


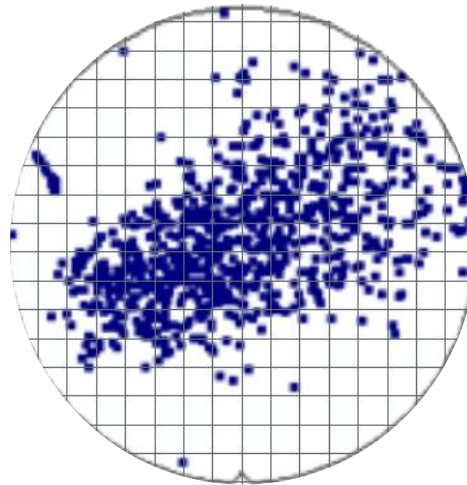
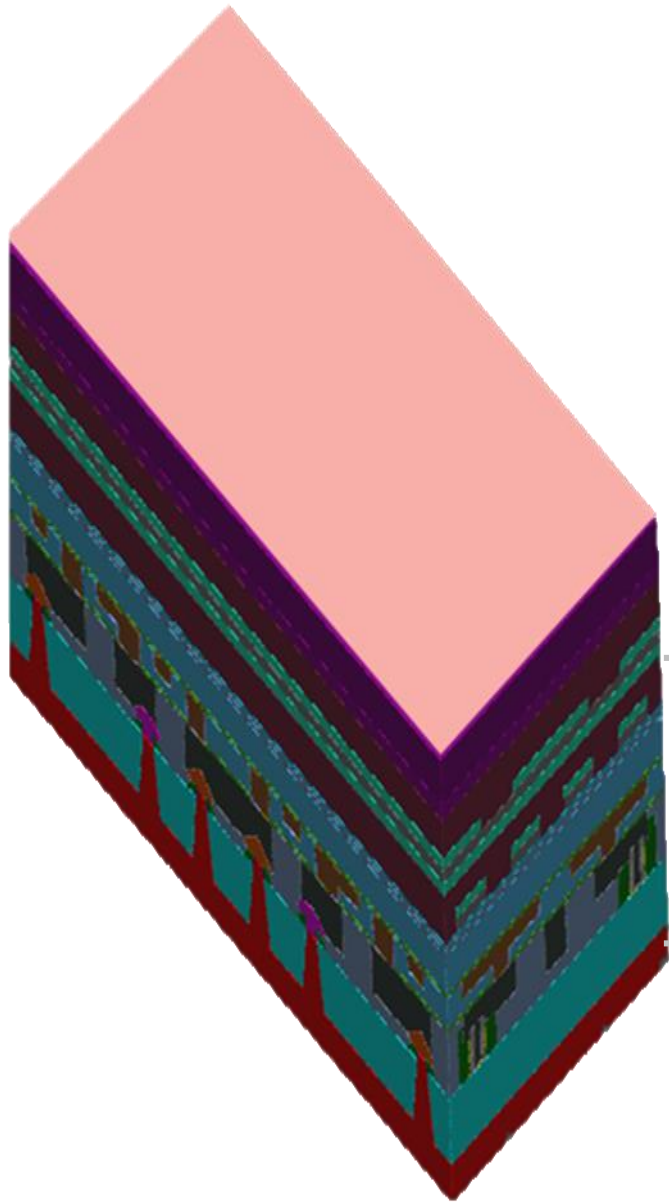
# Inspection and Metrology Relevance in SOI Manufacturing

Jijen Vazhaeparambil

KLA-Tencor Corporation  
July 11, 2018

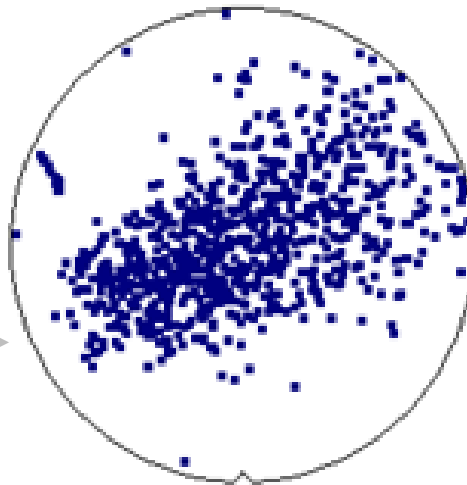


- 
1. **Relevant** substrate inspection and metrology is required to improve the quality and reduce cost of overall SOI supply chain
  2. **Innovation** to address SOI-specific challenges is essential for developing relevant inspection and metrology
  3. Industry **collaborations** enables the innovation leading to specific hardware and software solutions



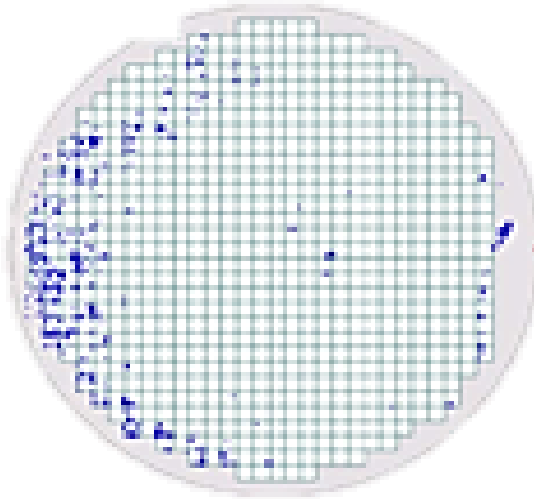
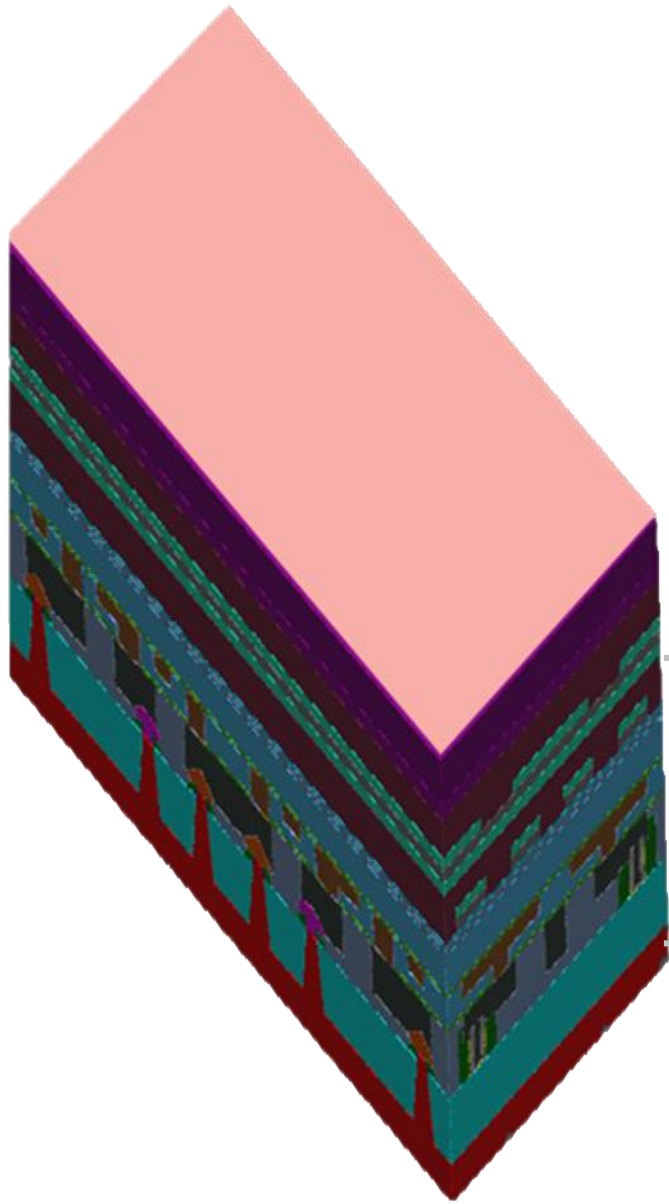
Product Inspection

Later, More \$



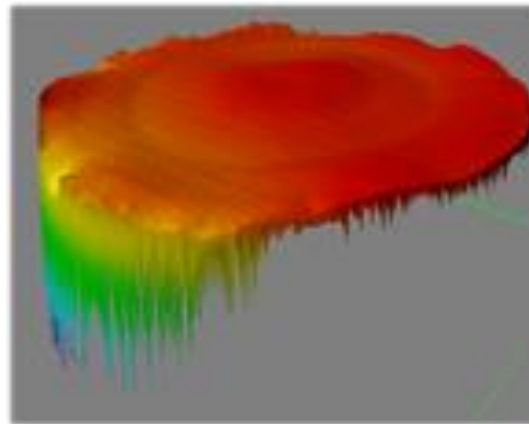
Substrate Inspection

Early, Less \$




Product Inspection

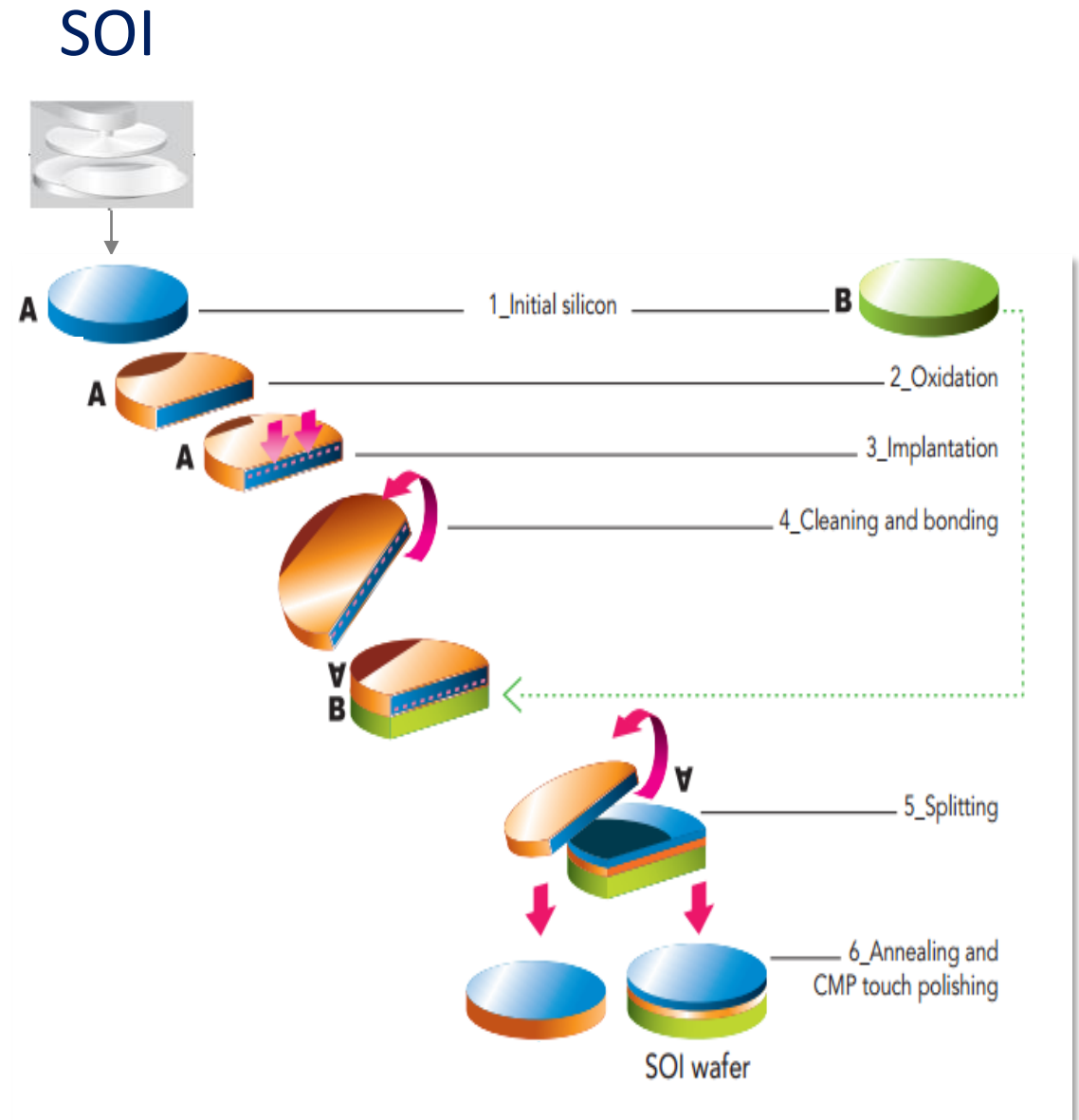
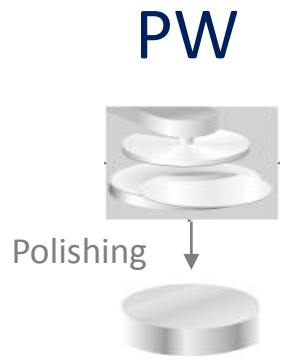
Later, More \$



Substrate Inspection

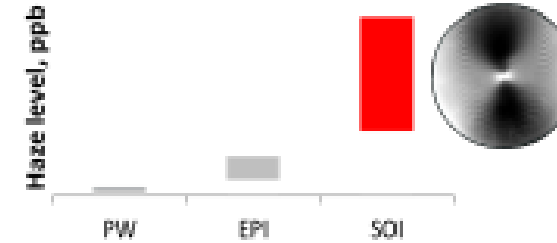
Early, Less \$

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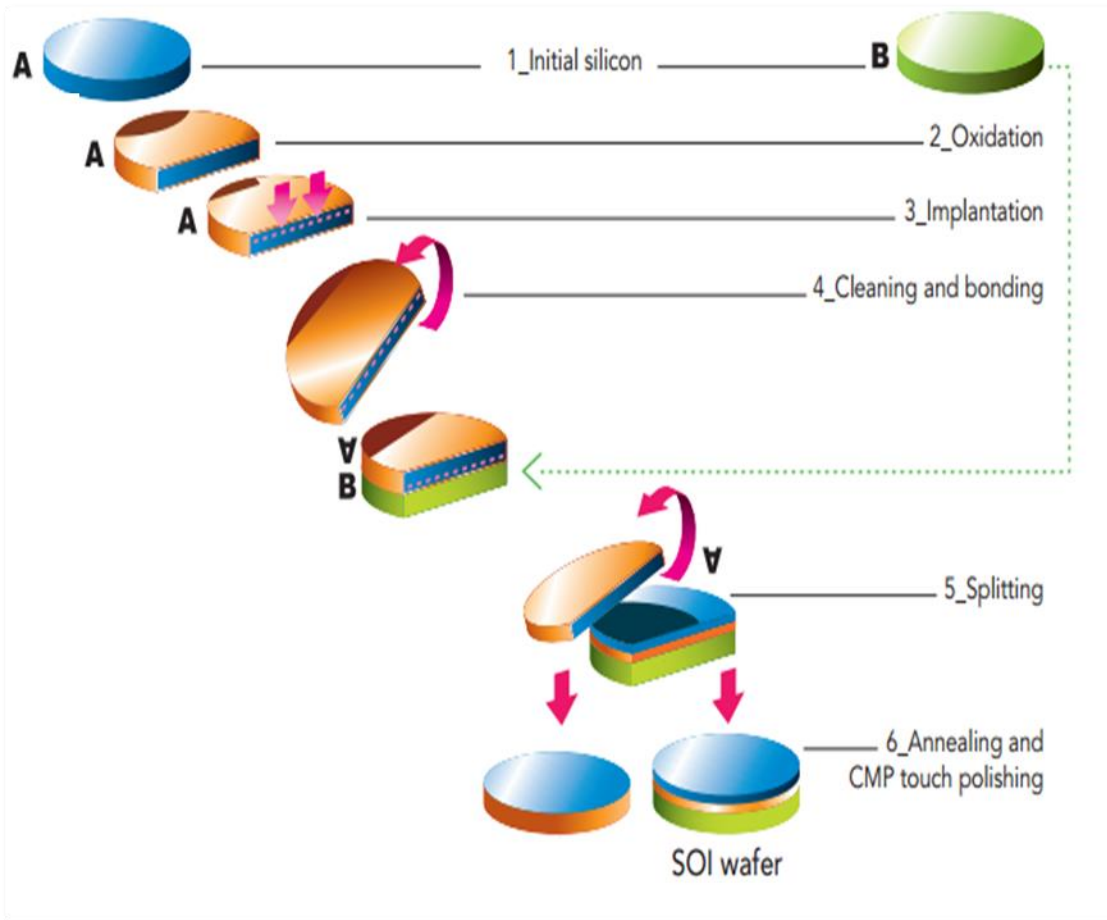
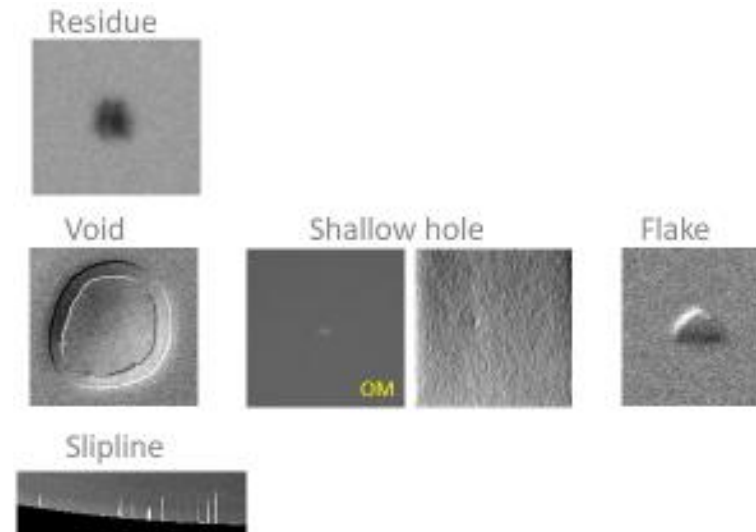


# Unique SOI Inspection Challenges

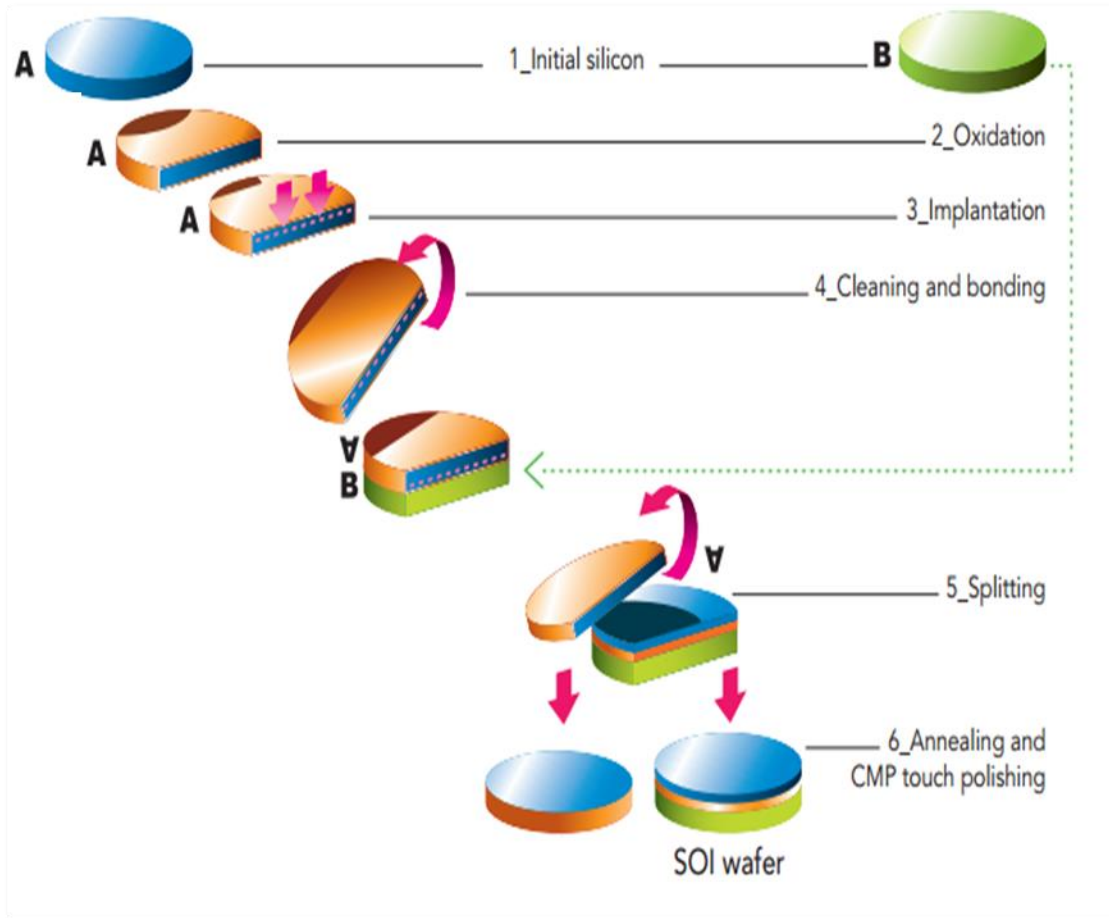
Higher surface roughness



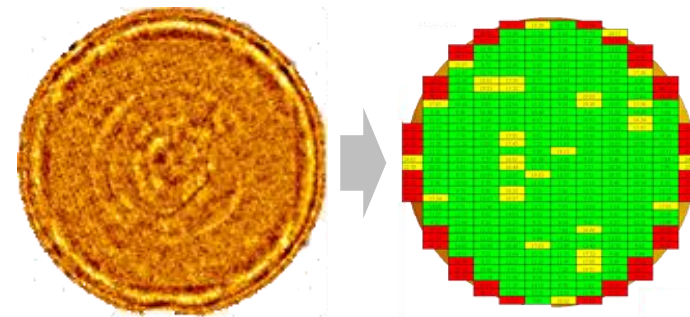
New defect types



# Unique SOI Metrology Challenges



Pre-Bonding and Post-Splitting Annealing requires nanometer level topography and near edge flatness

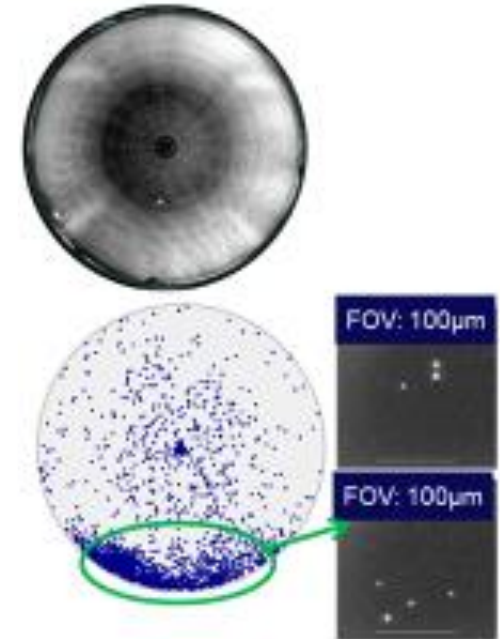
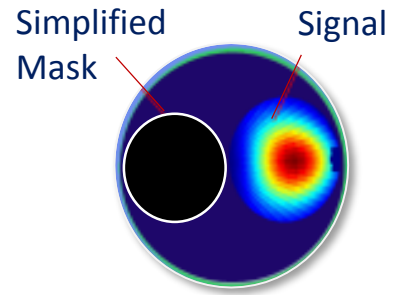
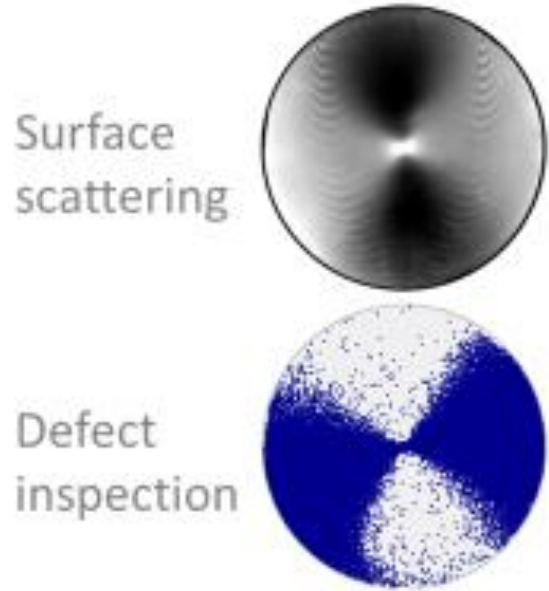




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# Collaboration Example: 1



## Challenge

Surface roughness limits defect detection

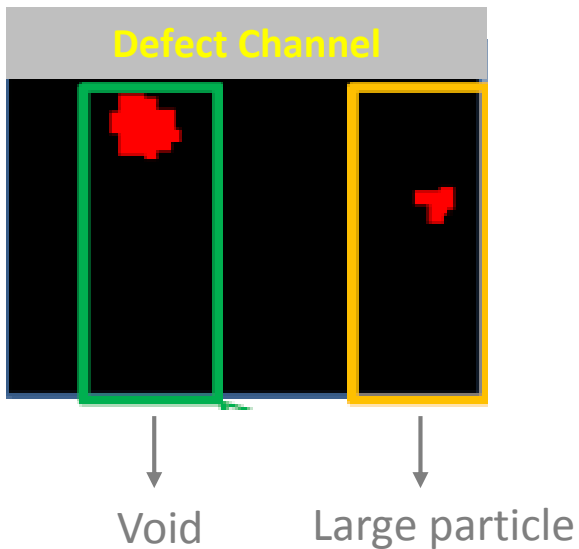
## Innovation

Customized SOI specific optics/aperture to filter out roughness

## Result

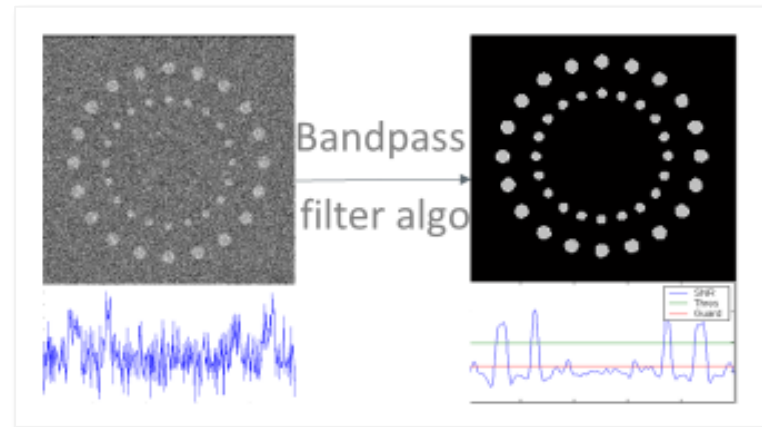
Relevant defects detected to enable to eliminate the problem

# Collaboration Example: 2



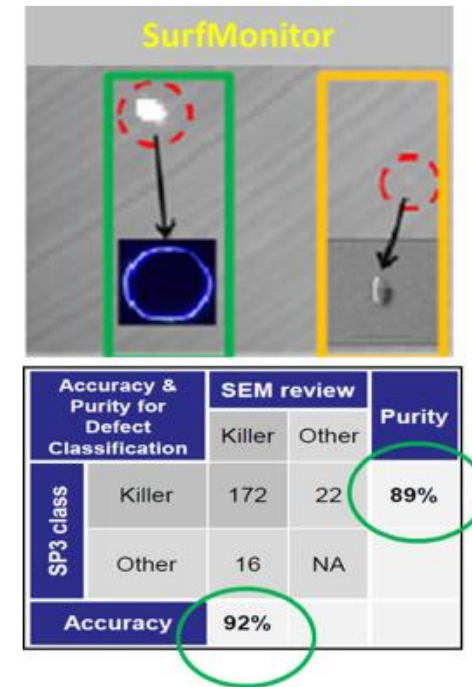
## Challenge

Void monitoring limited by classification capability



## Innovation

Surface background (SurfMonitor) combined algo to enhance signal for void detection & classification

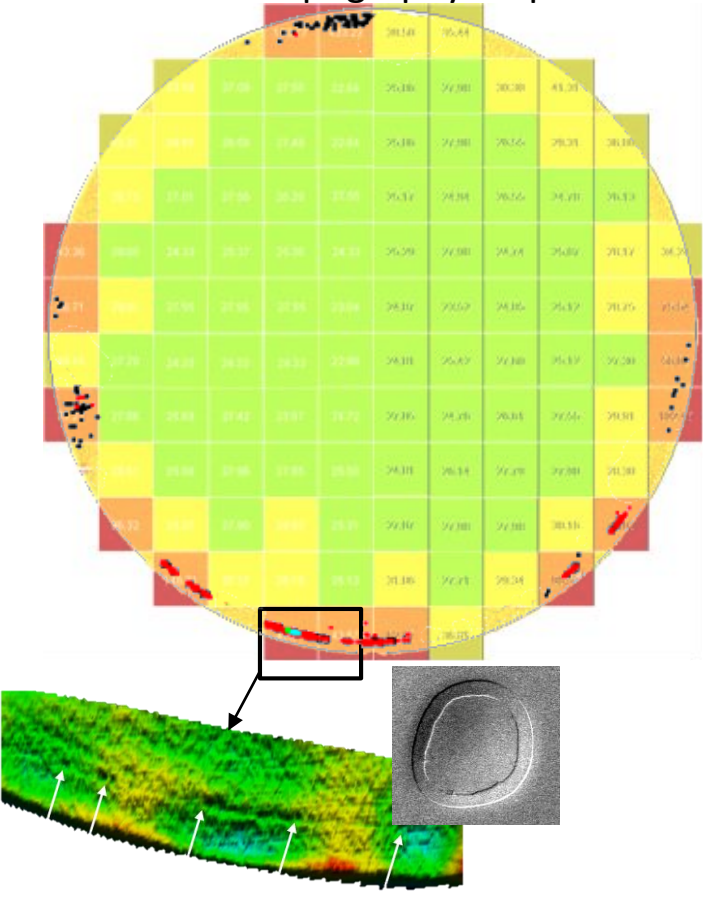


## Result

Relevant void monitoring to eliminate void defectivity

# Collaboration Example: 3

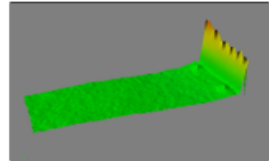
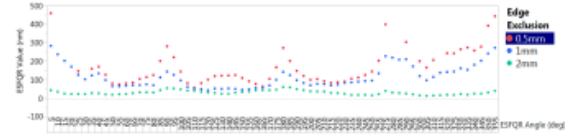
Nanotopography map



## Challenge

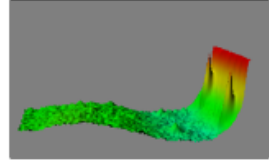
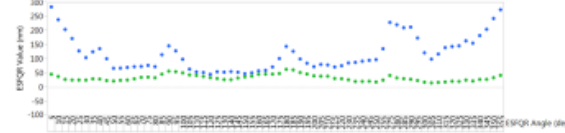
Post-bonding near edge voids

ESFQR 0.5mm, 1mm & 2mm EE



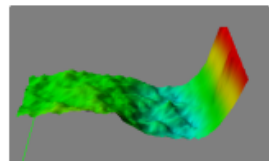
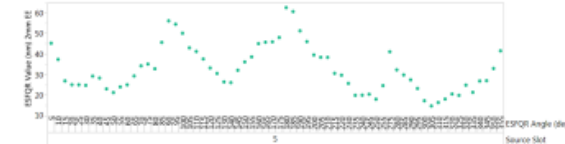
0.5mm EE

ESFQR 1mm & 2mm EE

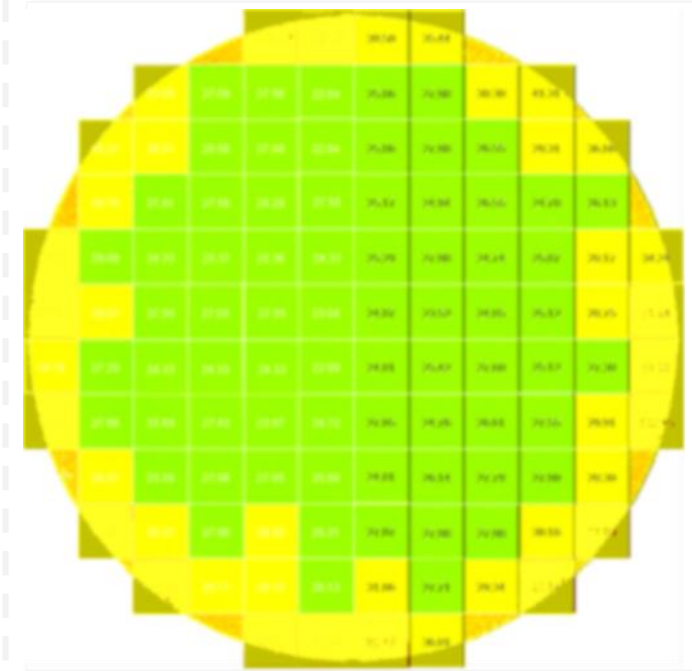


1mm EE

ESFQR 2mm EE



2mm EE



## Innovation

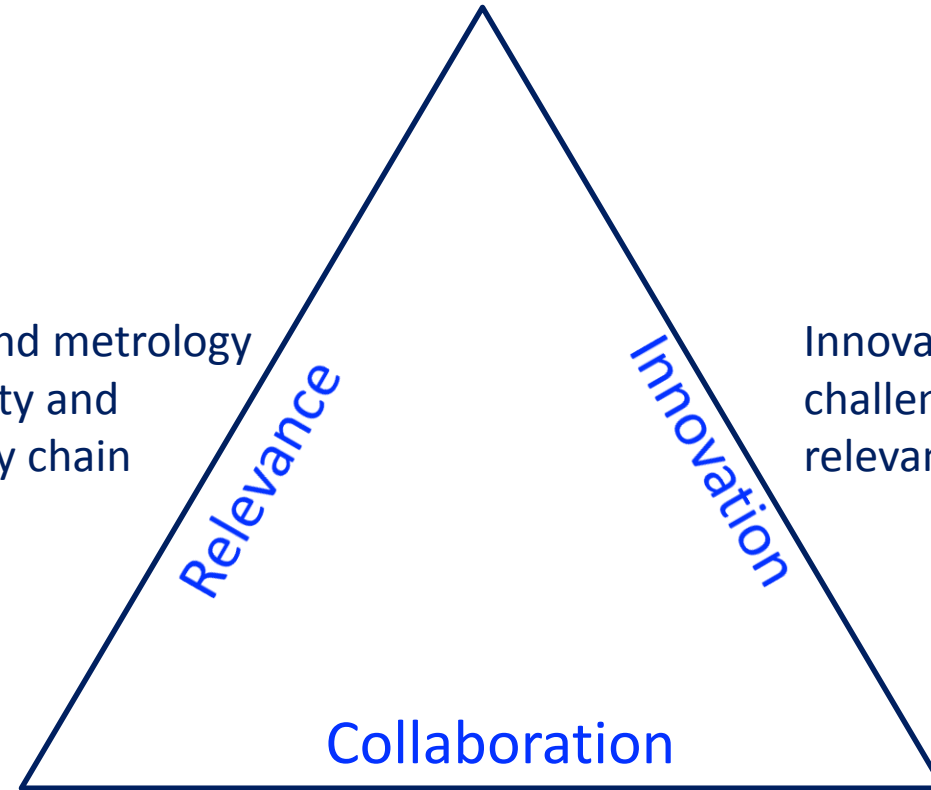
Pre-bond Edge Flatness up to 149.5mm

## Relevant Result

Edge flatness curvature metrics to detect and eliminate edge non-uniformity



Relevant substrate inspection and metrology is required to improve the quality and reduce cost of overall SOI supply chain



Innovation to address SOI-specific challenges is essential for developing relevant inspection and metrology

Industry collaborations enables the innovation leading to specific hardware and software solutions

Thank you

