



# Radial Symmetry Ellipsometer

Technology No. z00175

## Radial Symmetry and Polarization Properties

A novel ellipsometer uses radial symmetry and exploits polarization properties of high numerical aperture lenses. For example, circularly polarized light may be focused to and reflected from a spot on a sample using an objective lens. A radially symmetric analyzer apparatus (e.g., a pure polarization rotator such as two half wave plates and a radially symmetric analyzer such as a birefringent lens) can attain a radially symmetric ellipsometric signal based on the reflected light and representative of at least one characteristic of the sample.

## Ultra High Resolution from Smaller Scan Areas

Currently available techniques generally measure material properties over a large area, but determining the thickness and refractive index of homogeneous films over a larger areas is inadequate for exceedingly small featured structures. This aspect limits conventional ellipsometers to samples with large and uniform interface characteristics. This new method, however, can produce an ultra-high resolution image by scanning a relatively small spot. Measurement of homogeneous SiO<sub>2</sub> thin films on silicone as well as a photoresist microprism tested with spatial resolution of 0.5  $\mu\text{m}$  with a He-Ne lasers source and an objective lens with a NA of 0.8.

### **BENEFITS AND FEATURES:**

- Radial symmetry
- Polarization properties
- Ultra-high resolution images
- Works on relatively small spots

### **APPLICATIONS:**

- Ellipsometry
- Both large and small scan areas

**Phase of Development** - Proof of Concept

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