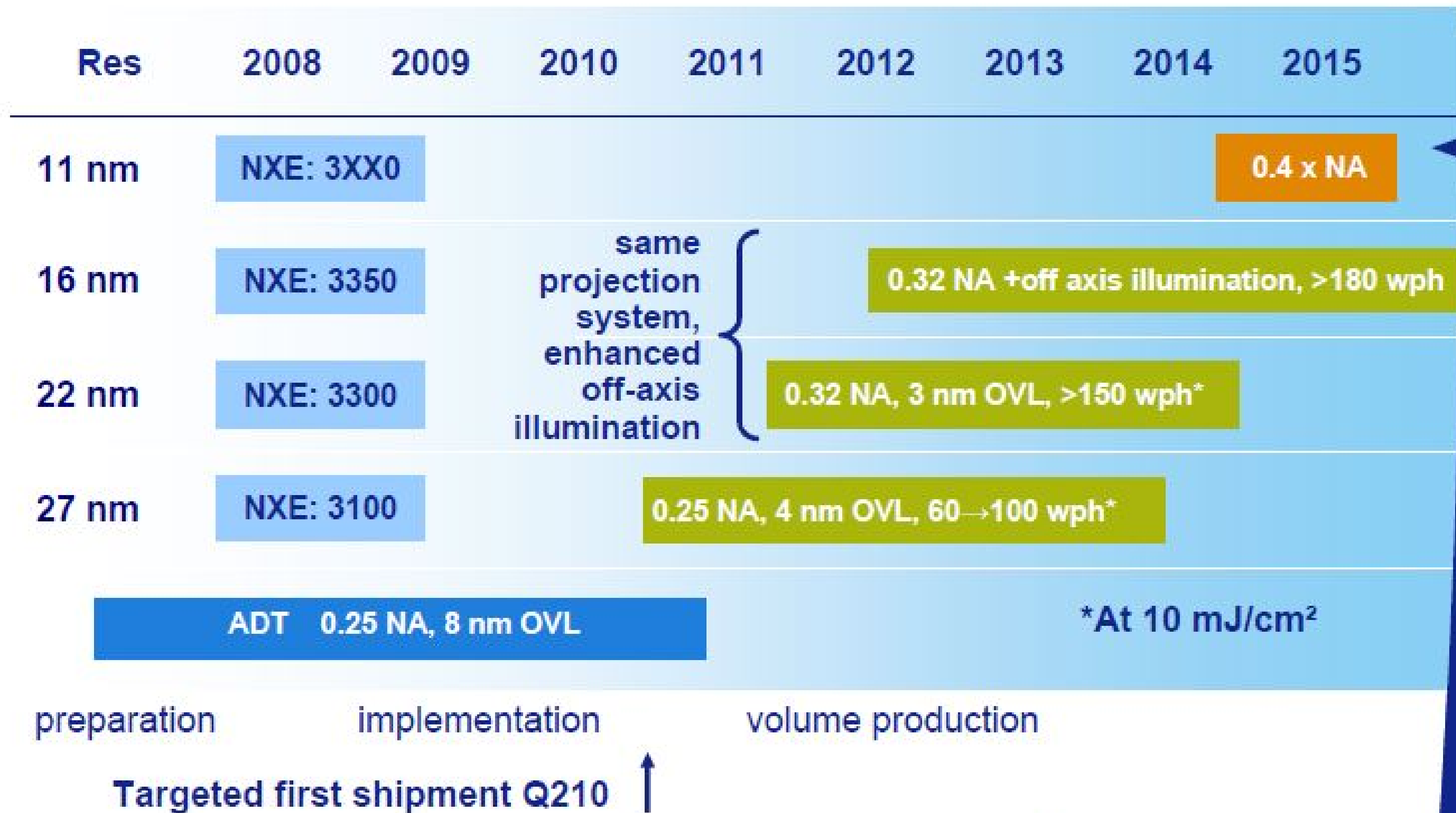
Welcome to the iEUVi Panel

"Defect Printability Mask Standardization - Attributes and Possibilities"

EUVL roadmap: a single multi-generation platform

For different optics suitable down to 16 nm



ASML

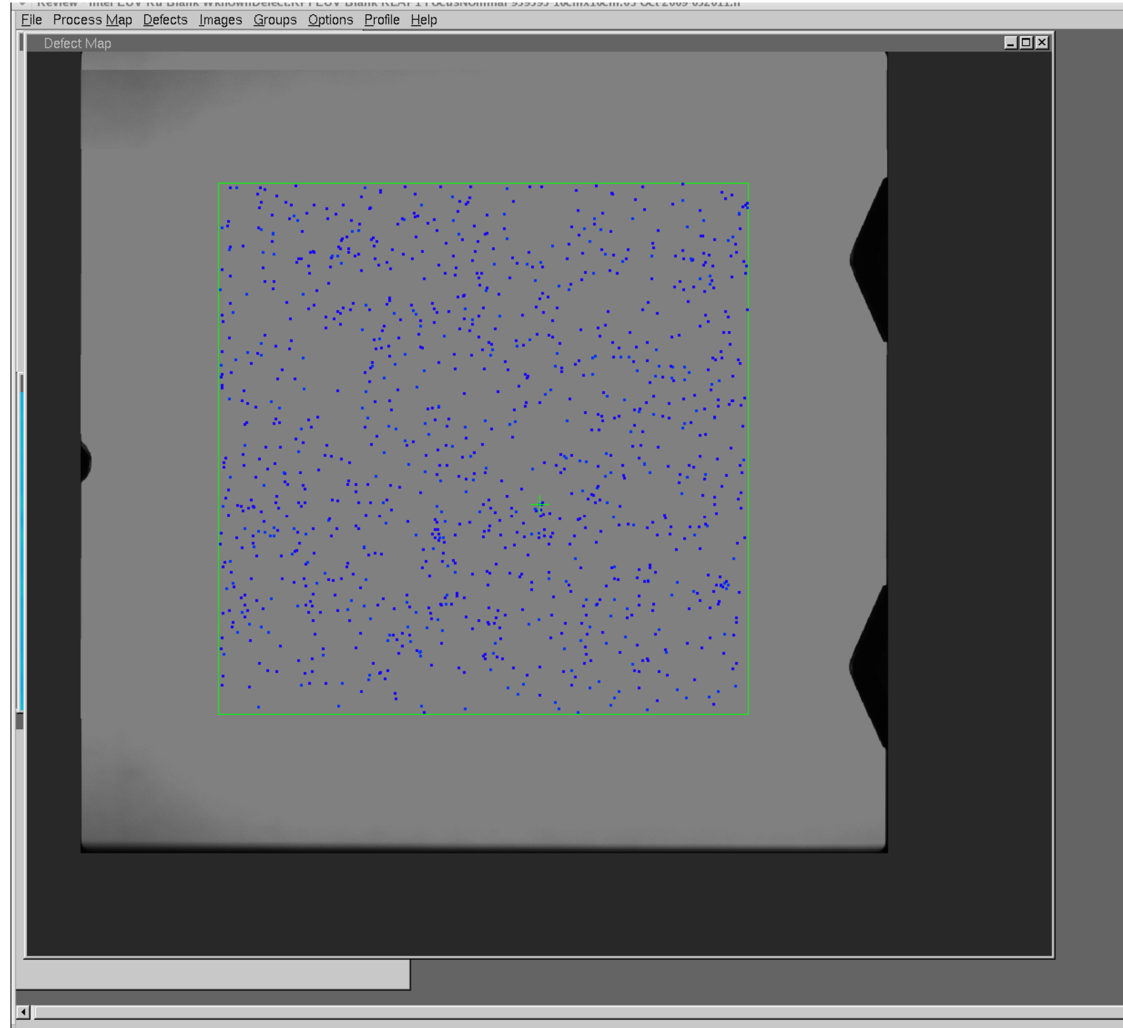
EUV mask inspection tools

Stage	Defect Size [nm] Substrate	Defect Size [nm] Blank	Substrate & Blank: Optical Tools	Substrate & Blank: Actinic Tools	AIMS & Patterned	AIMS & Patterned
Development	51	67	Lasertec M1350 (1st Generation) Lasertec M7360 (2nd Generation) M1350 & M7360 @ SEMATECH	SEMATECH Berkeley AIT Selete MIRAI	SEMATECH Berkeley AIT • 60 nm mask CD resolution • Key for defect printability understanding	Optical PMI
Development	41	53				
Development	35	40				
Pilot	20	25	2.5 Generation Substrate Inspection Tool (2.5G)	3rd Generation Blank Inspection Bridge Tool (3G)	AIMS Bridge Tool	Optical PMI
Pilot	15	20				
HVM		15		Commercial 3G Inspection Tool	Commercial AIMS Tool	Actinic Patterned Inspection

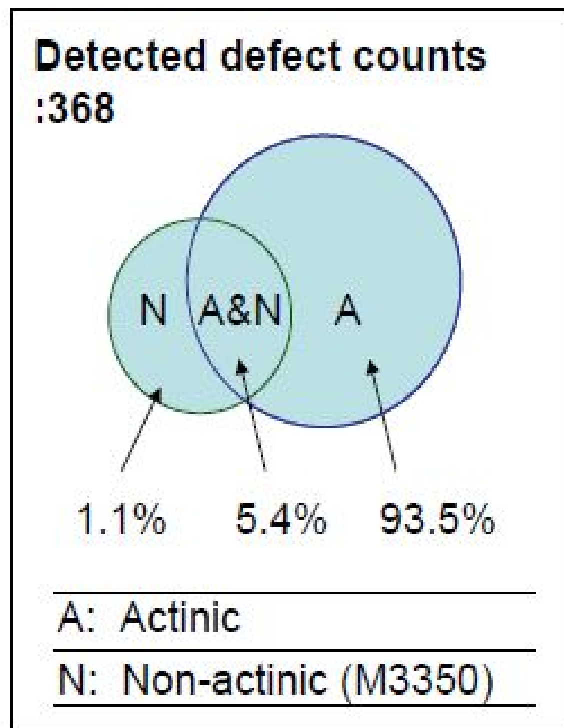
ABC = Existing Tools; [dark blue] = SEMATECH Pilot Line Tools; [light blue] = Production Tools

Blank Inspection

Defect map of natural defects on an EUV ML blank

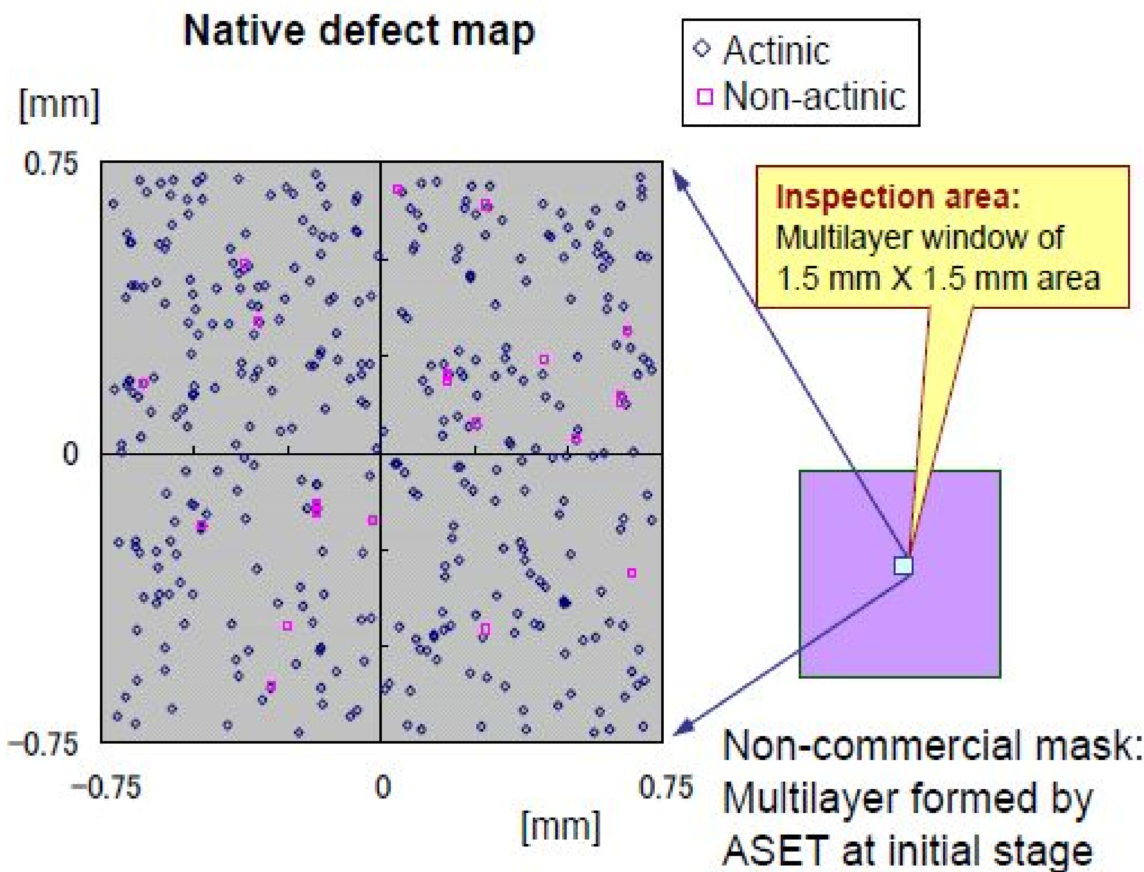


Comparison with non-actinic tool



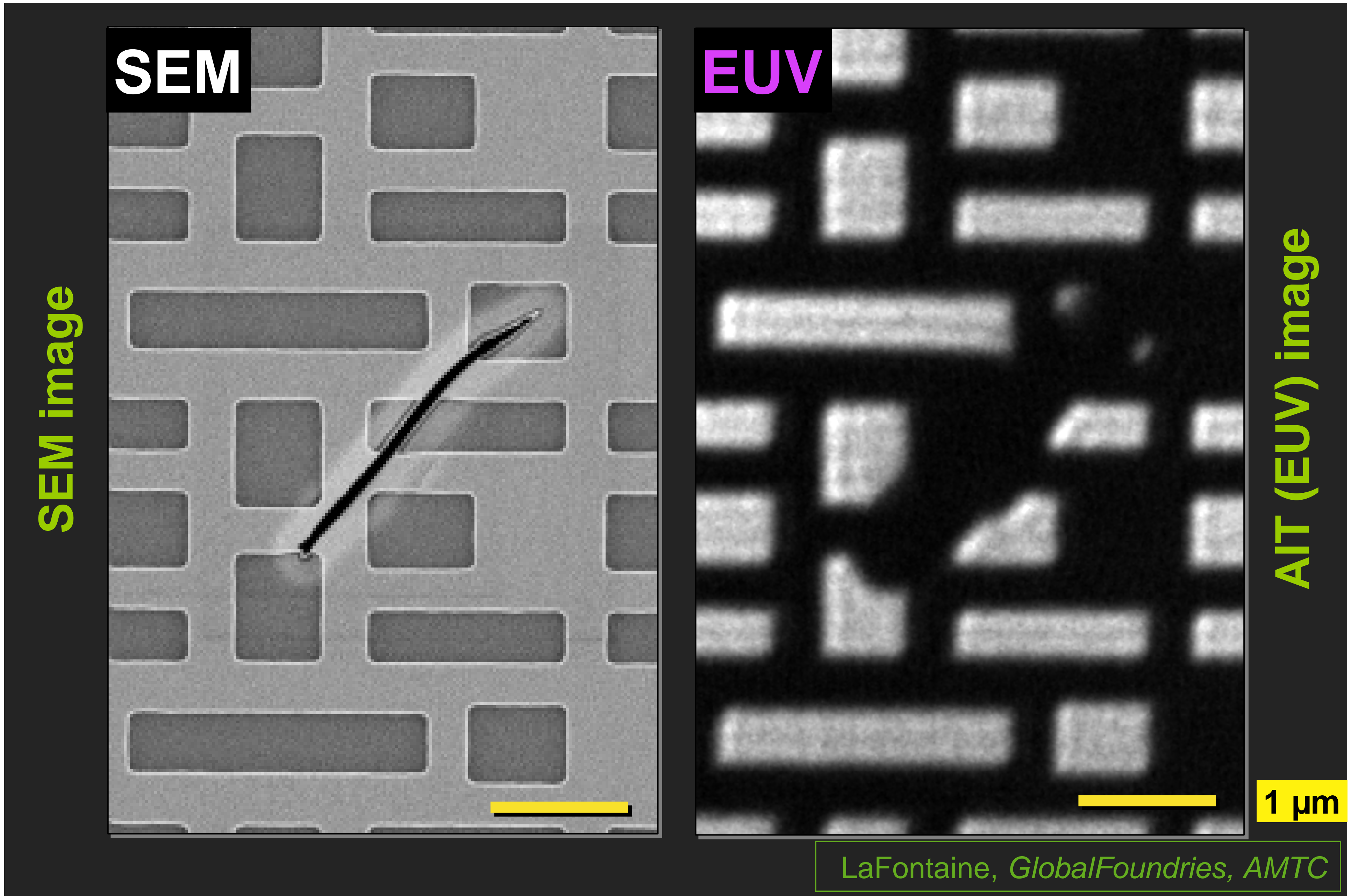
Defect review

A:	AFM
A&N, N:	SEM



Non-commercial mask:
Multilayer formed by
ASET at initial stage

Native defects on a full-field mask (1)

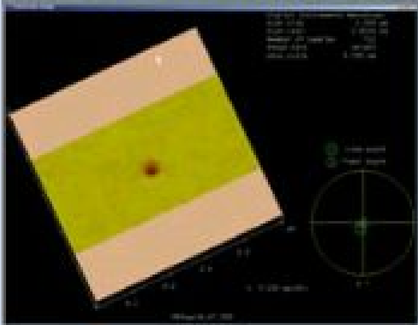


Click to see an entire page onscreen

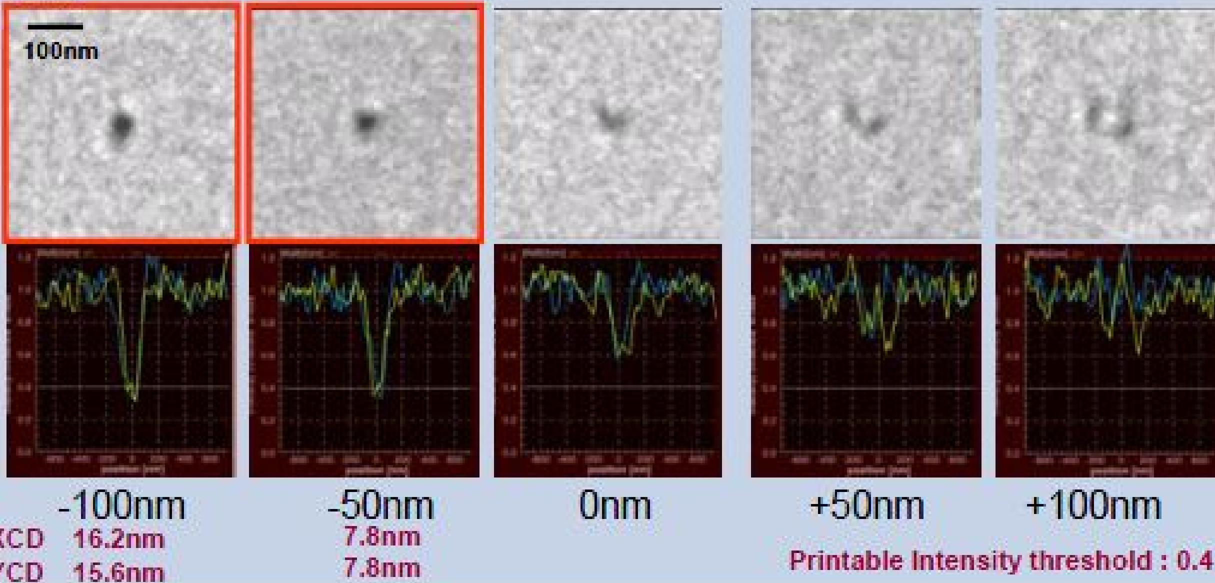
Defect Image on AIT / AFM (Pit)

AIT

Printable



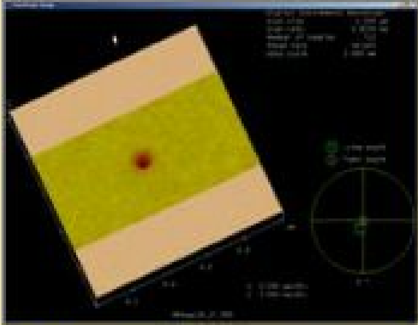
- FWHM : 50.5nm, depth : 4.4nm
- Phase : 236.2deg



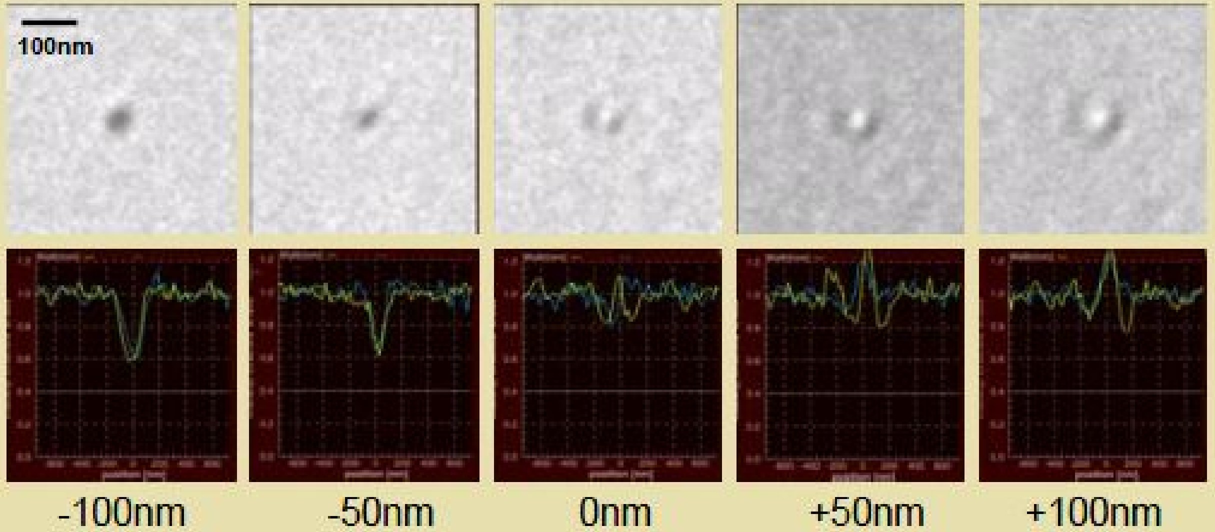
XCD 16.2nm 7.8nm
YCD 15.6nm 7.8nm

Printable Intensity threshold : 0.4

Unprintable



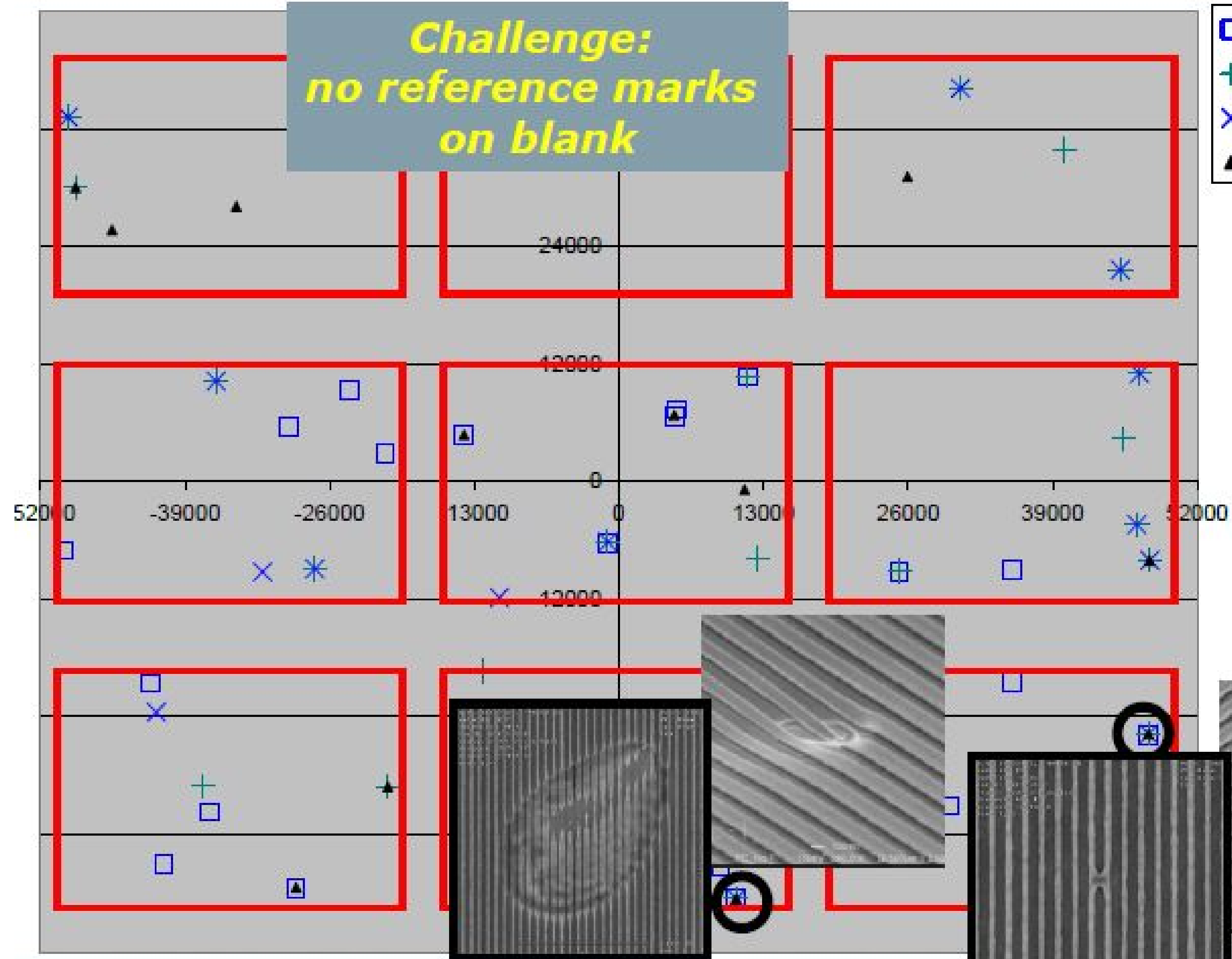
- FWHM : 22.8nm, depth : 2.8nm
- Phase : 150.6deg



-100nm -50nm 0nm +50nm +100nm

Pit : More printable at "-" focus

Comparison wafer inspection, mask inspection and blank inspection



- Nuflare_detected
- TaBN (>6 pixels)
- ML (>6 pixels)
- KLA2800_detected

2 defects in common between all 4 techniques

Left = wafer review
Right = mask review