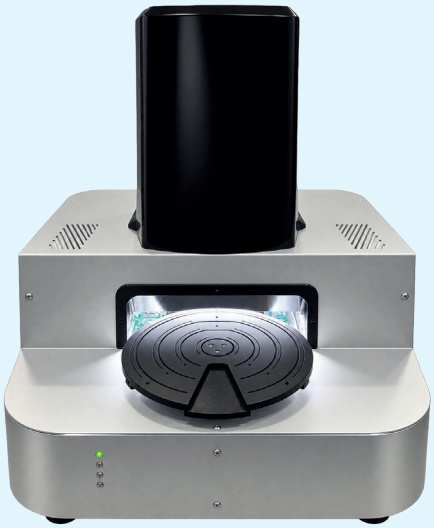
POLOS® FR-HYPERMAP

FR-HyperMap is a high-speed, line-scan hyperspectral imaging system for rapid, detailed and non-destructive area characterization of thin films and surfaces on wafers and other substrates. Combining a compact form factor combined with high-speed push-broom line-scan acquisition, FR-HyperMap captures spatial and spectral information simultaneously.



KEY SYSTEM HIGHLIGHTS:

- Full 300 mm wafer acquisition in <20 seconds
- 2.5 million independent spectral measurements per scan
- ~150 µm native spatial resolution (300 mm wafer size) for localized thickness variations and surface features
- Thickness measurement range from 15 nm to 100 µm, depending on material and configuration

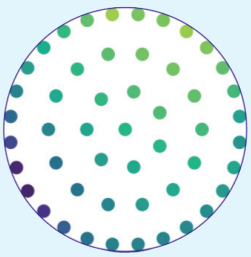
TARGET APPLICATIONS & SUBSTRATE DOMAINS

- Advanced Semiconductor & Packaging: dielectrics, photoresists, hardmasks, advanced packaging, SiC and GaN
- Optics & Photonics: PICs, waveguides, optical coatings and filters
- Displays: LCD, OLED and AR/VR technologies
- Industrial & R&D: photovoltaics, anti-reflective coatings, MEMS/MOEMS, polymers and specialty thin films
- Substrates: Si, SiC, glass, metal and other compatible materials; wafer sizes from 2-in to 300 mm

FROM SELECTED POINTS TO FULL-WAFER COVERAGE

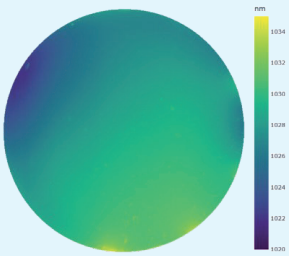
Within the same measurement time, a conventional point-scanning system can acquire approximately 100 selected measurement points, while FR-HyperMap captures approximately 2.5 million independent spectral measurements across the wafer. This high-density acquisition provides a substantially more detailed view of thickness distribution and local non-uniformities, without increasing the overall measurement time.

CONVENTIONAL-POINT MAPPING



- 50 selected measurement locations
- Acquired within 30 sec
- Discrete measurements at predefined wafer locations
- Local variations between measured positions may be missed

FR-HYPERMAP



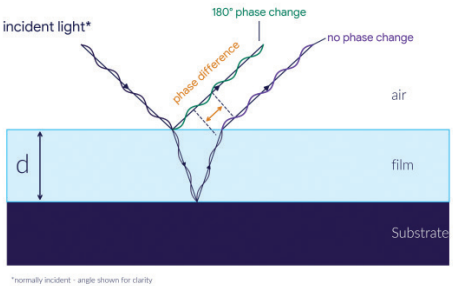
- ≈2.5 million independent spectral measurements per scan
- Acquired within 30 sec
- High-density mapping across the wafer
- Local thickness variations are captured in the resulting map

POLOS® powered by SPS
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TECHNICAL PRINCIPLE & HYPERSPECTRAL MAPPING

Hyperspectral Imaging Reflectometry (HSIR)

FR-HyperMap combines optical spectroscopy with push-broom hyperspectral imaging. Rather than acquiring one point at a time, the system captures spatially resolved spectra across the sample during a line scan, enabling non-destructive area mapping of thin-film and surface properties.



STANDARD SYSTEM CONFIGURATIONS & SPECIFICATIONS*

MODEL	VIS	VIS/NIR
Wavelength Range (nm)	400 – 700	380 – 1100
Spectral Resolution (FWHM)	2.9 nm	
Spatial Pixels	1920 px	
Min. Thickness (SiO_2)	20 nm	15 nm
Max. Thickness (SiO_2)	50 µm	100 µm
Min. Thickness for n&k	100 nm	
Scanning Line Length (FoV)	200 mm / 300 mm	
Spatial Resolution	~110 µm (200 mm wafer), ~150 µm (300 mm wafer)	
Light Source	Array of LEDs	Array of Tungsten bulbs
Wafer & Substrate Size	2 in, 3 in, 4 in, 6 in, 8 in, 300 mm, custom stage available upon request	
Scanning Throughput	Acquisition in <20 seconds	
Dimensions & Weight	545 mm (L) x 491 mm (W) x 497 mm (H)	
Power & Electrical	230V AC, 50-60 Hz, 250 W max power consumption	
Refractive Index Library	> 900 pre-loaded optical materials in library	
Software Environment	FR-Monitor suite (lifetime free software updates)	

* Specifications are subject to change without any notice;

ADDITIONAL TECHNICAL INFORMATION

Acquisition Mode	Push-broom line-scan hyperspectral imaging for spatially resolved spectral acquisition
Calibration	Factory spectral and spatial calibration is included with each system
Measurement scope	Non-destructive mapping of thin-film and surface properties; achievable thickness range depends on material and configuration