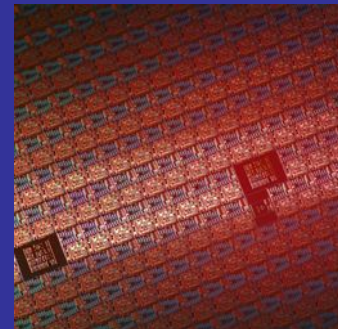




Accelerating the next technology revolution

SEMATECH Mask Program EUV Blank Defect Status

Henry Yun
Feb 22nd, 2009

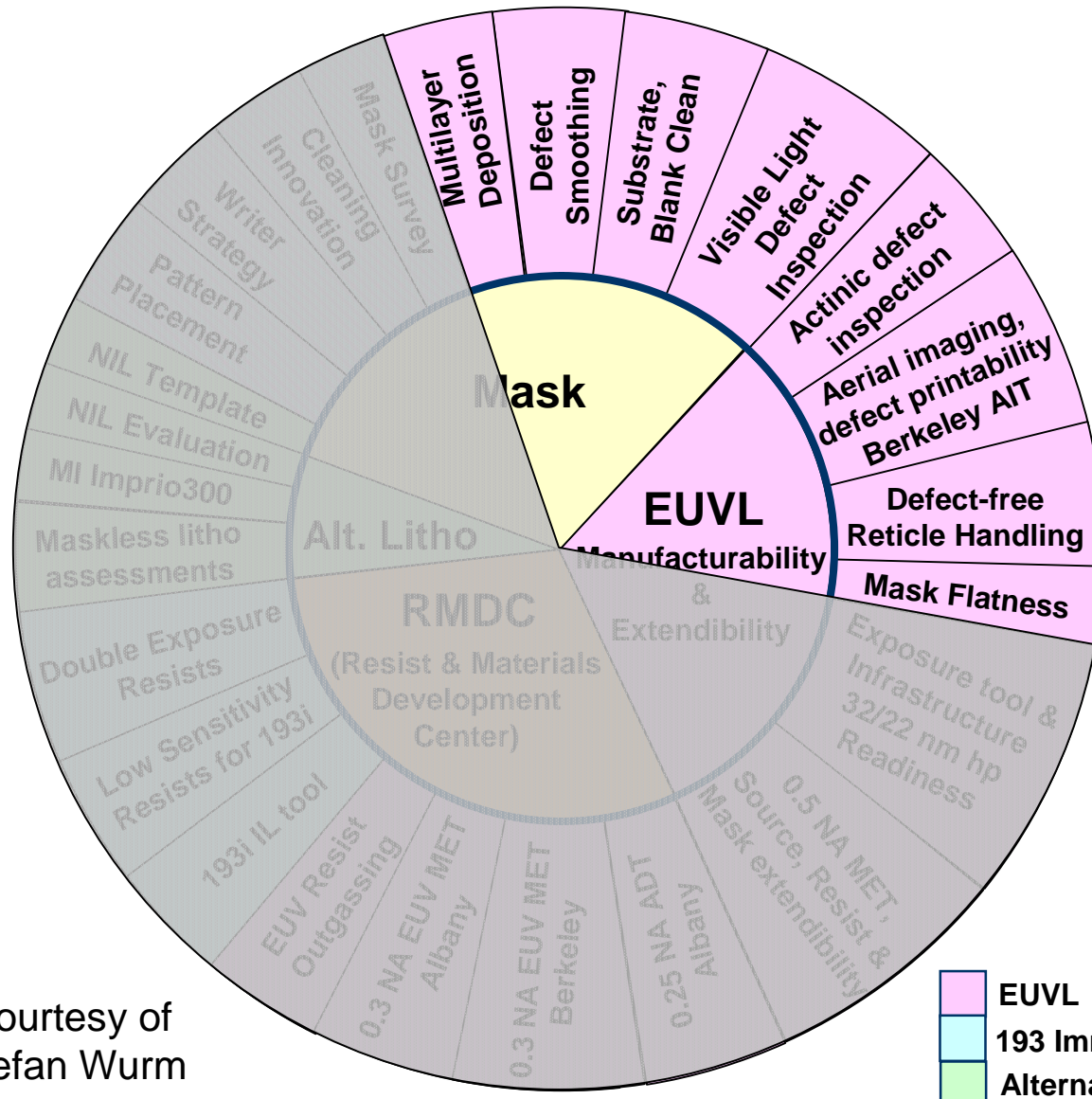


Presentation Outline



- Blank defect programs
- Substrate defect
- Inspection status

SEMATECH Lithography Programs

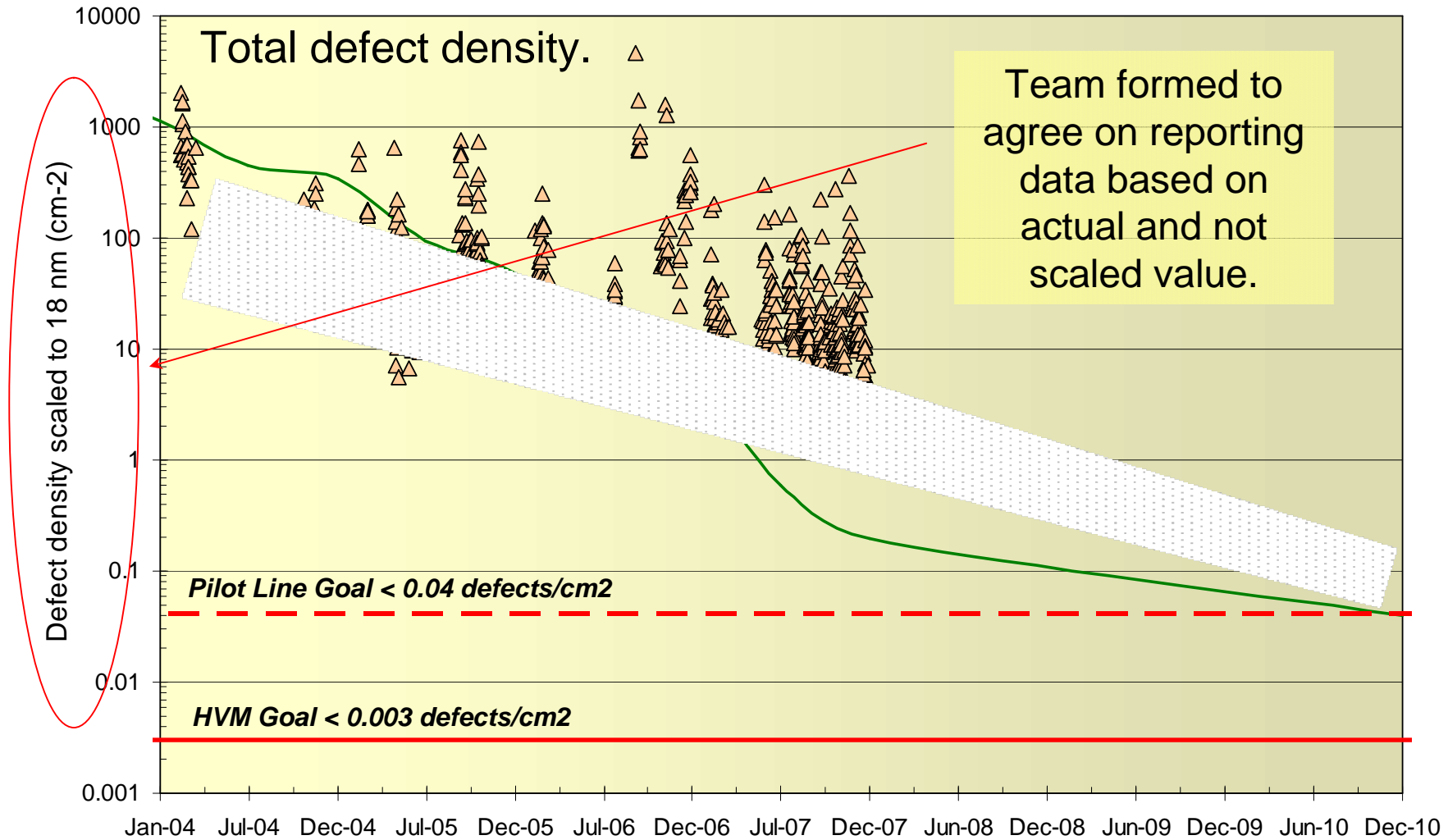


Mask defects are critical to enable EUVL. Many projects exist within SEMATECH to address these issues.

Courtesy of Stefan Wurm

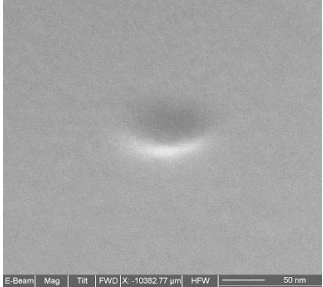
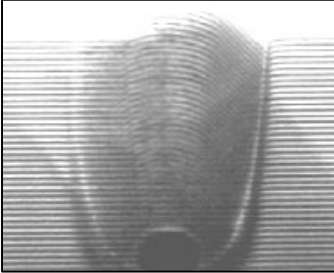
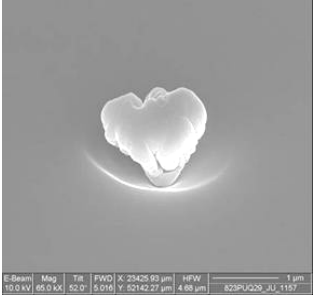
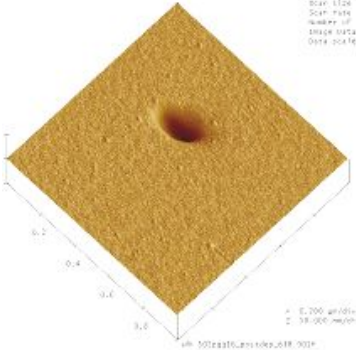
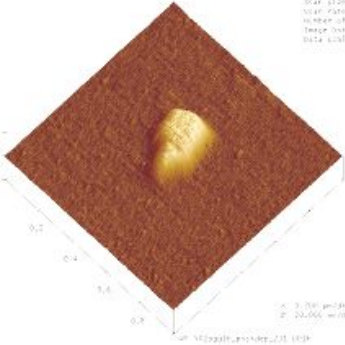
- EUVL
- 193 Immersion
- Alternative Litho

Defect Reduction Roadmap

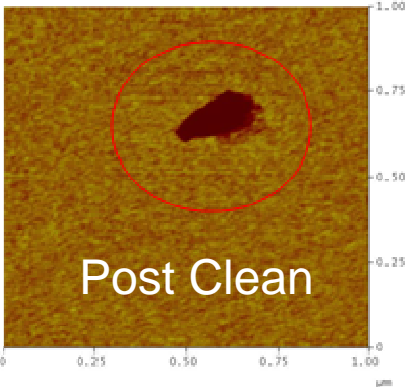
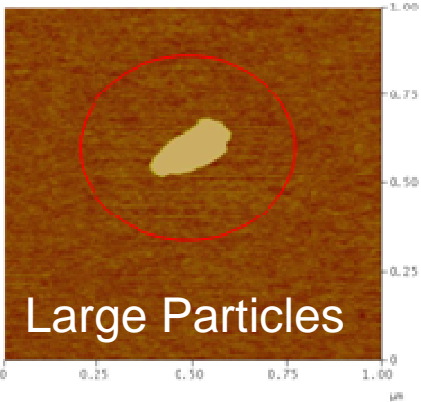


Mask Blank Defects

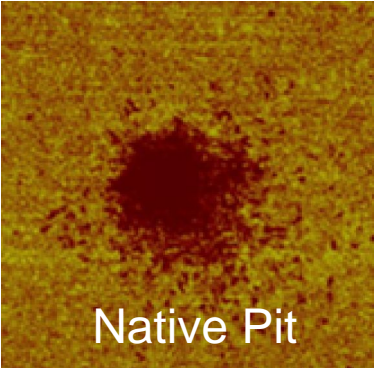


	Pit Defect	Substrate Particle	Deposited Particle
Blank	 <p>ML Dep on Pit</p>	 <p>ML Dep Particle</p>	 <p>ML Dep Particle</p>
Substrate	 <p>Polish Quality</p>	 <p>Incoming Embedded</p>	<p>Majority of blank defects originate from <u>substrate quality</u> and must be addressed.</p>

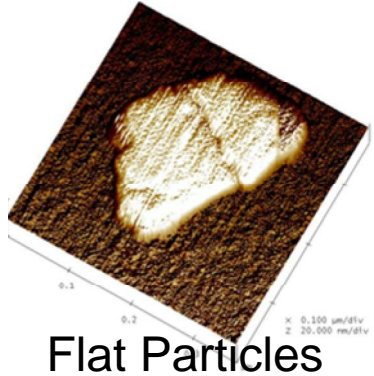
Incoming Substrate Quality



Pits can also form post embedded particle removal



~50% of incoming substrate defects can be considered native pits



Substrate Defect Origin



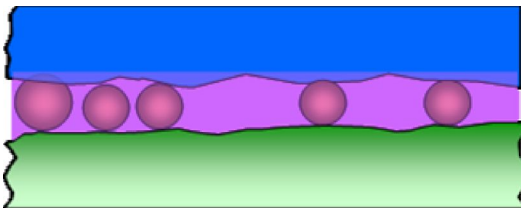
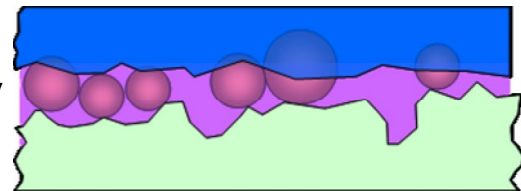
Dream



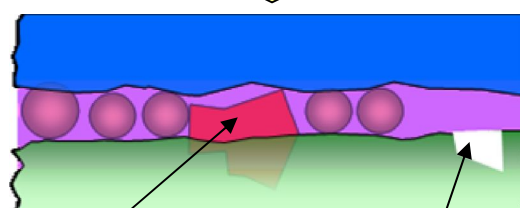
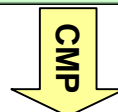
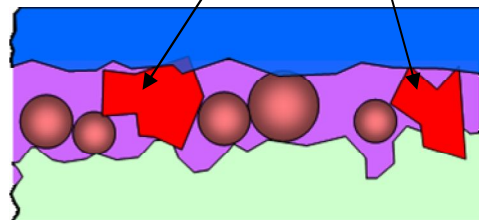
Reality



Pad
Slurry
Glass



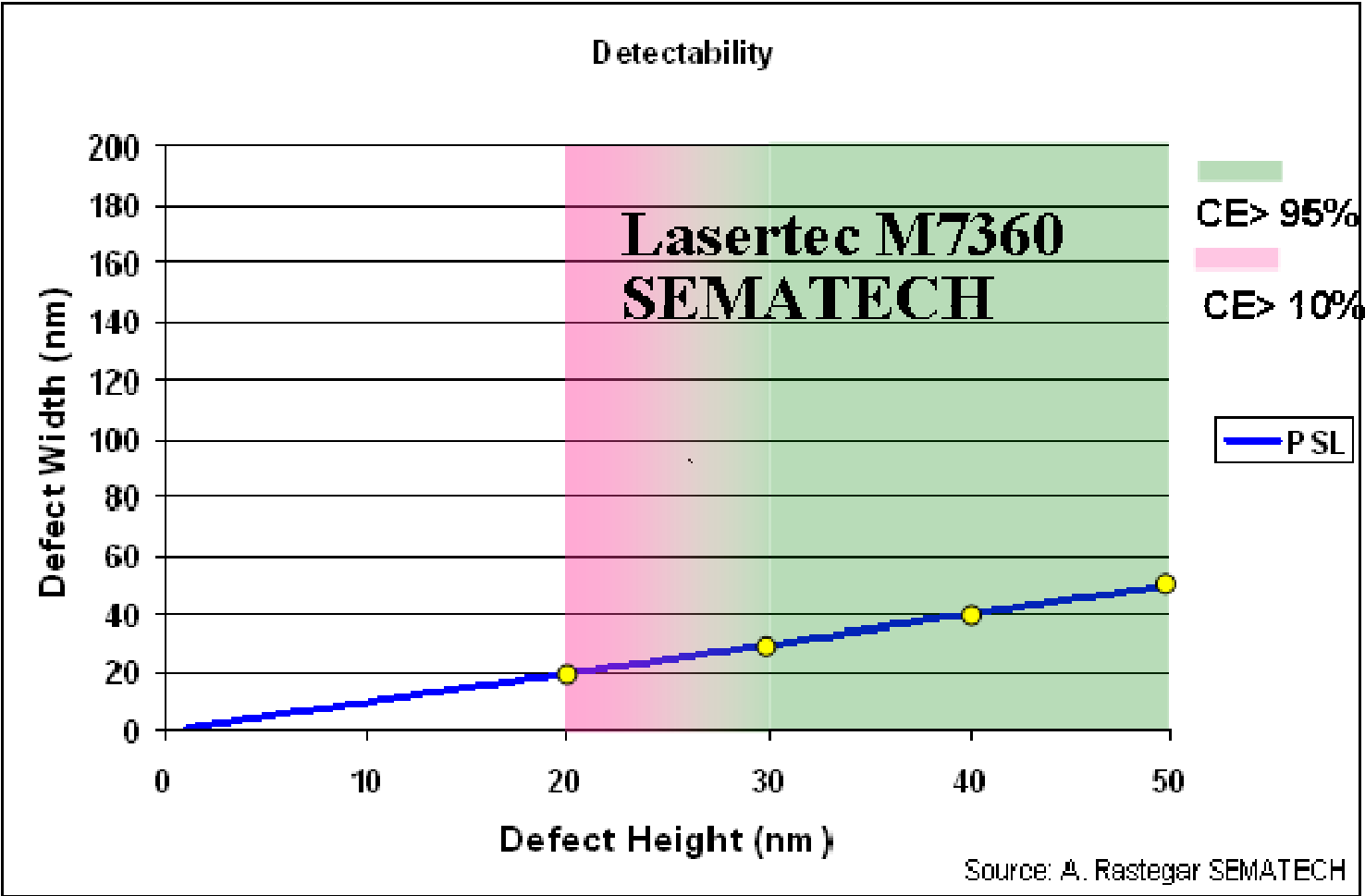
Embedded particles



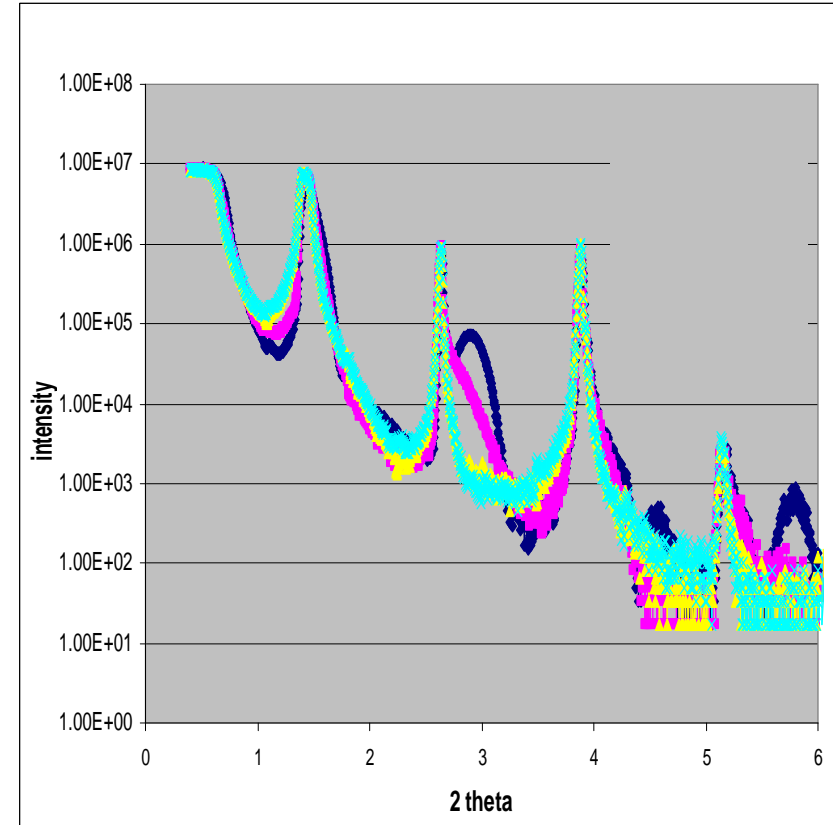
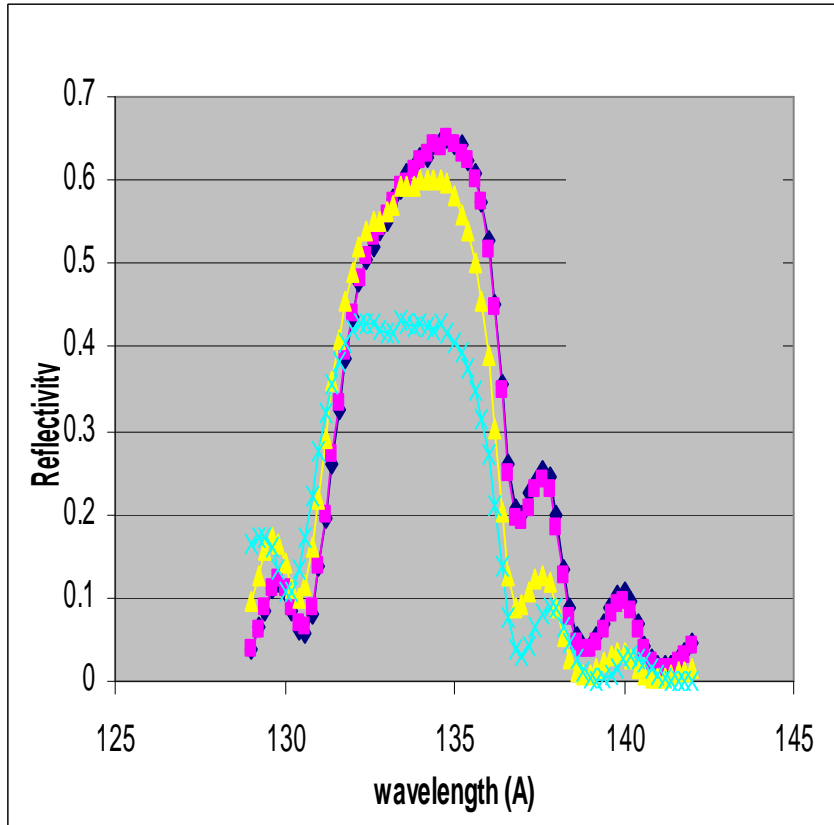
New pits

- Environment
- Slurry contamination
- Slurry coagulation
- Remaining glass particles
- Pad material
- Bacteria
- Glass manufacturing
- UPW
- Cleaning chemicals

Substrate Inspection

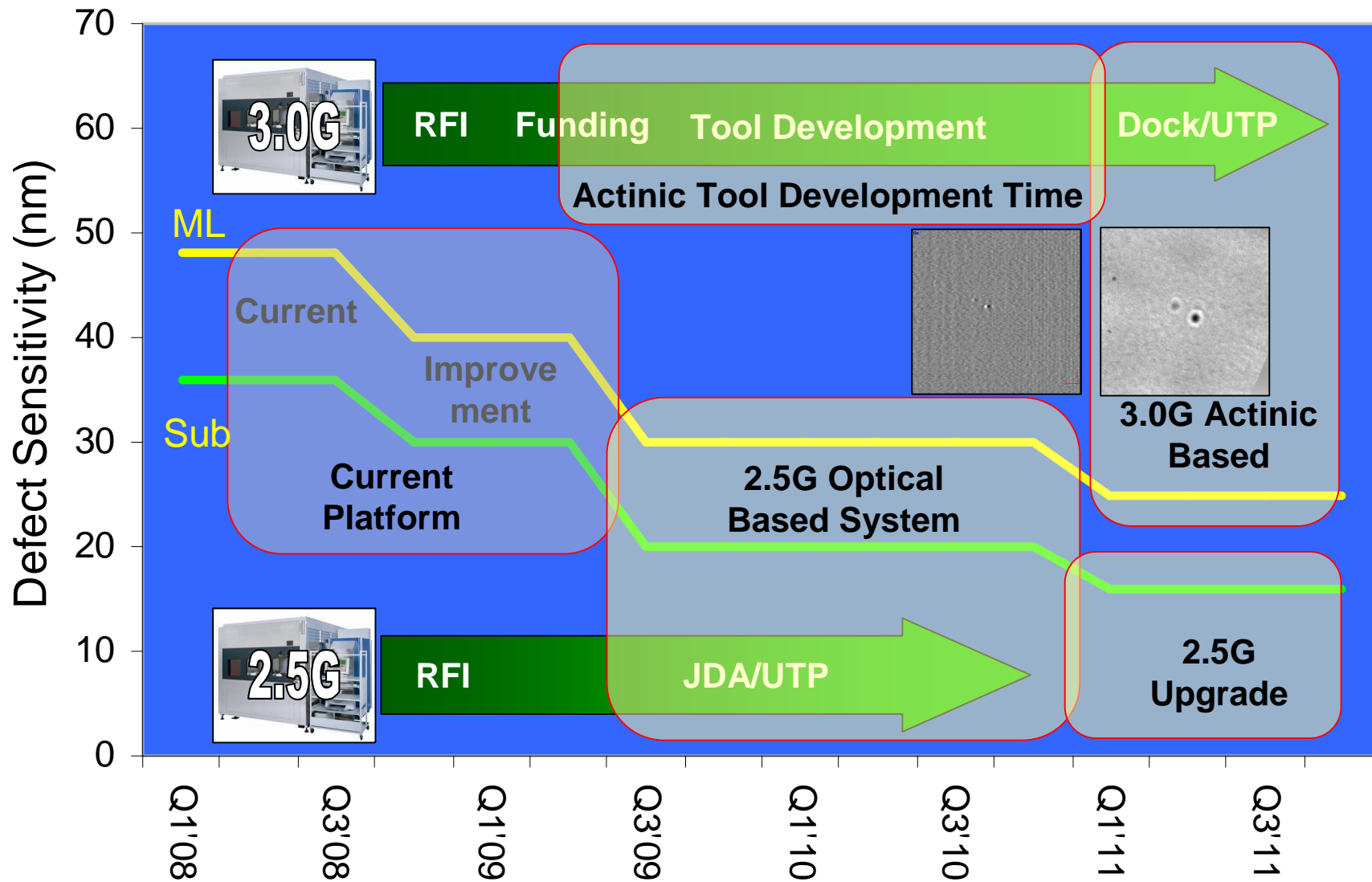


Laser Inspection Damage

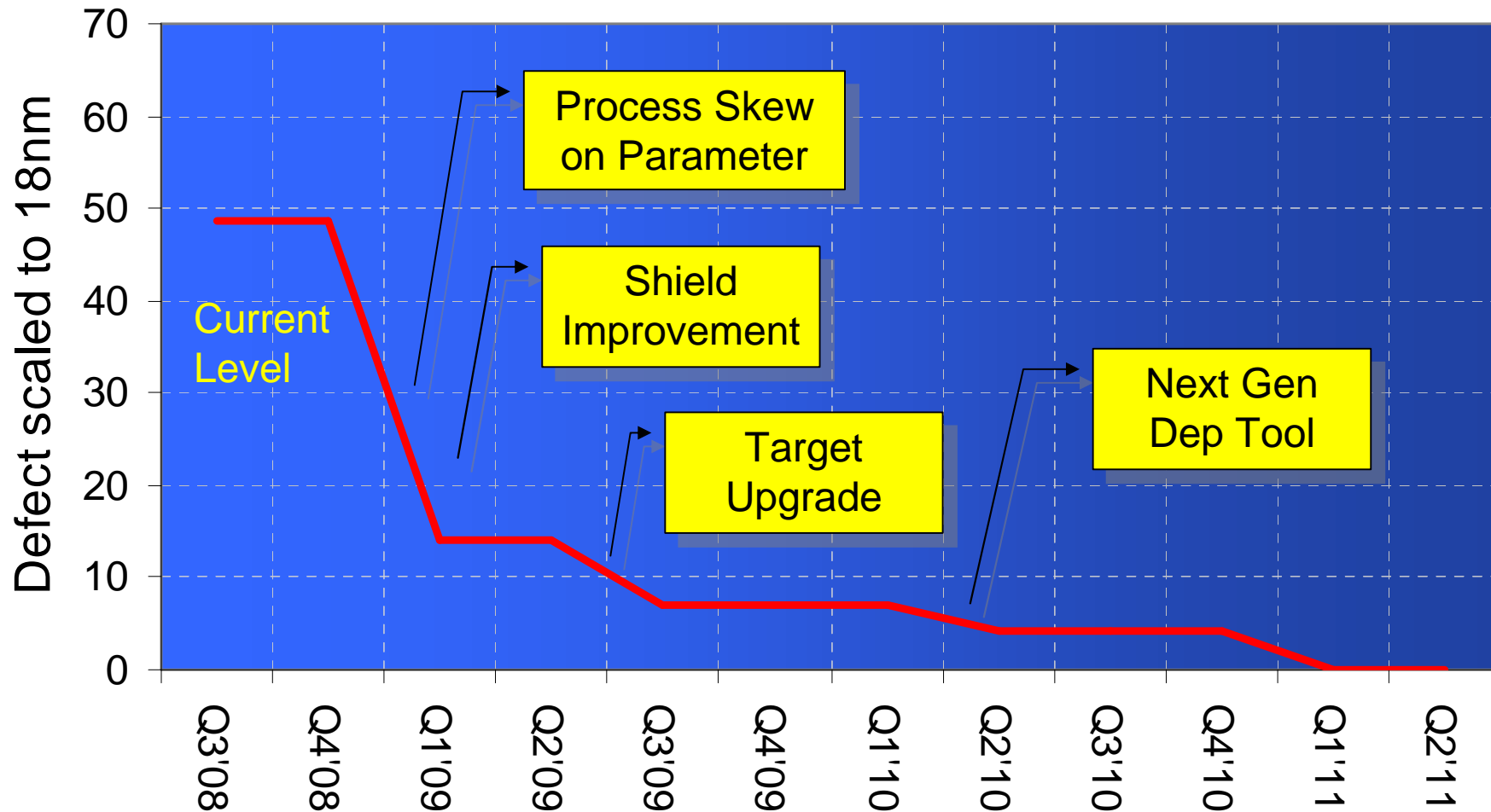


ML damage from seen at high power setting used for substrate inspection. Need to decouple ML from substrate.

Mask Inspection Roadmap



Deposition Improvement Roadmap



Summary



- Defect free mask blank is a critical component for the timely insertion of EUVL.
- MBDC at SEMATECH continues focused effort on achieving defect free blank.
- Progress on defect reduction, however substrate pit and inspection capability remains top priority to resolve.