

The CASI™ Scatterometer



Incident plane scatter measurements with an option for polarization control

The CASI™ was developed to provide reflective and transmissive scatter measurements very near the specular beam as well as at high scatter angles. The noise floor is limited by scatter from air molecules, but it also measures right through the specular beam. Measurements can be compared to a “no sample signature scan”

allowing very near specular sensitivity. Collection apertures can be changed from a fraction of a millimeter to about 14 mm. Coupled with gain and filter changes this gives a dynamic range as large as 14 orders of magnitude. Sources and detectors from the near UV to mid-IR give it applications over a huge range of industry and government applications. The polarization control option allows measurement and analysis of Stokes vectors and Mueller matrices. The retro-scatter assembly option provides sensitive measurement of energy scattered directly back along the incident beam.

System Description

The TSW CASI® Scatterometer uses light energy (generally from lasers) as a non-contact probe to measure scattered light from a wide variety of materials. The sample is mounted vertically on stages capable of moving in X, Y and rotation. The incident angle can be set to any angle up to 85° from surface normal. CASI can be programmed to take single scans or batch scans at different incident angles.

Windows software simplifies sample and scan set-up and stores the information in retrievable scan configuration files. Measurements are compared to the signature scan while data is taken. BRDF data can be used to calculate TIS, Total Hemispherical Reflectance, PSD, and RMS roughness when appropriate. ASTM Standard data files are in a format easily read by stray radiation codes and other programs for expanded analysis capabilities.

Applications Include

Semiconductors Materials
Magnetic Storage Media

Polarization Studies
Cosmetic Appearance

Precision Machined Surfaces
Diffuse and Specular Baffles

CASI™ Technical Specifications

Measurement: BRDF, BTDF, transmittance and reflectance
Calculation of: TIS, RDIF, PSD, and RMS
Wavelength: 0.325µm to 10.6µm available
System Accuracy: 5%
System Linearity: 2%
Repeatability: 2%
Noise Equiv. BRDF: Typical 5×10^{-8} /sr (wavelength dependent)

Automated Axes

Resolution: 0.001 degrees
0.01 mm linear
Accuracy: 0.05 degrees angular
0.01mm linear

Incident Angle Range: 0-85 degrees
Receiver Angle Range: 360 degrees
Sample X Motion: +/- 3"
Sample Y Motion: +/- 3"
Raster Area: 6" L x 6" W
Sample Weight: up to 5 lbs.
Source/Detector
Occulted Area: +/- 4 degrees from specular
Controller: Dual-core computer with Bluetooth cordless keyboard and mouse
Software: Windows Menu driven control and display functions, compatible with Microsoft XP up to Windows 10 software and both 32 and 64 bit systems.

Options

Other source wavelengths and receivers are available.
Full polarization control for measurement of Stokes vectors and Mueller matrices.
Upgrade to retro- scatter measurement.



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Specifications subject to change.

On the web at <http://www.thescatterworks.com>