

PhaseCam 6110

4D

Dynamic Twyman-Green Interferometer

Instantaneous Acquisition

The PhaseCam® 6110 is a compact, dynamic laser interferometer operating at 632.8nm. It incorporates a new 4MP camera for high resolution measurement, with a 2X improvement in both RMS Repeatability and Precision over previous models. The PhaseCam 6110 features fully motorized controls and on-axis illumination and imaging, making it ideal for optical path measurement of long-radius meter-scale concave mirrors, mirror segments, telescope assemblies, and collimators. It is also optimized for the alignment of complex optical assemblies and characterization of deformable mirrors.

The PhaseCam 6110 incorporates Dynamic Interferometry® technology, using a single camera, high-speed optical phase sensor to make wavefront measurements in less than 30 microseconds—over 5000 times faster than a temporal phase shifting interferometer. Because acquisition time is so short, the PhaseCam can be used under almost any conditions, without vibration isolation. Vibration immunity makes the PhaseCam ideally suited for use on the production floor, in clean rooms and in environmental test chambers.

Compact and lightweight, the PhaseCam 6110 was designed with performance and remote measurement in mind. Moving the system to reconfigure a test set is simple and easy, and isolation equipment is not required. Fully motorized controls make it easy to operate the system in remote locations.



PhaseCam 6110, with a diverger optic, on the 5 axis pedestal.

Complete Measurement System

The PhaseCam 6110 system includes the interferometer, 4Sight™ Focus advanced wavefront analysis software, and complete computer system. Samples with reflectivity from 1% to 100% can be measured with optimal signal-to-noise ratio via a simple adjustment. The diffraction-limited optical system maximizes sampling resolution of the test part or configuration. Easy to use, the vibration insensitive PhaseCam 6110 ensures rapid and precise data acquisition.

Industry Leading Analysis

4Sight Focus wavefront acquisition and analysis software utilizes a user-friendly interface with unmatched simplicity, analysis features and graphical displays.

4Sight's 64-bit acquisition engine produces rapid analysis and display of single, averaged or burst measurements. Continuous data acquisition and real-time Zernike bar plots provide real-time visual feedback for simplifying optical system or beam train alignment.

The user-friendly interface makes data comparison, manipulation, masking, reference subtraction, filtering and terms removal simple to perform. Zernike, Seidel, geometric and diffraction analyses are standard. Comprehensive data sharing capabilities let you read, write, and save most file types, including Zemax, MatLab, Vision, MetroPro, HDF5 and CodeV.

FEATURES

- On-axis, vibration-insensitive dynamic interferometer
- Superior instrument transfer function
- Fast data acquisition
- Continuously adjustable sample reflectivity compensation

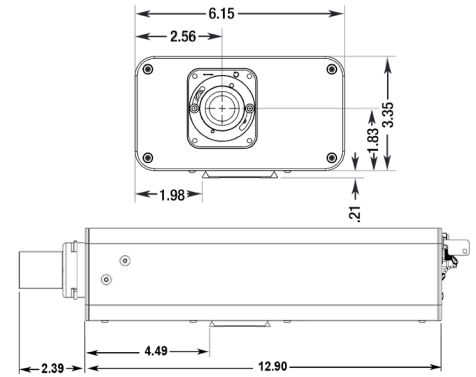
APPLICATIONS

- Meter-class telescope optics
- Large imaging system alignment
- Tests in vacuum/environmental chambers
- Production floor quality control
- Testing with computer generated holograms

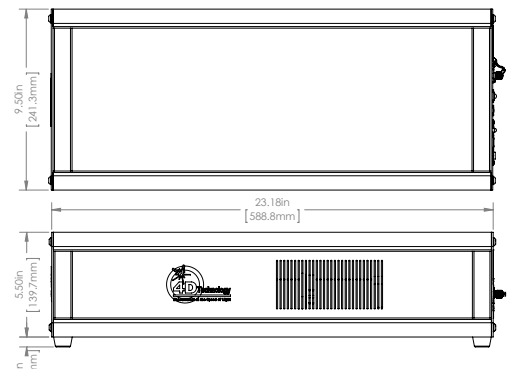
PhaseCam 6110

Specifications

| Configuration | Model 6110 633 nm |
|---------------------------|---|
| Description | Vibration insensitive dynamic Twyman-Green interferometer |
| Acquisition Mode | Single camera, high-speed optical phase sensor |
| Optical Path | Fiber-coupled head and laser source module; 5 m fiber length |
| Laser Source | Stabilized HeNe source @ 632.8 nm |
| Typical Laser Power | 1.5mW |
| Maximum Cavity Length | >100 m |
| Beam Diameter | 7 mm FWHM |
| Divergers | Range of lenses from f/1 to f/32 |
| Polarization | Circular |
| Focus Range | ±12.5 mm, optical magnification dependent |
| Pupil Magnification | 1X fixed |
| Fringe Contrast | User-adjustable for reflectivity from 1-100% |
| Camera | 4 MPx, 12-bit standard |
| Data Array | User selectable full, half, quarter data arrays |
| Motorized Controls | Focus, reference beam block, aperture block, contrast adjustment |
| Operating System | Windows® 10 or higher |
| System Software | 4Sight™ Focus Analysis Software 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 HDF5 data format standard, others supported Analysis of multiple sub-apertures Upgrades free during warranty period |
| Physical Envelope | Measurement Head: < 38.9 × 15.7 × 9.1 cm (15.3 × 6.2 × 3.6 in) Laser Source: 58.9 × 24.1 × 14.0 cm (23.2 × 9.5 × 5.5 in) |
| Weight | Measurement Head: < 4.3 kg (9.5 lbs) Laser Source: 12.25 kg (27 lbs) |
| Power consumption | < 750 Watts with computer |
| Temperature Range | Operational: 16-27° C (60-80° F), non-condensing Storage: -1-38° C (30-100° F), non-condensing |
| System Performance | |
| Acquisition Rate | ≥ 15 frames/sec live video ≥ 15 frames/sec acquisition with post processing |
| Minimum Exposure | 30 μsec |
| Sample Reflectivity | 1-100% |
| RMS Repeatability | < 0.0005 wave* |
| RMS Precision | < 0.001 wave** |
| Warranty | One year, limited, standard; extendable; Includes on-site system installation and operator training. |



Mainframe



Source module

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

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

Calibrated surface is the average of all 160 measurements.

Patent 7,230,717. Other patents may apply.

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All specifications subject to change without notice.

4D Technology

An Onto Innovation Subsidiary



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