



# SEMVision™ H20

# ACCELERATING DEFECT REVIEW

February 2025

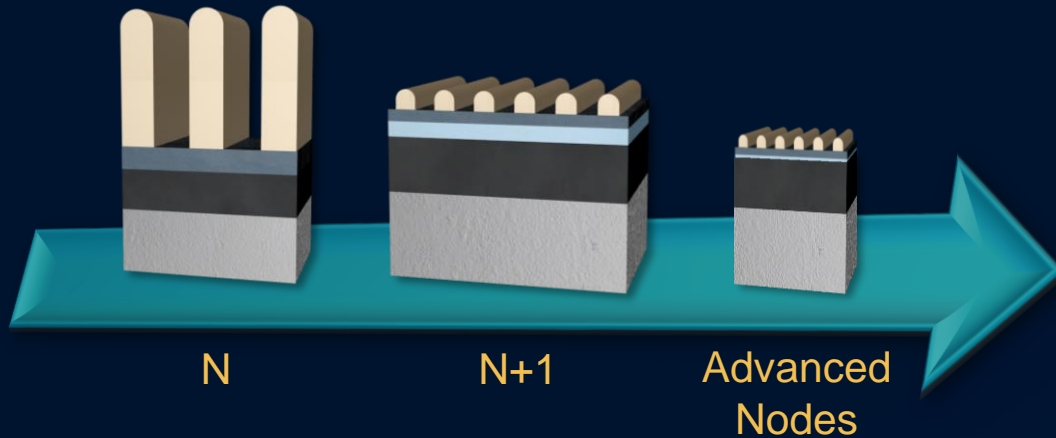
# News Summary

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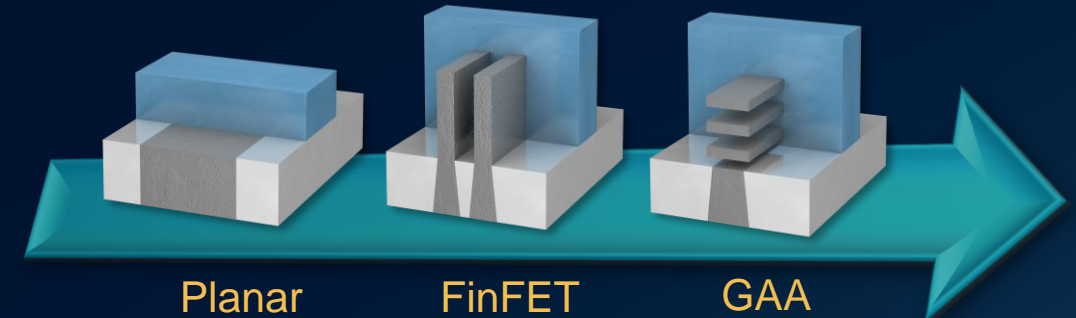
- Accelerating defect review for the "angstrom era"
  - SEMVision™ H20 enables better and faster analysis of nanoscale defects in leading-edge chips
- Advancing the industry's most sensitive eBeam technology
  - Second generation "cold field emission" technology delivers faster throughput at the highest resolution
- Leveraging the power of AI to separate the signal from the noise
  - Deep learning models speed up defect detection and binning
- Driving the eBeam market forward
  - Faster and more accurate defect analysis allows chipmakers to make greater use of eBeam in HVM

# Angstrom Era: Shrinking, More Complex Structures

## New Ways to Shrink

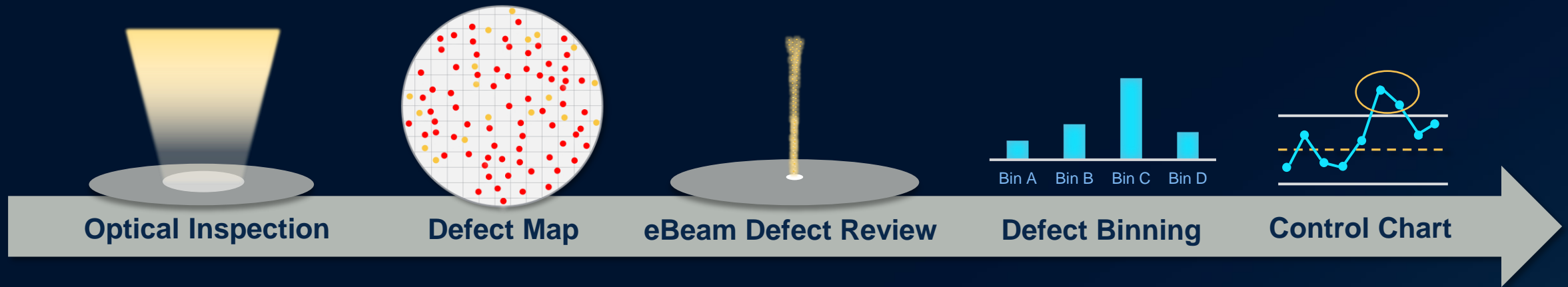


## New 3D Architectures

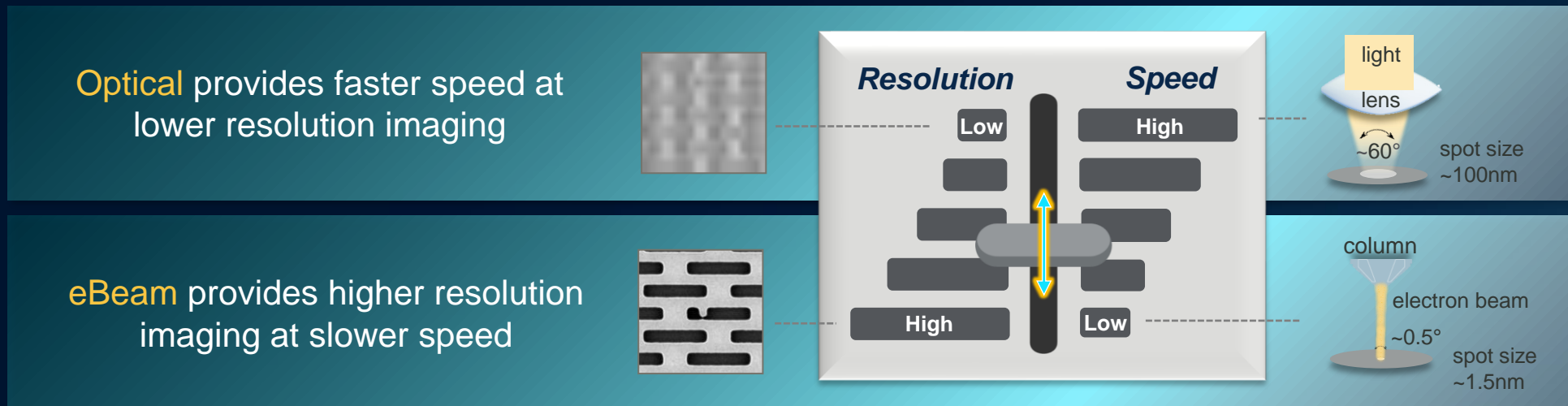


Smaller, more buried defects require nanometer resolution and depth imaging

# Process Control Flow: Optical Inspection and eBeam Review



## Complementary Technologies



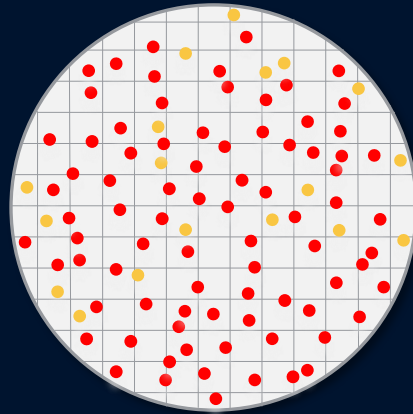
# Optical Inspection Limit Poses Angstrom Era Challenge

## Defect Map

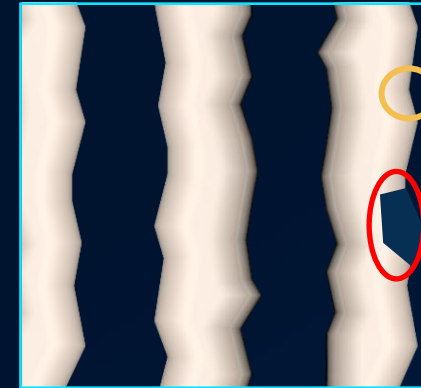
## Review and Binning



N, N+1



Manageable amount (~100) of defects



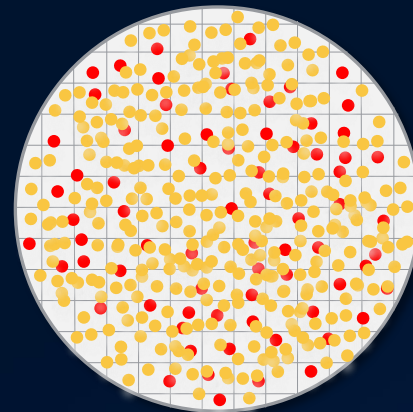
Pattern roughness

Clear defect detection

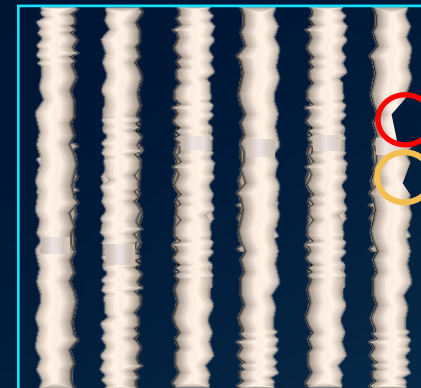
Pattern (top view)



Advanced Nodes



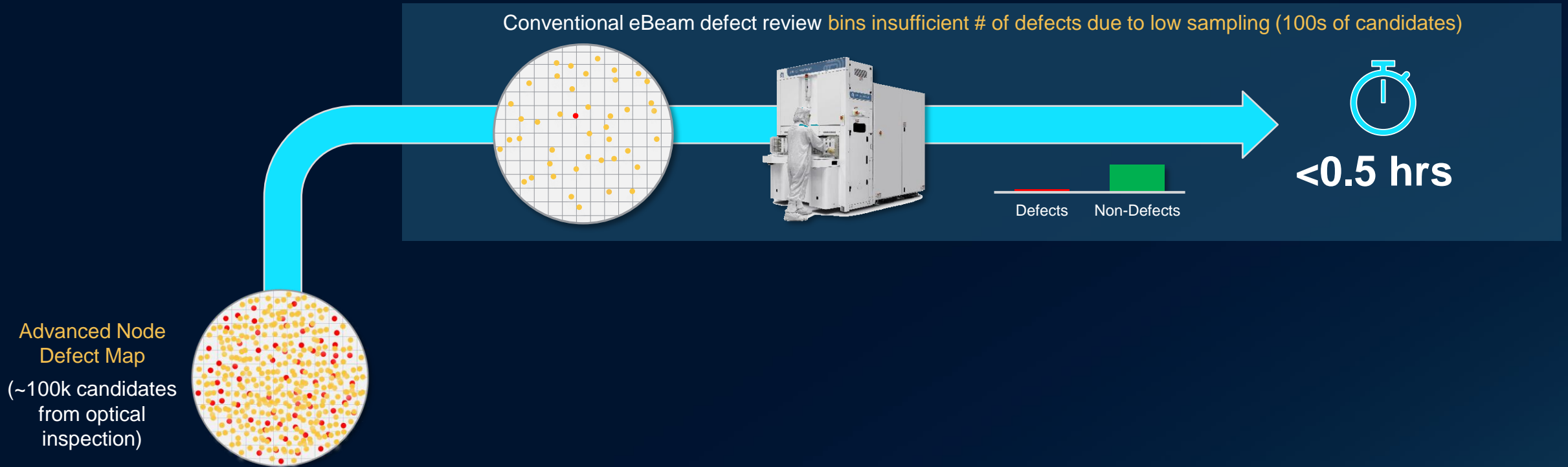
Massive amount (~10k) of questionable "defects"



Difficult to differentiate defects from non-defects, and accurately bin

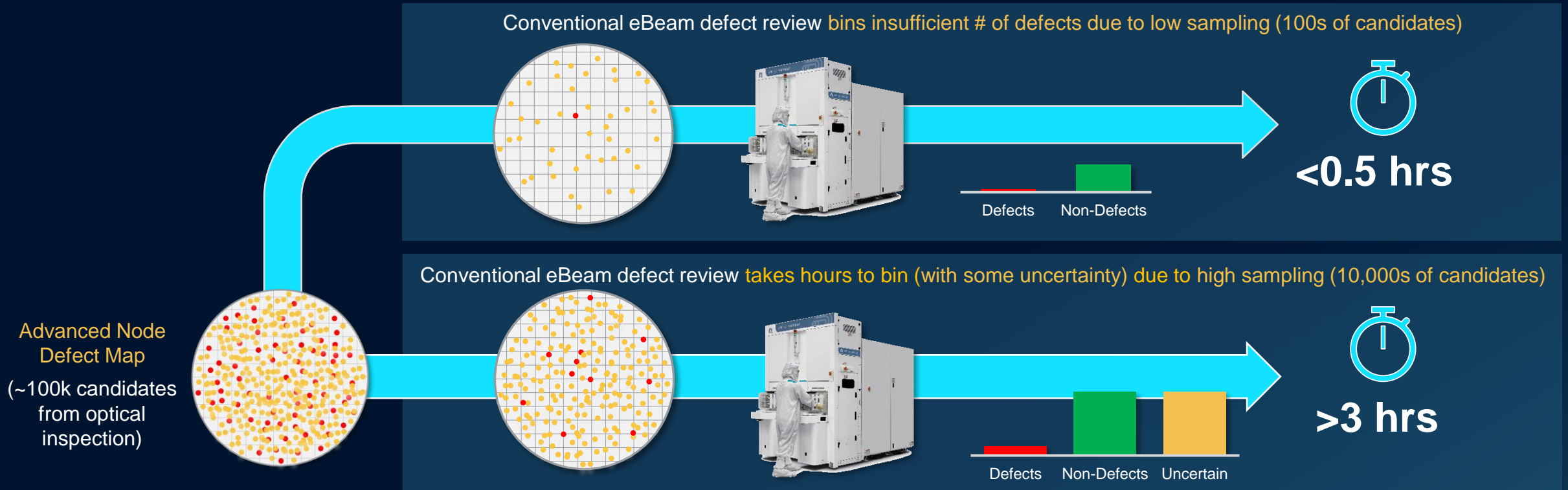
Optical inspection generates a massive amount of questionable "defects" that prolong review and are difficult to image and accurately bin

# Optical Limitation Challenges Conventional Defect Review



Need new technologies to review and bin more samples in advanced nodes

# Optical Limitation Challenges Conventional Defect Review



Need faster, more accurate technologies to make defect review practical in advanced nodes

# Introducing SEMVision™ H20 Defect Review and Analysis

*2<sup>nd</sup> generation CFE imaging and AI-based review technologies*

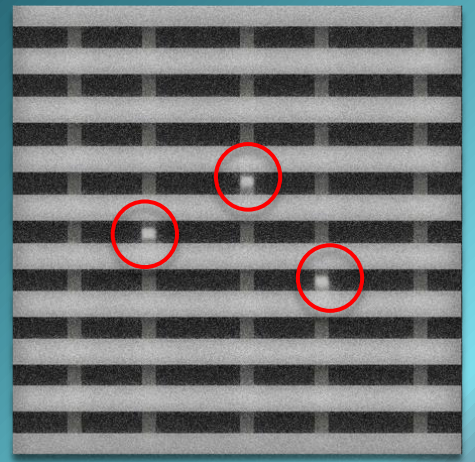
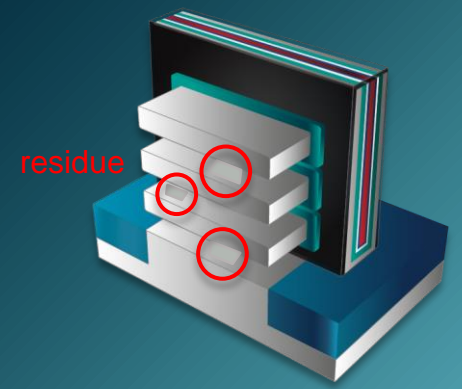


- ✓ Sub-nm imaging resolution of smallest defects at high speed
- ✓ Boosting performance and productivity with AI-based review
- ✓ The industry's benchmark for in-depth imaging of buried defects

Applied's SEMVision H20 defect review system has been adopted by leading logic and memory chipmakers for emerging technology nodes

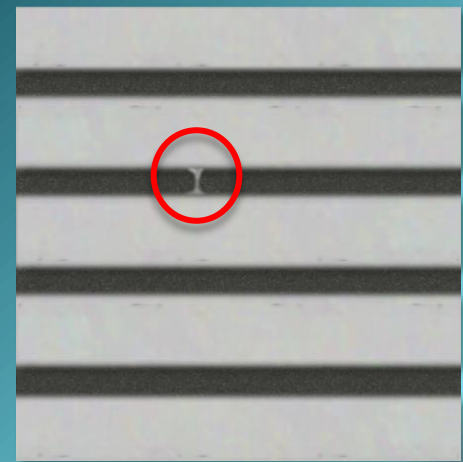
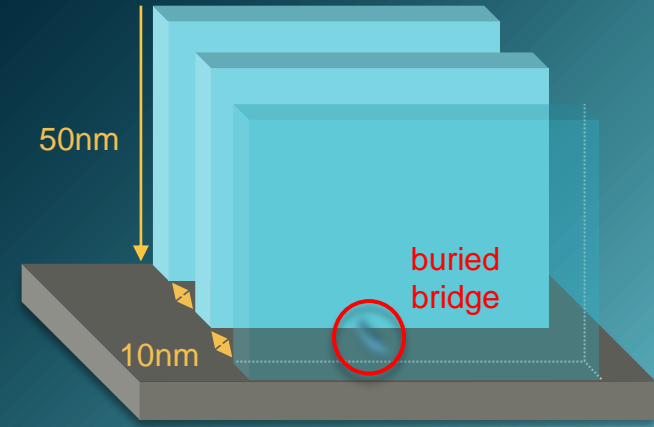
# SEMVision™ H20 Defect Review for Technology Inflections

## Gate-All-Around



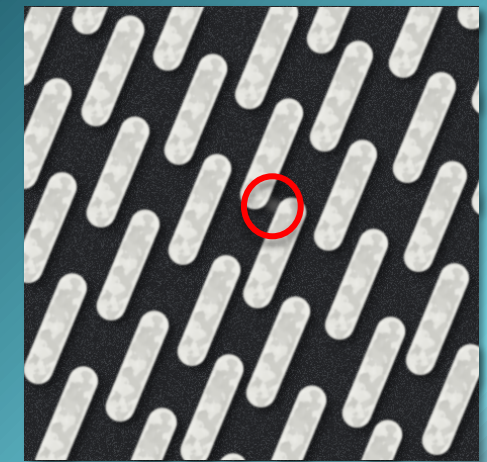
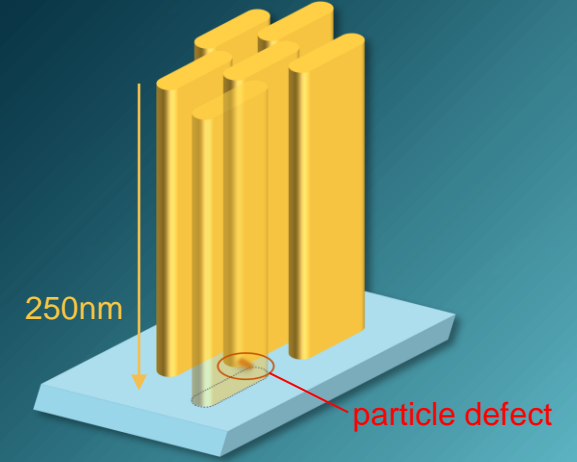
top view

## EUV Photoresist

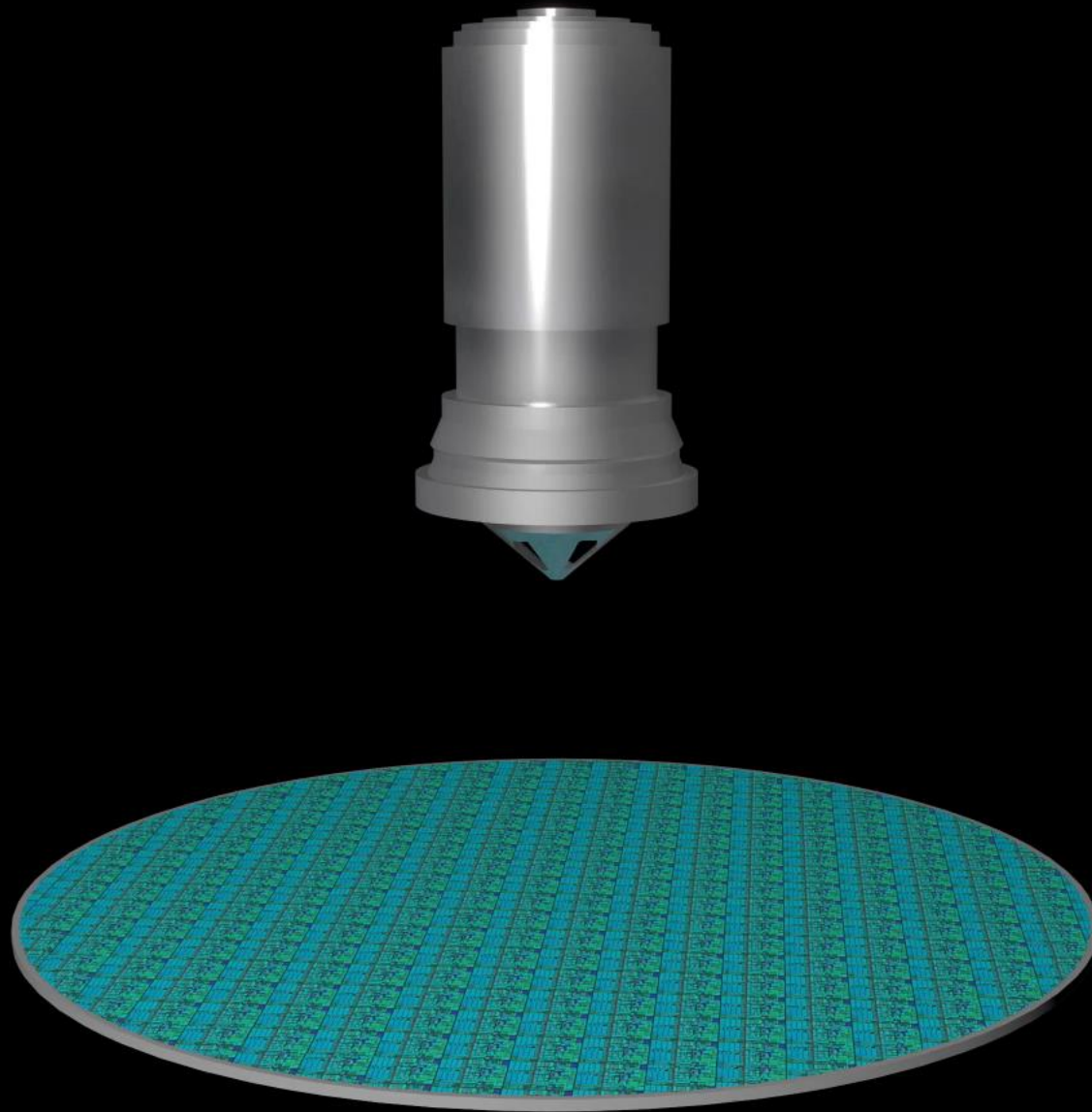


top view

## DRAM

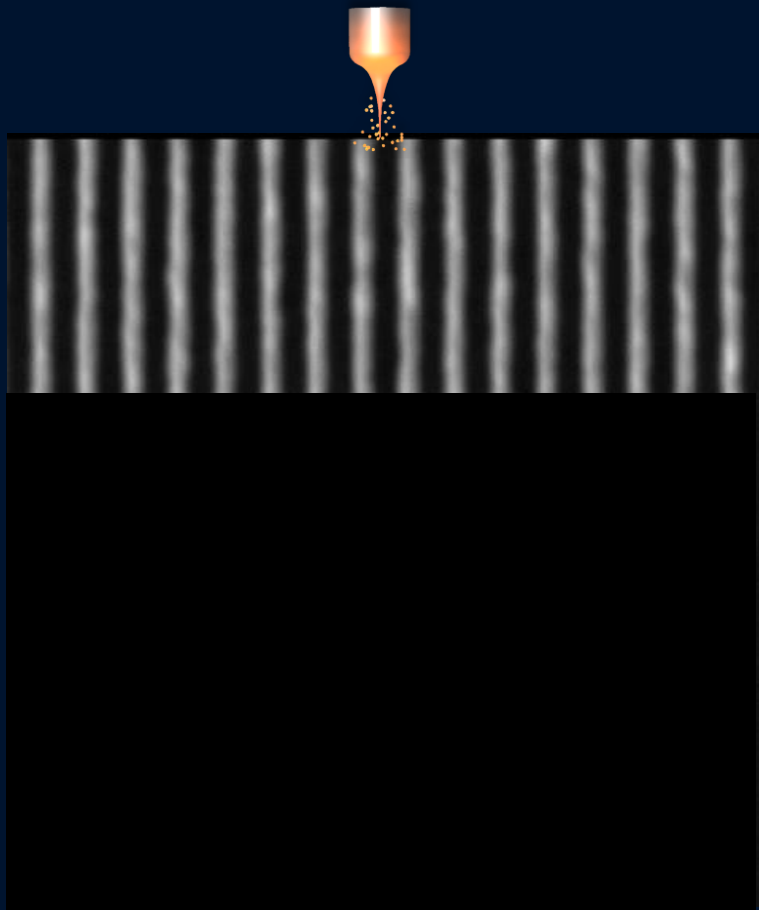


top view

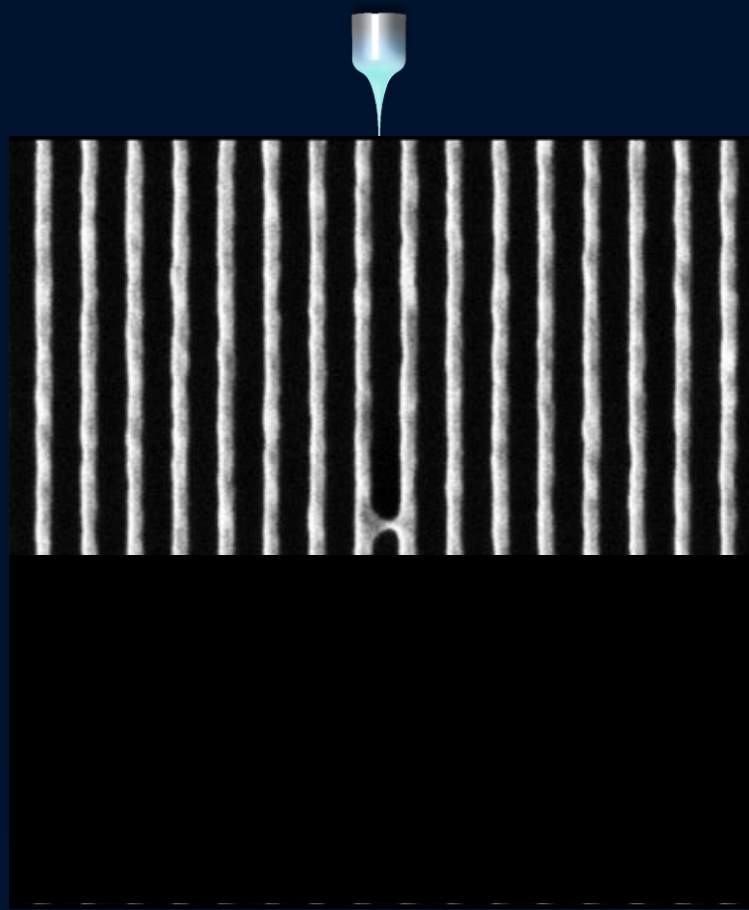


Video available at [https://www.youtube.com/watch?v=k\\_nE2taufD8](https://www.youtube.com/watch?v=k_nE2taufD8)

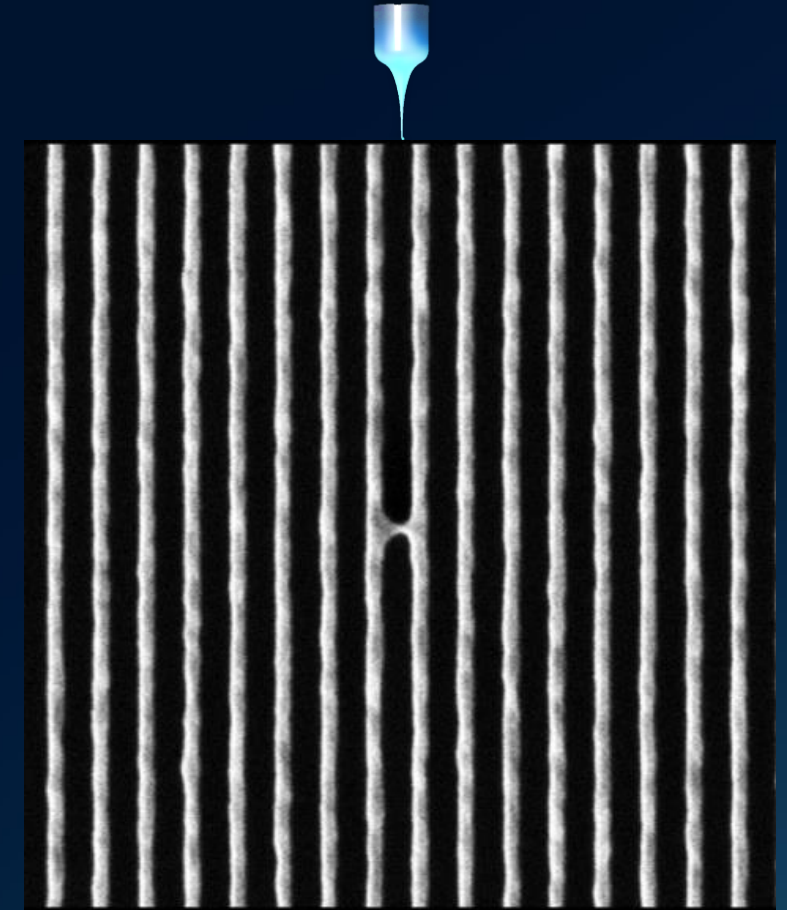
# Extending Capabilities with 2<sup>nd</sup> Generation CFE



**TFE**



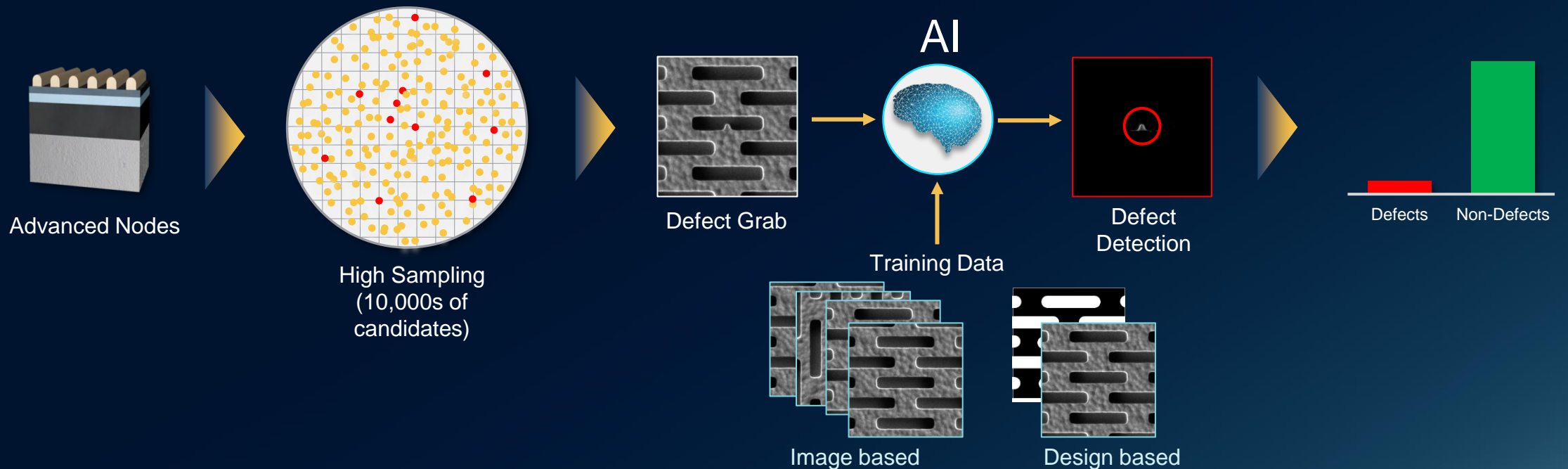
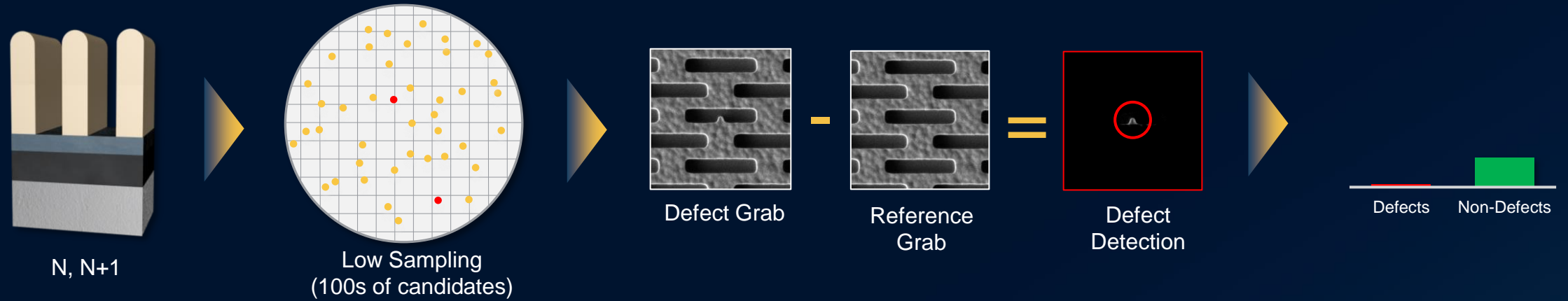
**CFE Gen 1**  
Sub-nm resolution



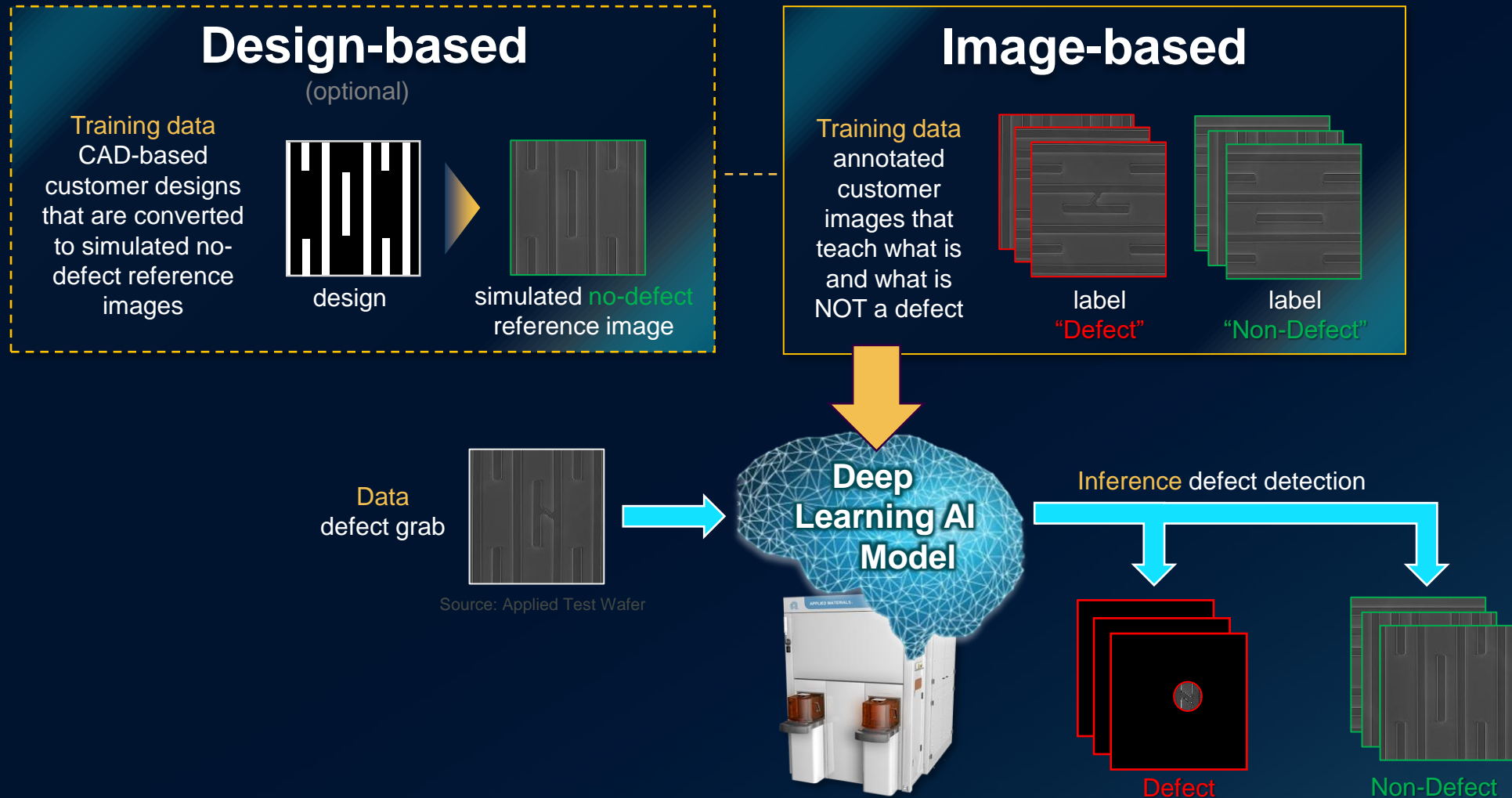
**CFE Gen 2**  
Better resolution at faster speed

\* Images with same scanning duration

# Introducing AI-based Review and Binning

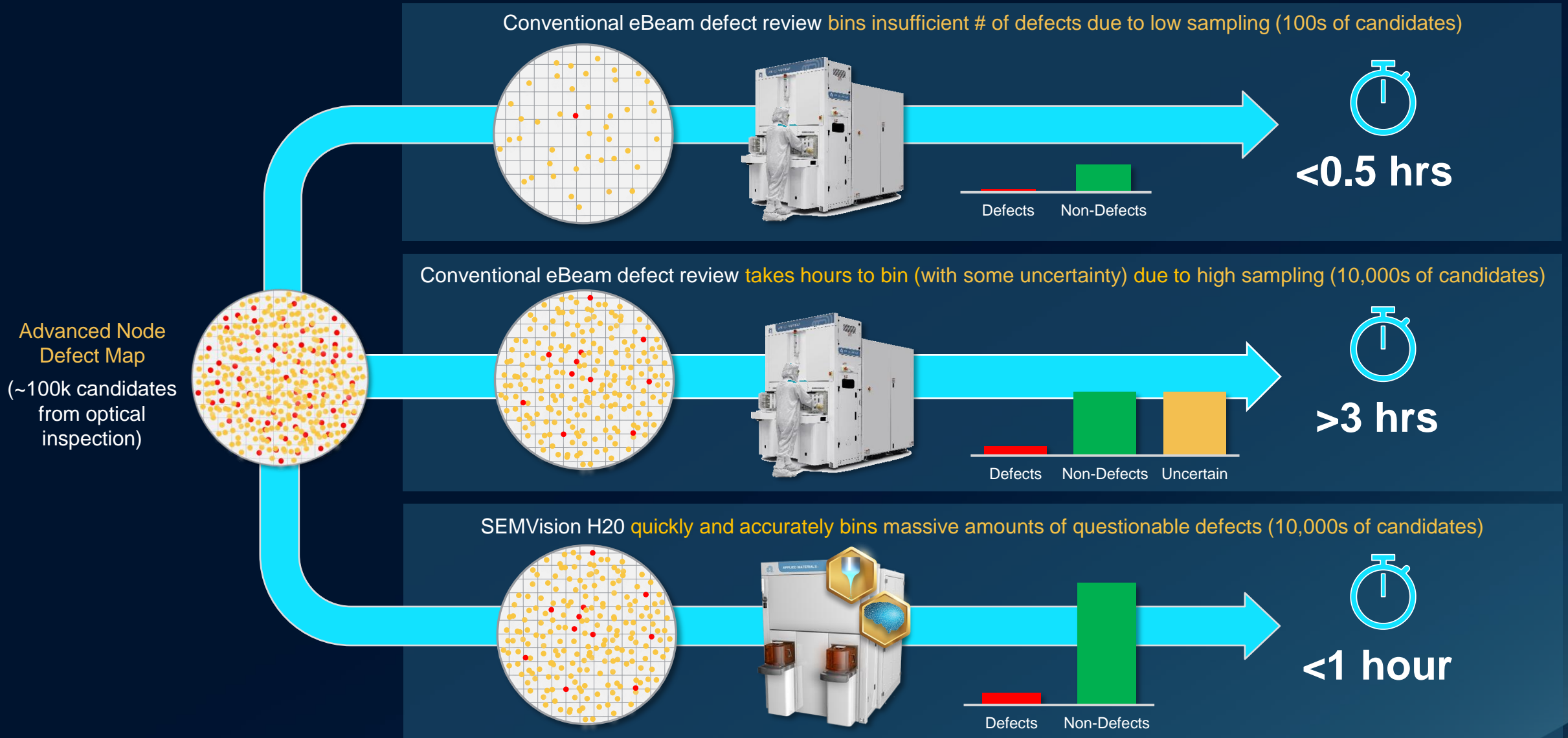


# Training SEMVision's AI Model



Complementary training methods for all defect review scenarios

# SEMVision™ H20 Overcomes Optical Inspection Limit



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