CodeV®. Generating phase movies to characterize deforming surfaces and moving parts is simple and straightforward.

Accessory Optics

Numerous accessories and options are available including diverger lenses and beam expanders.

FEATURES

- Vibration Insensitive Dynamic Operation
- 30 μsec Data Acquisition Time
- 1.053, 1.064, 1.3 and 1.55 μm Wavelengths
- Easy Sample Reflectivity Adjustment
- Outstanding Data Analysis and Visualization Software

APPLICATIONS

- Meter-Class Telescope Optics
- Quality Verification of Optical Components
- Vacuum and Environmental Chamber Testing
- Production Floor Quality Control
Specifications

**Configuration**

<table>
<thead>
<tr>
<th>Description</th>
<th>PhaseCam NIR</th>
</tr>
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<tbody>
<tr>
<td>Turnkey vibration insensitive dynamic Twyman-Green interferometer</td>
<td></td>
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<tr>
<td><strong>Acquisition Mode</strong></td>
<td>Single camera, high-speed optical phase sensor</td>
</tr>
<tr>
<td><strong>Wavelength</strong></td>
<td>1.053, 1.064, 1.3 and 1.55 μm</td>
</tr>
<tr>
<td><strong>Maximum Output</strong></td>
<td>&lt; 50 mW at 1053 nm; &lt; 300 mW at 1064 nm; &lt;10 mW at 1.3μm; &lt;30 mW at 1.55 μm</td>
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<tr>
<td><strong>Maximum Cavity Length</strong></td>
<td>&gt; 60 m</td>
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<tr>
<td><strong>Beam Diameter</strong></td>
<td>7.0 mm collimated</td>
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<tr>
<td><strong>Polarization</strong></td>
<td>Circular</td>
</tr>
<tr>
<td><strong>Pupil Focus Range</strong></td>
<td>±12.5 mm</td>
</tr>
<tr>
<td><strong>Pupil Magnification</strong></td>
<td>Fixed, 1x</td>
</tr>
<tr>
<td><strong>Fringe Contrast</strong></td>
<td>User adjustable for reflectivity from 1–100%</td>
</tr>
<tr>
<td><strong>Camera</strong></td>
<td>1K x 1K pixels standard; 640 x 512 pixels for 1.3 μm and 1.55 μm models</td>
</tr>
<tr>
<td><strong>Data Array</strong></td>
<td>User Selectable full, half, quarter data arrays</td>
</tr>
<tr>
<td><strong>Computer System</strong></td>
<td>Minimum Dual Core 2 GHz processor, 1 GB RAM, 160 GB hard drive</td>
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<tr>
<td><strong>Operating System</strong></td>
<td>Windows XP®</td>
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<tr>
<td><strong>System Software</strong></td>
<td>4Sight™ Version 1.8 or later, with User Manual</td>
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**Instantaneous Phase Shifting data acquisition**

- Reference generation, subtraction, data averaging, masking
- 2D and 3D surface maps
- Zernike / Seidel / Slope / Geometric / Fourier Analysis
- Fiducial aided data set mapping
- HD4 / HD5 data format standard, others supported
- Absolute sphere, prism & corner cube analysis
- Multiple sub-aperture analysis

**Upgrades** – free during warranty period

**Physical Envelope**

- < 75 x 25 x 18.3 cm (30 x 10 x 7.2 in)
- Weight < 15 kg (33.1lbs)
- Power consumption < 750 Watts

**Temperature Range**

- Operational: 60–80° F, non-condensing
- Storage: 30–100° F, non-condensing

**Warranty**

One Year, limited, on-site system installation and operator training

**Options**

- Beam Expanders
  - Optional 25 mm, 45 mm (others on request)
- Divergers
  - Range of lenses from f/1 to f/32

**System Performance**

- **Acquisition Rate**
  - > 10 frames/sec display; 4 interferograms/frame
  - > 25 frames/sec max data acquisition with post processing
- **Minimum Exposure**
  - 30 μsec
- **Sample Reflectivity**
  - 1 to 100%
- **RMS Repeatability**
  - < 0.001 wave*
- **RMS Precision**
  - < 0.002 wave**

* One sigma for RMS of 10 data sets of calibration mirror, each data set being an average of 16 measurements.

** Average RMS of the difference of 10 data sets between measured surface and the calibrated surface. Each data set being an average of 16 measurements. Calibrated surface is the pixel by pixel average of 10 measurements of calibration mirror.

All specifications subject to change without notice.