

State-of-the-Art Direct Phase Measurement Interferometers

- **Current state-of-the-art direct phase measurement interferometers**
- **Predictions of future developments**

Limitations of Direct Phase Measurement Interferometers Measurements

- **Accuracy generally limited by environment**
Vibration
Turbulence
- **Measurement of surface roughness less limited by environment because path differences small**

Non-Contact Microsurface Profilers

Phase-shifting and vertical scanning interference microscopes can rapidly measure surface roughness from 0.1 nm to 2 mm steps. Both 2-D and 3-D measurements are available with up to 1024 x 1024 data point arrays.

General Optical Testing Interferometers

Several Fizeau interferometers for general optical testing are available. Beam diameters from less than 1 cm in diameter to larger than 60 cm diameter are available. Microsoft Windows based computer systems generally used.

Interferometers for measuring optical components at 10.6 μm

Commercial interferometers are available for measuring the transmitted wavefront quality of infrared materials at 10.6 μm . Accuracies up to 1/50 wave are possible. Beam diameters as large as 30 cm are available. Optics can be tested from the rough grinding state to the finished component.

Laser Diode Tester

Self referencing interferometers are available for testing collimated, converging, or diverging laser sources for wavefront phase and intensity distribution. Analyses include Strehl ratio, wavefront slope, and near and far-field intensity for wavelengths from 0.6 to 1.6 μm , with an accuracy to better than 1/50 wave.

Remember

- **If you make optics you have to be able to test the optics because you cannot make optics any better than you can test.**
- **If you purchase optics you need to test the optics you buy to make sure the optics meet the specs.**
- **If you let the supplier know you are going to test the optics when you receive them you will get better optics.**

References

D. Malacara, Ed.
Optical Shop Testing

W. Smith
Modern Optical Engineering

Kingslake, Thompson, Shannon, and Wyant, Ed.
Applied Optics and Optical Engineering, Vols. 1-11

Optical Society of America
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Thanks

**Thanks for taking the
short course.**