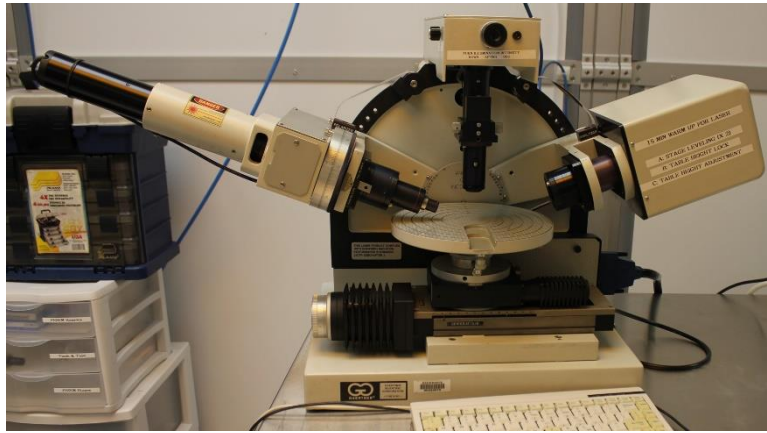


## Ellipsometer



### How It Works:

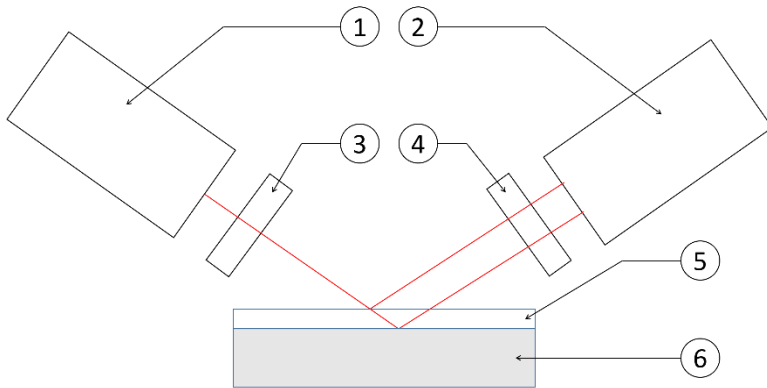
Ellipsometry is based on the measurement of the light polarization change upon reflection from a sample surface or interface. This very sensitive measurement technique provides unequalled capabilities for thin film metrology. As a non-contact optical technique, spectroscopic ellipsometry is non-destructive and is commonly used to characterize with an excellent accuracy film thickness for single layer or complex multilayer stacks ranging from a few angstroms to several microns also many other film properties can be determined. The shape of the reflected ellipse is measured and film thickness is determined based on given information from software integrated with the instrument. A linearly polarized reflected beam from the source is converted to an elliptically polarized reflected beam from the source is converted to an elliptically polarized reflected beam which is analyzed from the detector to give a readout of the index of refraction, angle of incidence, and film thickness. Ellipsometry measures the ratio of two values and because of this it can be highly accurate and very reproducible.

### Tool Operation:

The ellipsometer is capable of measuring the index of refraction and film thickness for transparent thin films deposited on a reflective substrate.

### Material / Applications:

Many types of thin films can be analyzed with this instrument: silicon, oxides and nitrides. There are some types of films that cannot be analyzed: organic films including photoresist, small features, and opaque films like metals. All films to be analyzed have to be partially transparent.



- 1 Laser source
- 2 Laser detector
- 3 Polarizer
- 4 Analyzer
- 5 Dielectric layer
- 6 Substrate

### Gartner L115S-8 Specifications

Laser Light Source:	632.8 nm helium-Neon (Red)
Incidence Angles:	50° and 70° are used mostly
Beam Diameter:	1.0 x 1.6 mm at 50° and 1.0 x 3.0 mm at 70°
Method of Measurement:	Four detector-voltages are used to determine state-of-polarization of light of reflected beam. The surface parameters Psi and Delta, and hence film thickness and index of refractive, are calculated.
Film Thickness Range:	0 to 6,000 nm
Accuracy:	±3 Angstrom
Repeatability:	±1 Angstrom
Refractive Index:	±0.005
Scanning Modes:	Operator selectable; 5 point, 9 point, XY grid or contour map
Scanning Stages:	Rotation with translation stages with built in stepping motors
Stepping Motor Drive Source:	Two axis, programmable control
Scanning Increments:	0.01° steps rotation; 0.01 mm steps to translation