



The Scatter Works Inc.

...because scatter works.

## ScatterScope4™

### Fast Hemispherical Scatter Measurements



TSW is proud to announce the SS4 scatterometer. This patented instrument is a new concept in high-speed scatter metrology. It operates in both reflection and transmission and provides BRDF measurements in seconds instead.

### System Description

The ScatterScope4 consists of a compact desktop scatterometer (20" cube /35lbs) controlled by a laptop computer (included) running our proprietary ScatterMaster™

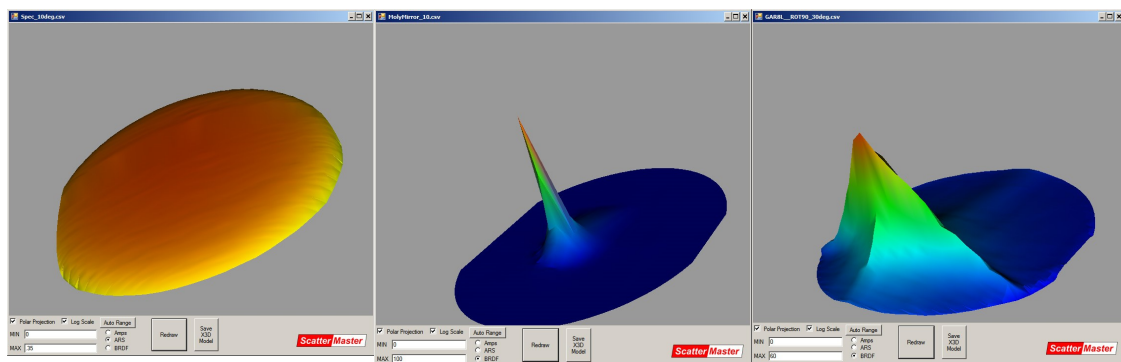
control and analysis software. The system is easy to set up and use. The software is straightforward and supports scatter analysis. The sample is horizontal so liquids and powders can be measured. An arc of 35 detectors rotates below the sample during measurements. The laser source can be moved from below the sample (reflective scans) to above the sample (transmissive scans) at incident angles up to 75 degrees

### Measurements

Programmable scans allow sampling the reflective or transmissive hemisphere tighter than 5 deg. Standard units include a 639 nm source and optionally can be configured with multiple wavelengths such as: 473, 520, 639 and 980 nm. Dynamic range exceeds 10 orders of magnitude with a noise floor of approximately  $10^{-6}$ /sr at 639 nm. This makes it capable of measuring most optics (but not polished silicon

wafers). Any incident angle up to 75 deg from surface normal can be used. Batch scans can be programmed at different incident angles. Data can be displayed in either BSDF or ARS units and is stored in Microsoft Excel spread sheets. Full hemisphere scans are typically done in 15 to 20 seconds depending on scan resolution. Data can also be displayed as 3D images as shown on the next page.

The data scans shown below were taken in 15 seconds each. The examples show the ARS (angle resolved scatter) of Spectralon taken at an incident angle of 10 degrees. The BRDF of a molybdenum mirror (also at 10 degrees), and the BRDF of a 6 micro inch GAR roughness standard (at 70 deg) that has been rotated 90 deg to the incident plane.



The software also creates “reports” saving time to share results. A camera can be used to show the bottom side of the sample to help with sample alignment.

Scatter very near the specular beam is not measured. For samples where higher angle scatter is of interest or for diffuse samples the system is perfect. Another application is for quickly measuring representative samples from a production line.

Learning to use the system is straight forward and can be accomplished at trade shows where people often bring their own samples to be measured.