Lumina AT1 Defect Scanner

FOUR DETECTION CHANNELS:

- Polarization (Stains, Film Non-uniformity)
- Slope (Scratches, Surface Topography)
- Reflectivity (Internal Stress, Striations)
- Dark Field (Particles, Inclusions)

EFFECTIVE

Full-surface scan with sub-nanometer sensitivity

COMPATIBLE

Scan any shape as large as 300 X 300mm

EFFICIENT

Scan a 150 x 150mm sample under 4 minutes

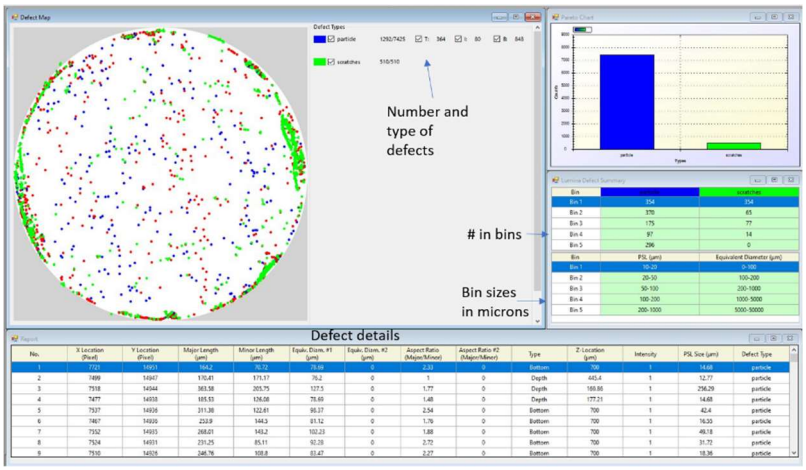
RESILIENT

Capable of scanning fragile and thin glass

- Enables full surface scan and imaging of sub-nanometer film coatings, nanometer size particles, scratches, pits, bumps, stress points and other defects.
- Scan and displays a 150mm wafer under 4 minutes.
- Capable on transparent, silicon, compound semiconductor and metal substrates.
- Accommodates non-circular and fragile substrates up to 300 x 300mm.
- Able to separate top/bottom features on transparent substrates with a single scan.
- Can scribe locations of defects for further analysis.

Using data from any combination of the multiple detectors the AT1 software generates the defect map and report:

- Map and location
- Color coded defects
- Size of defects
- Quantity of defects
- Image of defects



LUMINA INSTRUMENTS

Defects on Transparent Substrates

GLASS DEFECT DETECTION

- Both exterior and interior
- Film residue and water marks from cleaning or other processes
- Internal stress or refractive index variation
- Work with thin glass without backside interference

CLEAN AND GENTLE HANDLING

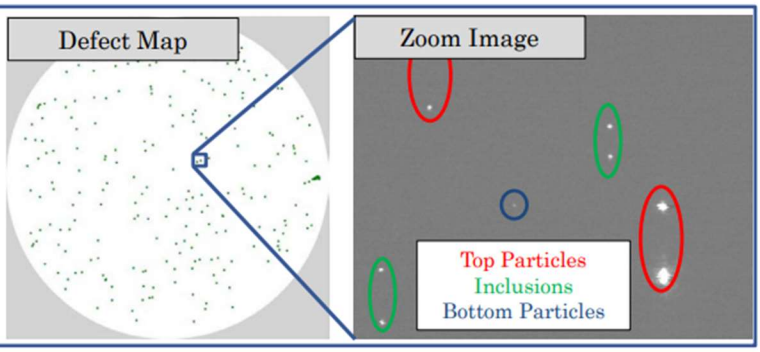
- No need for vacuum
- Edge contact
- Scan any shape
- Work with fragile samples
- High immunity to vibration

EFFICIENT

- Detect defects on top surface, bottom surface, and inclusions with one scan
- Report depth of internal defects

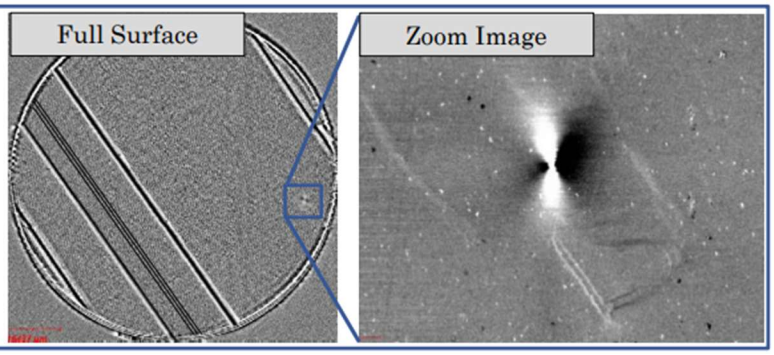
Inclusions

Contaminants incorporated within the glass during the melting phase



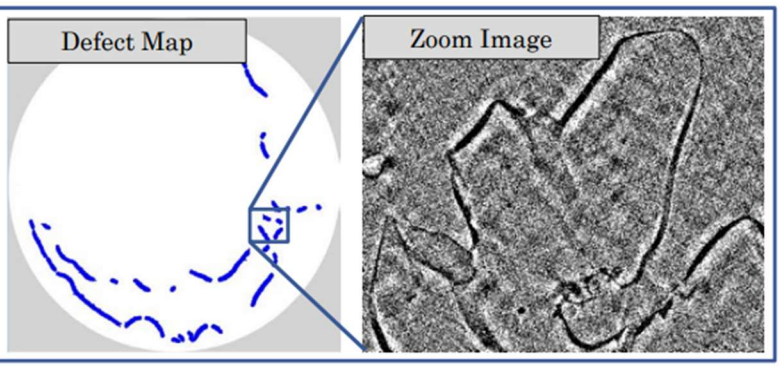
Internal Stress

Tension or index variation formed within glass during production



Stains

Discoloration on the surface due to film residue or cleaning process



LUMINA INSTRUMENTS

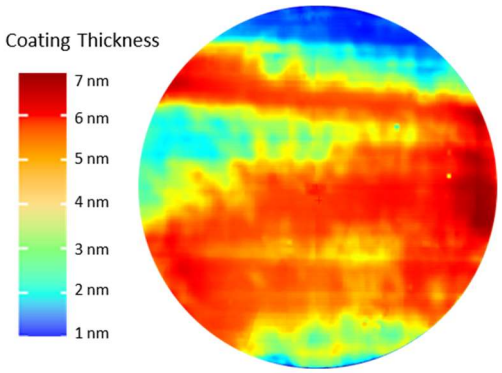
REVOLUTIONARY SENSITIVITY IN THIN-FILM DEFECT SCANNING

Sub-nanometer sensitivity in full surface scanning of thin-film contamination

Ellipsometry sensitivity at full surface scanning speed

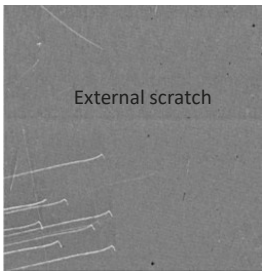
VERSATILE

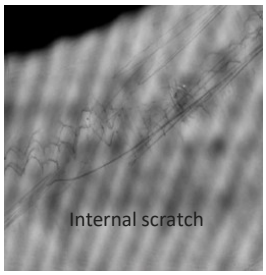
- All defect types
- Thin and thick substrates
- Transparent and opaque substrates
- Dielectric coated
- Metallic coated
- Bonded wafers
- Developmennt and inline production

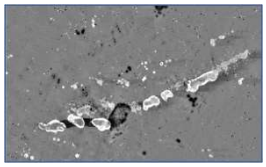


Monolayer stains or thin-film non-uniformity

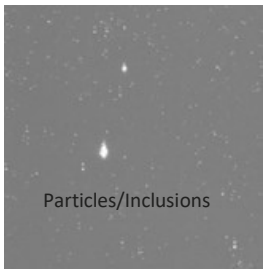
- Stains
- Water marks
- Voids
- Bubbles
- Fingerprints



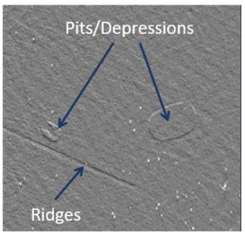


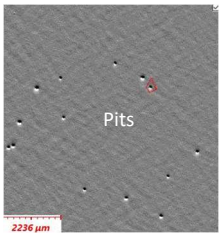


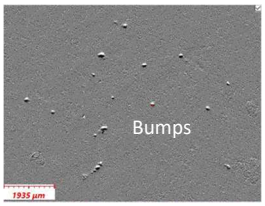
Dark: Top surface stain
Bright: Bottom surface stain

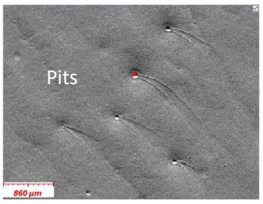


Defect examples on glass

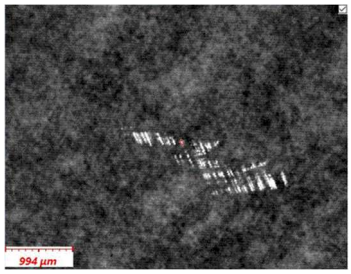




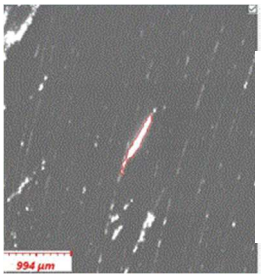




Defect examples on Si wafers



Scratches from oxide CMP



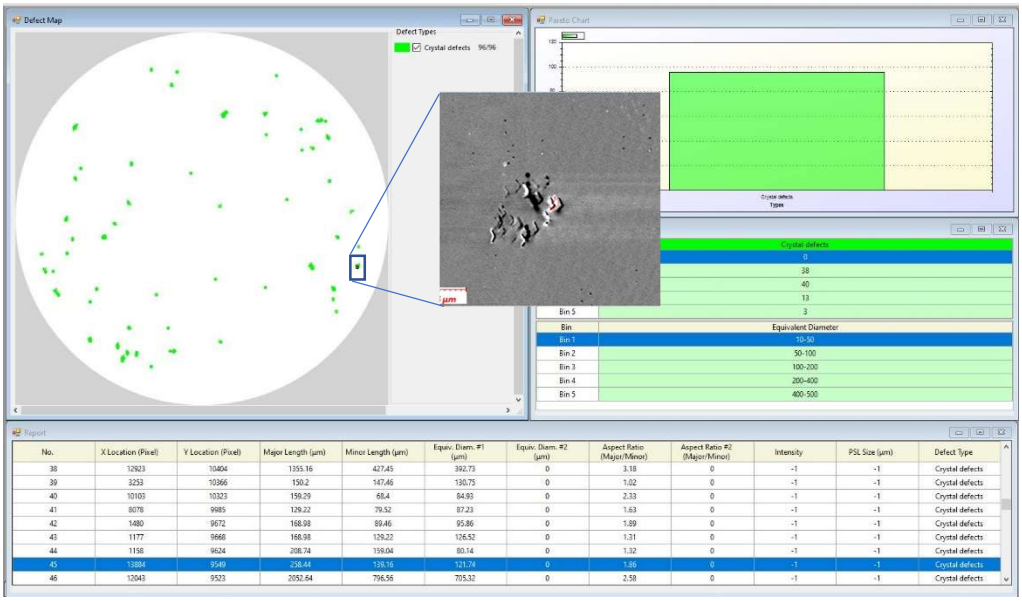
Scratches from Si wafer backside thinning

LUMINA INSTRUMENTS

Crystal Defects on Compound Semiconductor

CRYSTAL DEFECTS

Detect and classify many types of crystal defects on compound semiconductor substrates and epitaxial growth layer



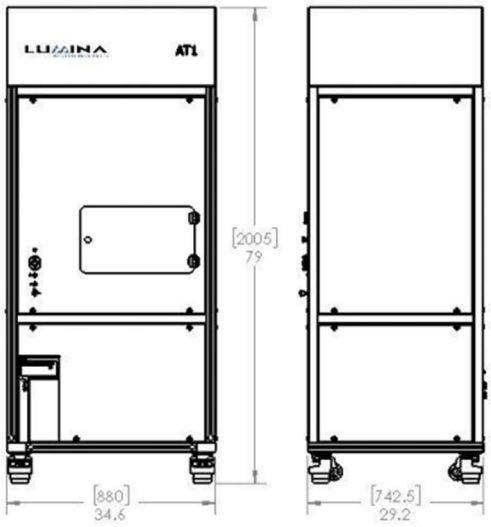
No.	X Location (Pixel)	Y Location (Pixel)	Major Length (µm)	Minor Length (µm)	Equiv. Diam. #1 (µm)	Equiv. Diam. #2 (µm)	Aspect Ratio (Major/Minor)	Aspect Ratio #2 (Major/Minor)	Intensity	PSL Size (µm)	Defect Type
38	12923	10404	1355.16	427.45	392.73	0	3.18	0	-1	-1	Crystal defects
39	3253	10366	150.2	147.46	130.75	0	1.02	0	-1	-1	Crystal defects
40	10103	10323	159.29	68.4	84.93	0	2.33	0	-1	-1	Crystal defects
41	8078	9985	129.22	79.52	87.23	0	1.63	0	-1	-1	Crystal defects
42	1480	9672	168.98	89.46	95.86	0	1.89	0	-1	-1	Crystal defects
43	1177	9668	168.98	129.22	126.52	0	1.31	0	-1	-1	Crystal defects
44	1158	9624	208.74	159.04	80.14	0	1.32	0	-1	-1	Crystal defects
45	13084	9549	258.44	128.16	121.74	0	1.98	0	-1	-1	Crystal defects
46	12043	9523	2052.84	796.58	705.32	0	2.58	0	-1	-1	Crystal defects

NEED MORE AUTOMATION?

AT1-Auto - Fully automated production systems for substrate size 200 x 200mm or smaller with factory automation capability

System Specifications

Scan time	150mm wafer under 4 minutes
Scan area	300 x 300mm
Sensitivity	Film defects < 0.5nm
	Particles, 100nm PSL on Si
	Particles, 150nm PSL on glass
Scribe	Diamond scribe
Temp	18 – 30 ^{0}C
Voltage	120 / 230VAC
Current	6A / 4A
Weight	370Kg (815lbs)
Dimension	880 x 743 x 2005mm
	(34.6 x 29.2 x 79 inches)



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