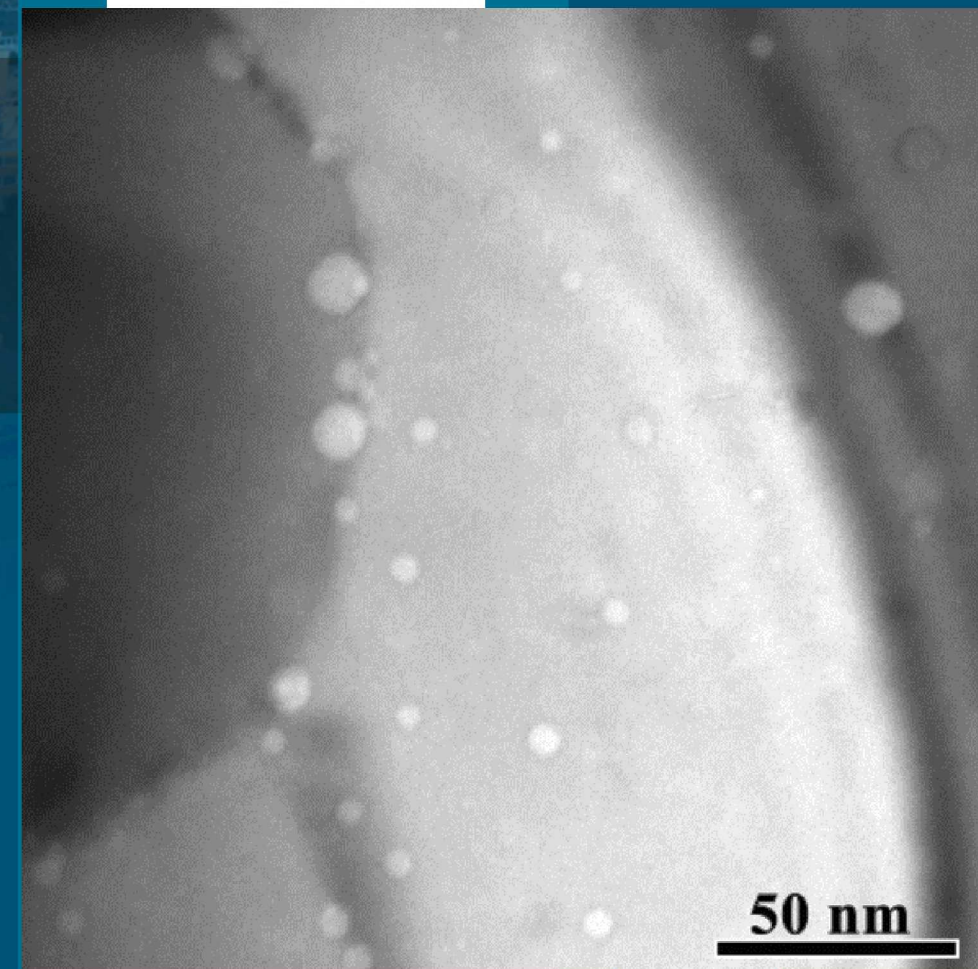


Nanobubbles and Nanocavities in Palladium as a function of He



PRESENTED BY

Trevor Clark

Sandia National Laboratories NM

Caitlin Taylor
David Robinson
Joshua Sugar
Khalid Hattar

Sandia National Laboratories NM
Sandia National Laboratories CA
Sandia National Laboratories CA
Sandia National Laboratories NM



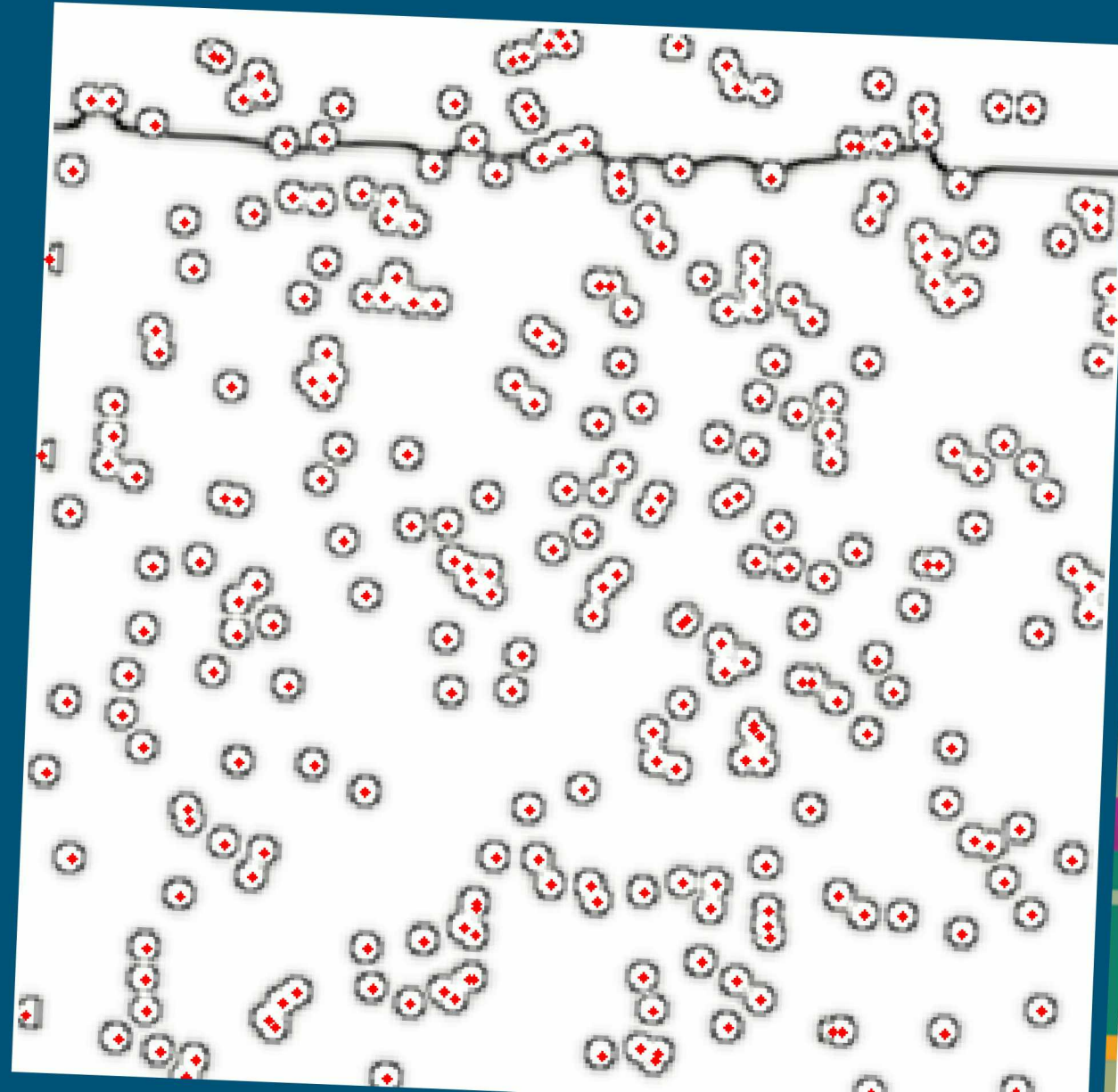
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2

Traditional grain boundary particle interaction

Zener pinning

Prevents motion of boundary
through particles

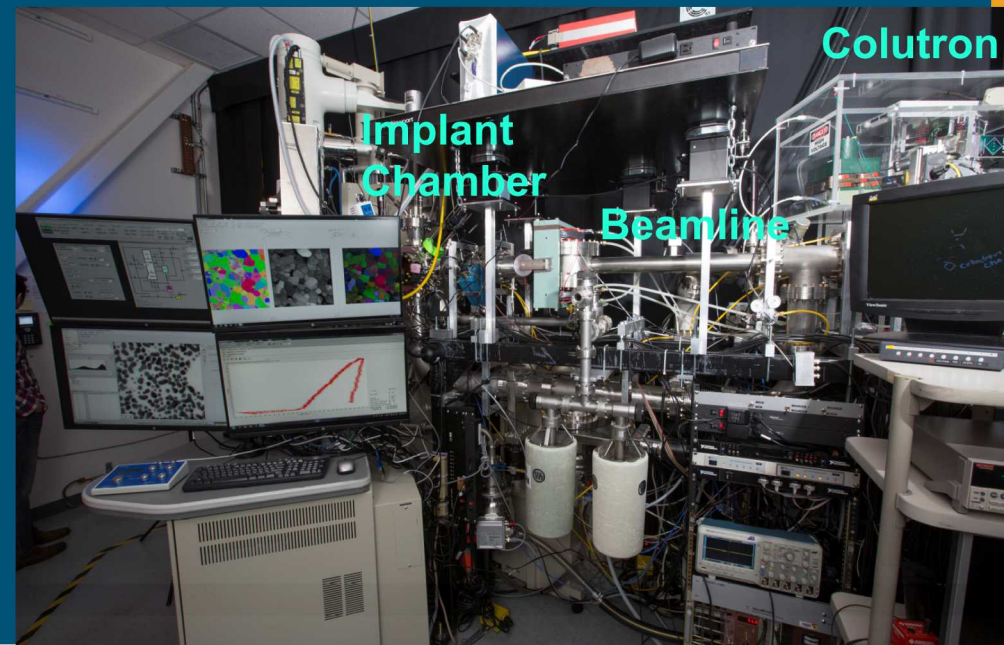


1. In-situ Helium Implantation

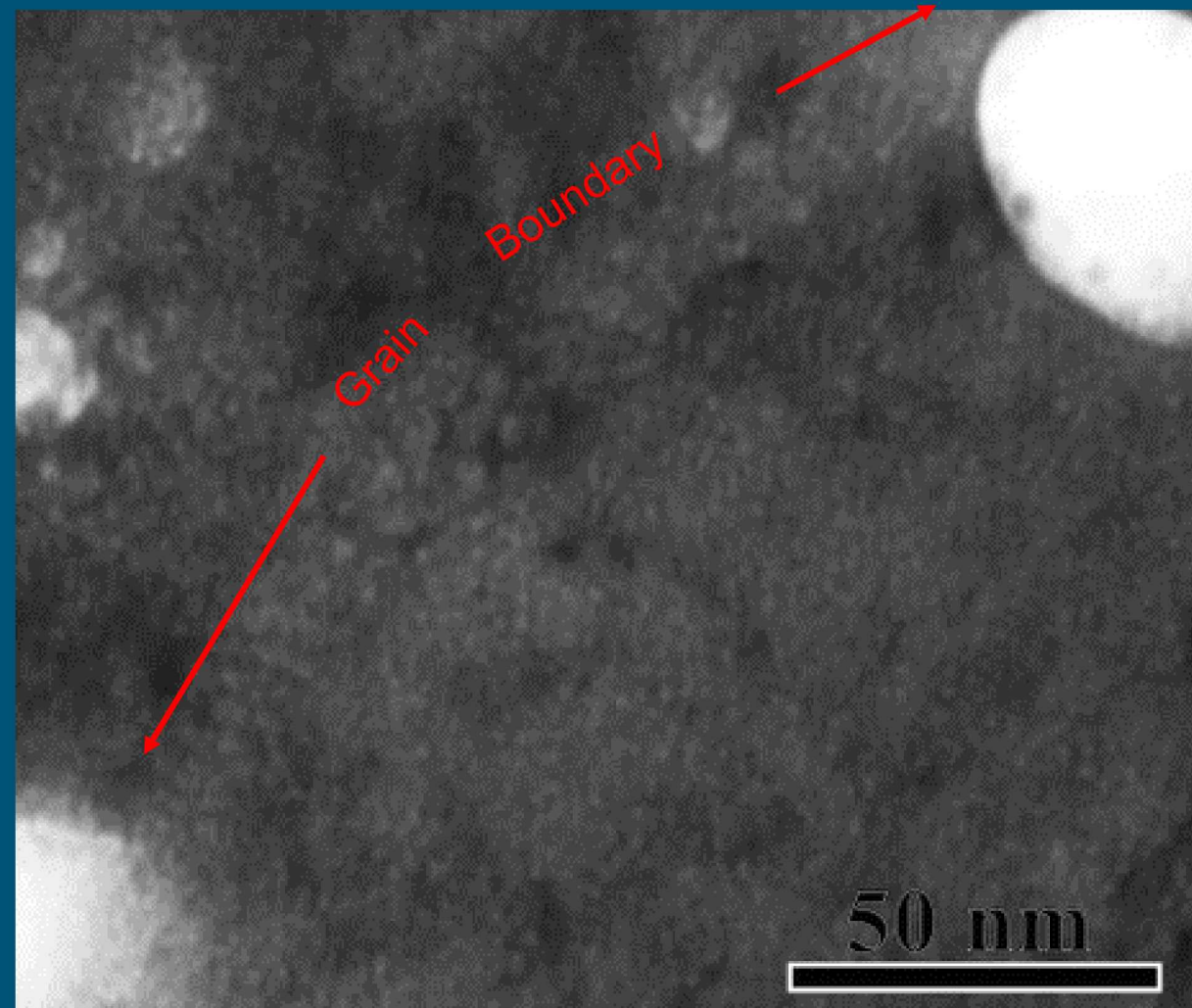
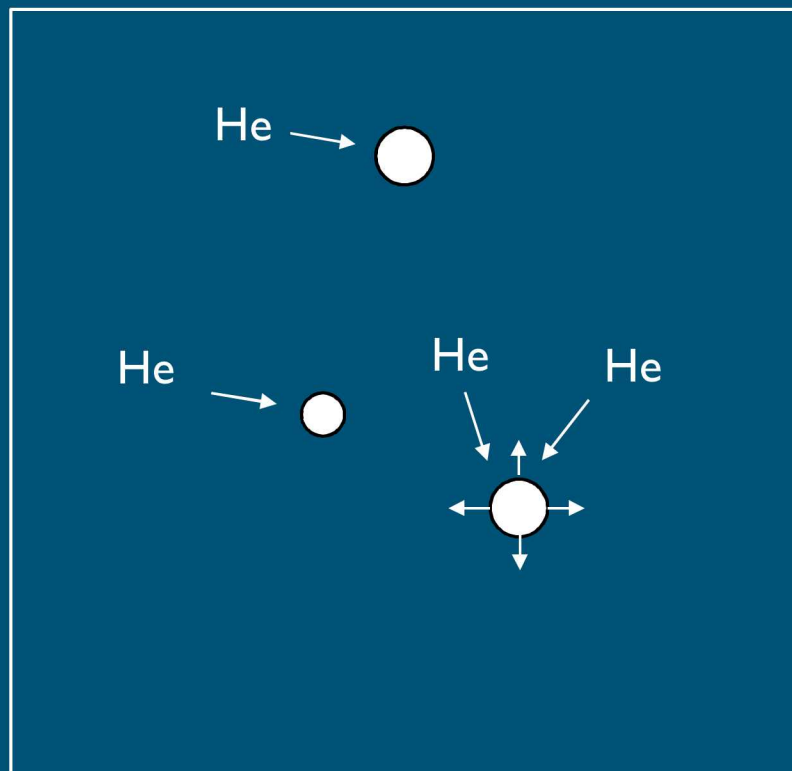
- Accelerated aging: reach high He concentration without making radioactive samples
- Bubble nucleation kinetics, nucleation sites, and growth
- How He behavior changes at room, elevated, and cryogenic temperatures

2. In-situ Annealing in Vacuum

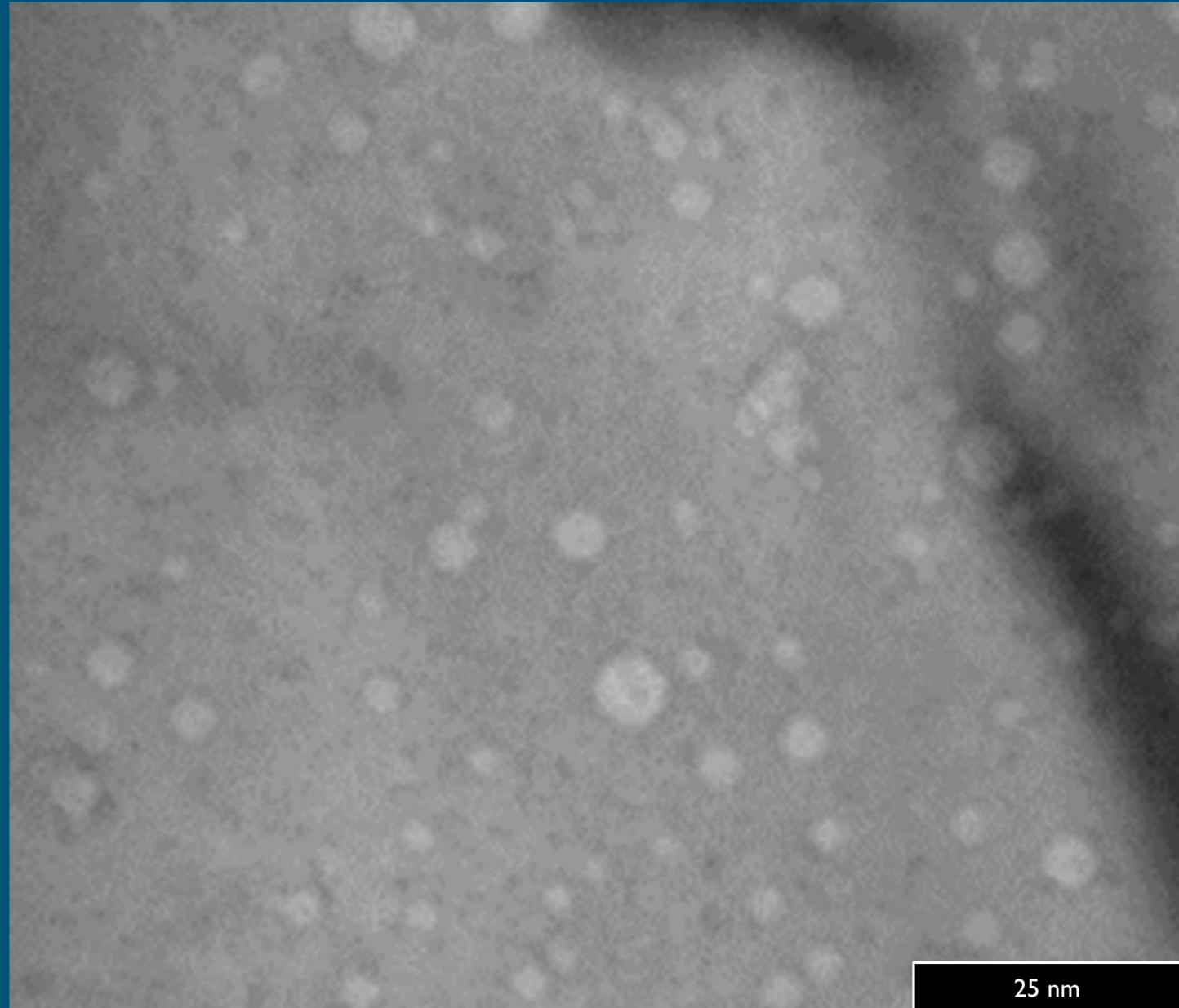
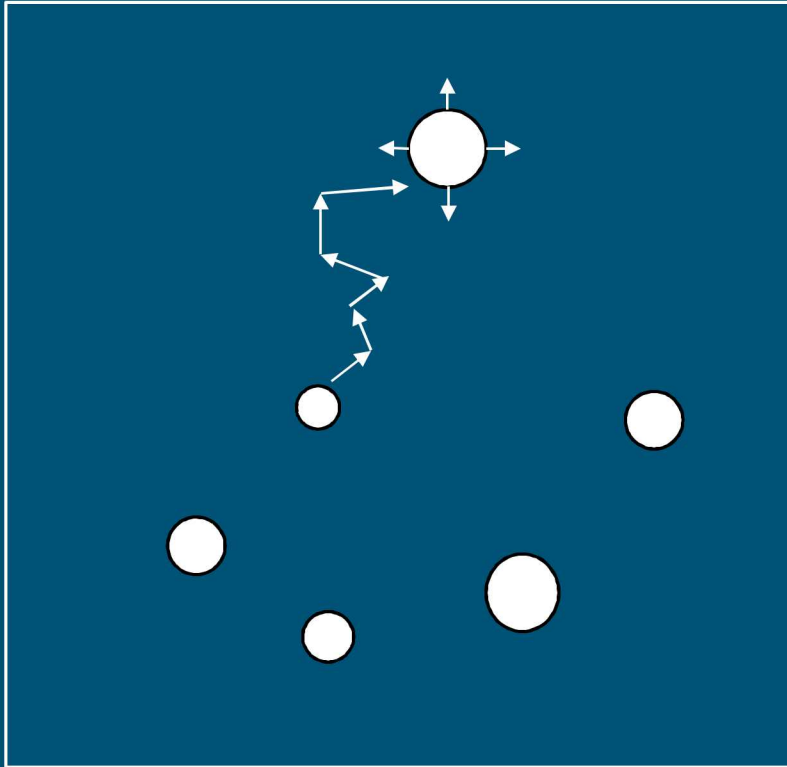
- How bubbles evolve under extreme temperatures
- Provides microstructural information important for interpreting thermal desorption data
- Accelerated aging method for understanding long-term bubble growth

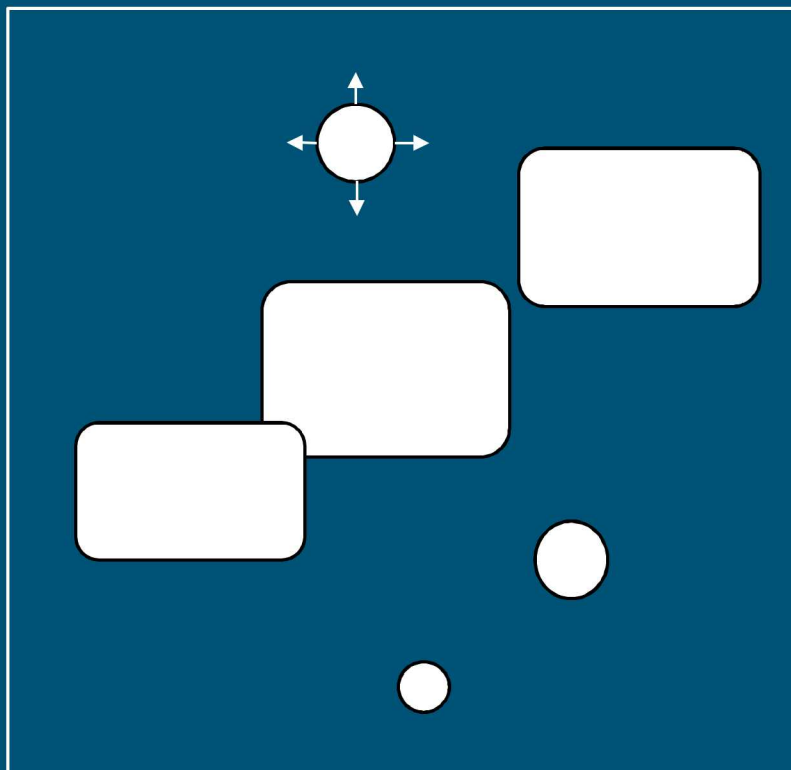


Bubble growth

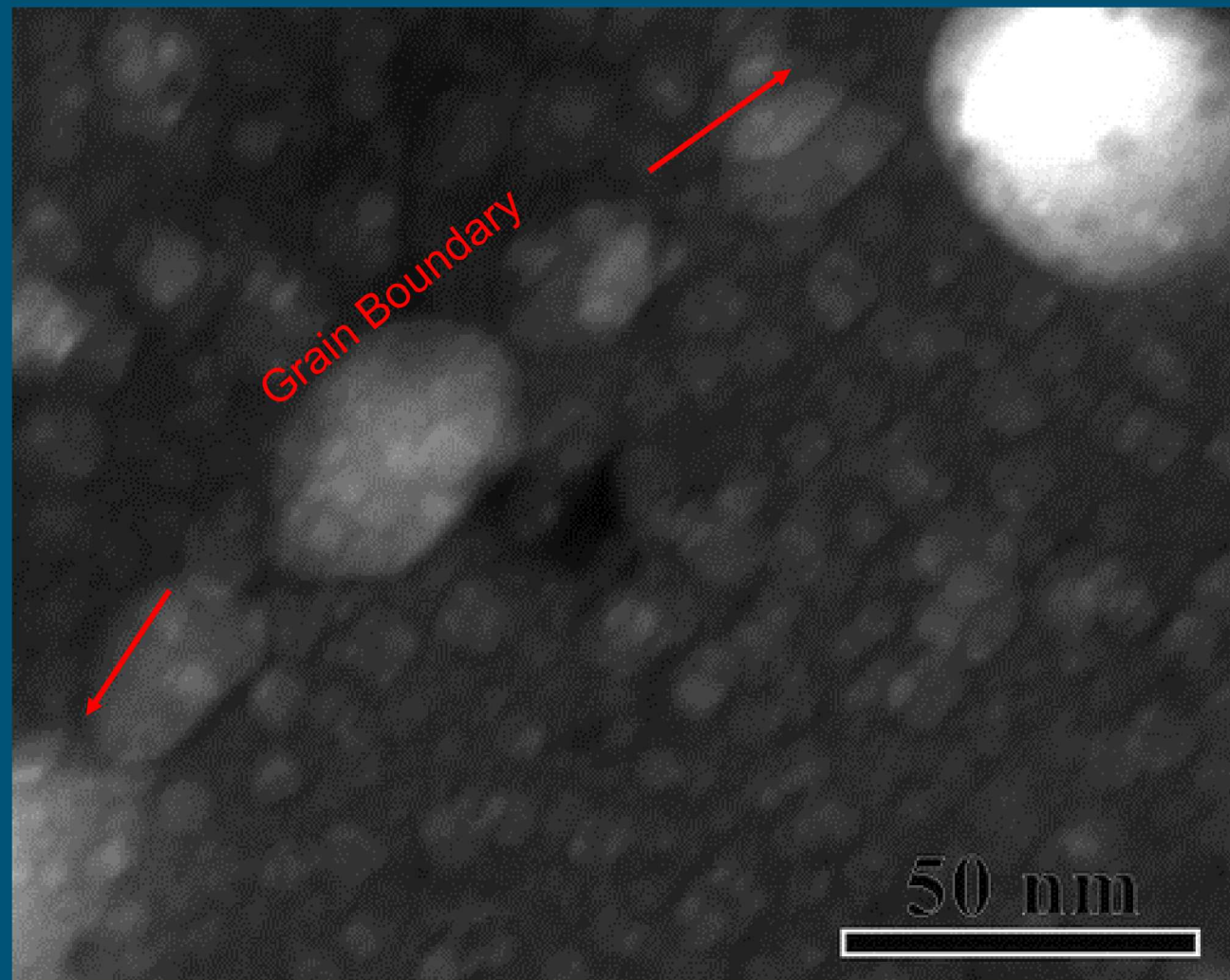


Bubble migration and coalescence

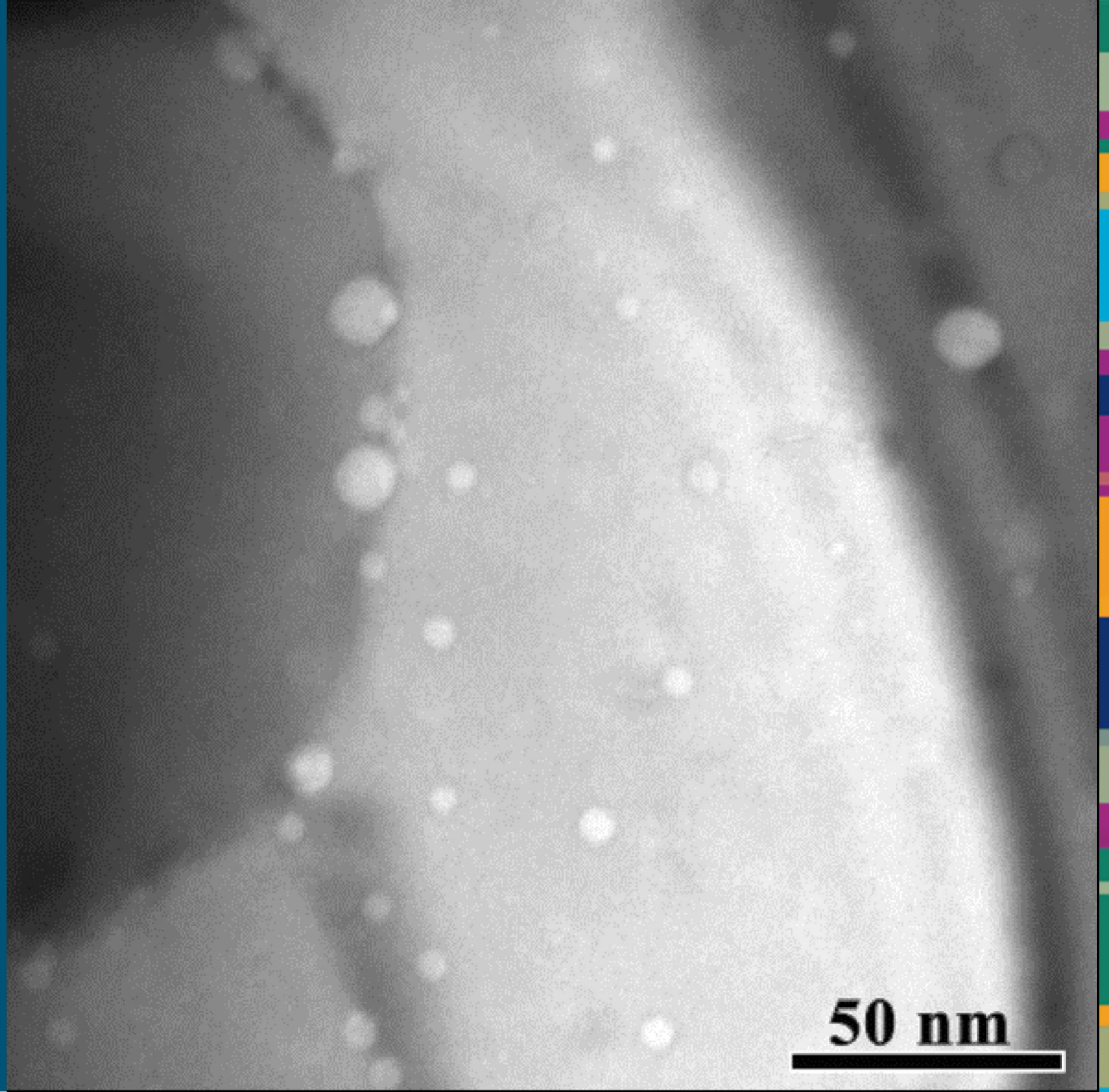


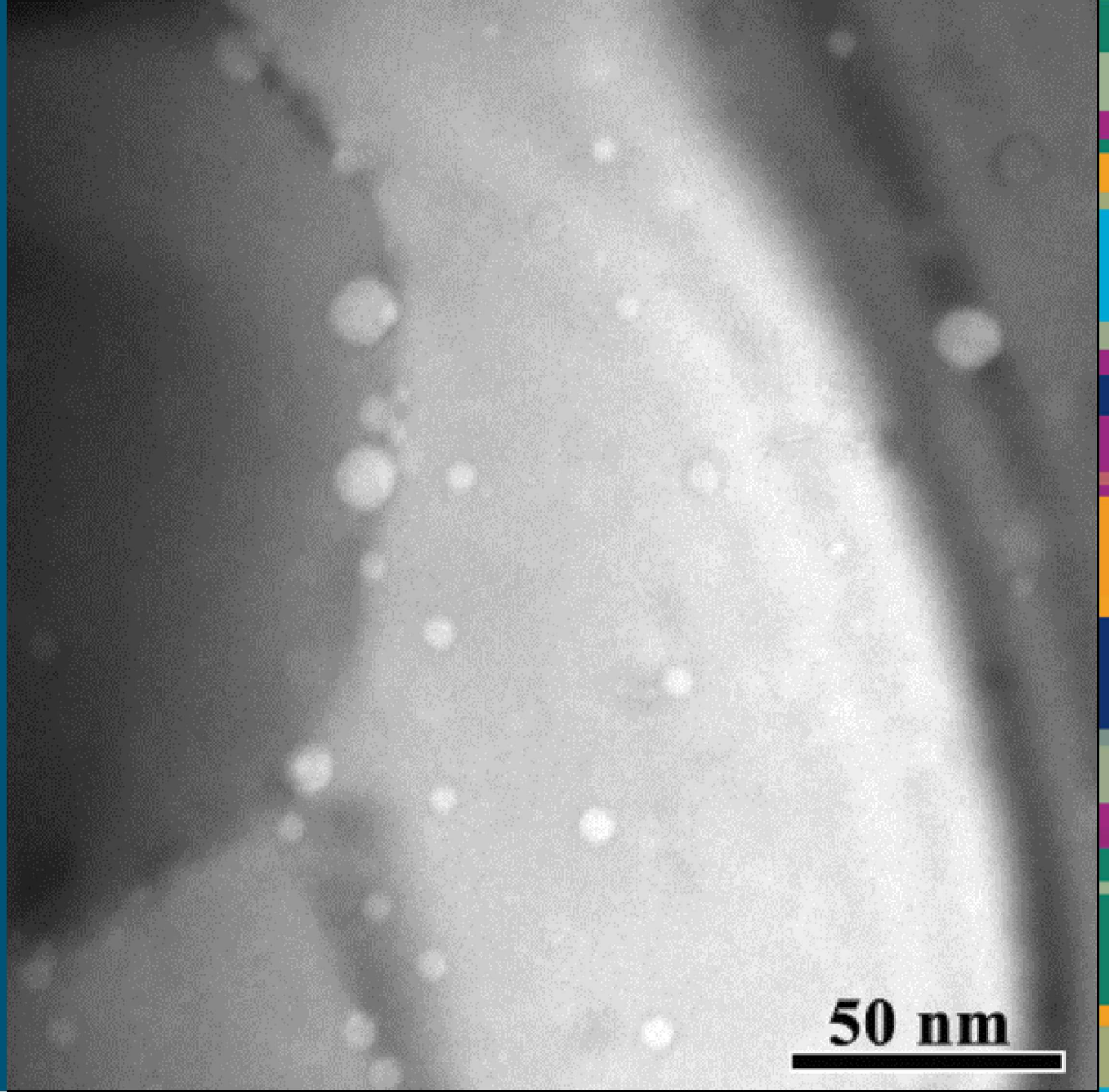
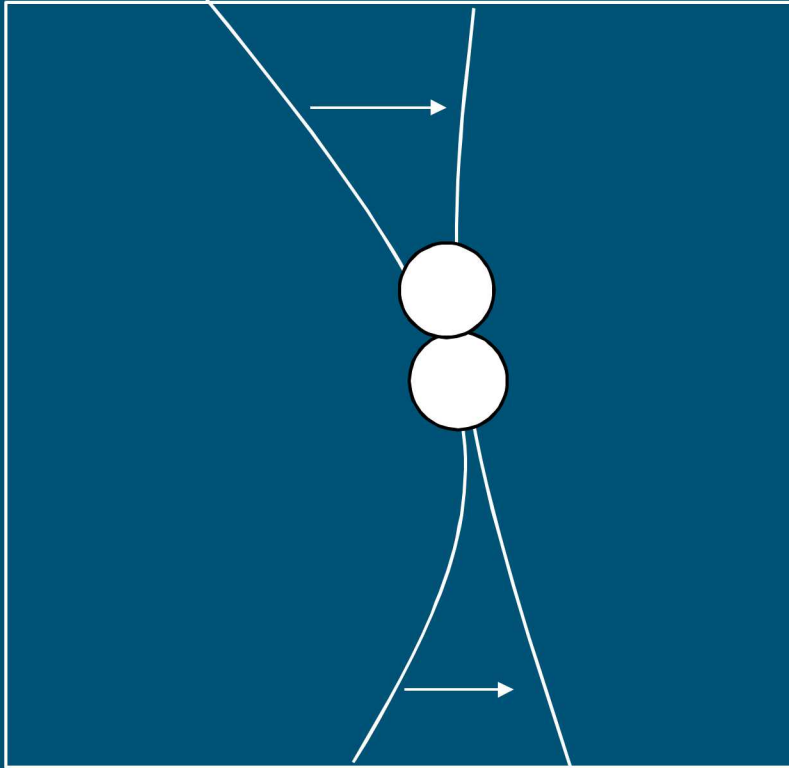


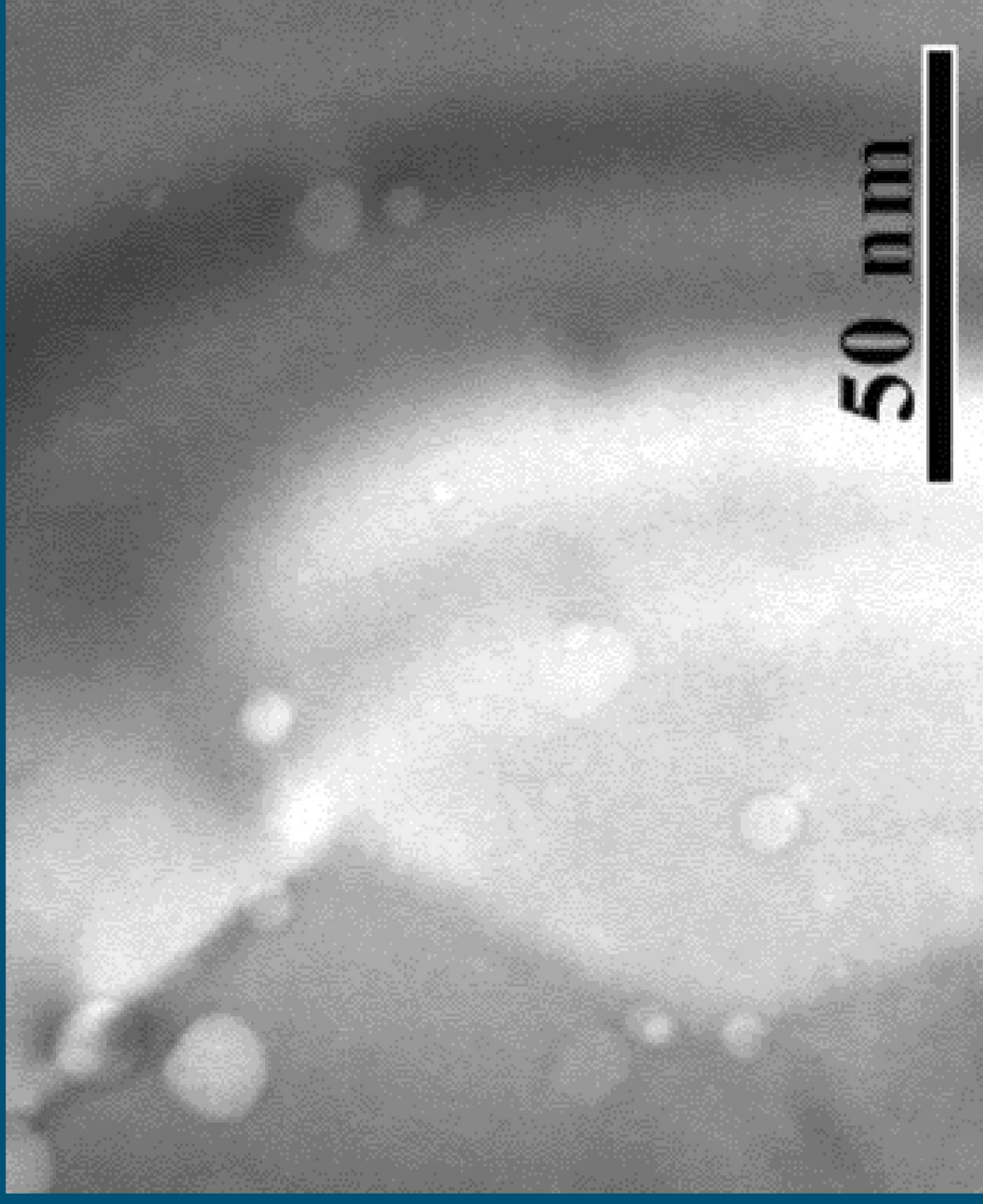
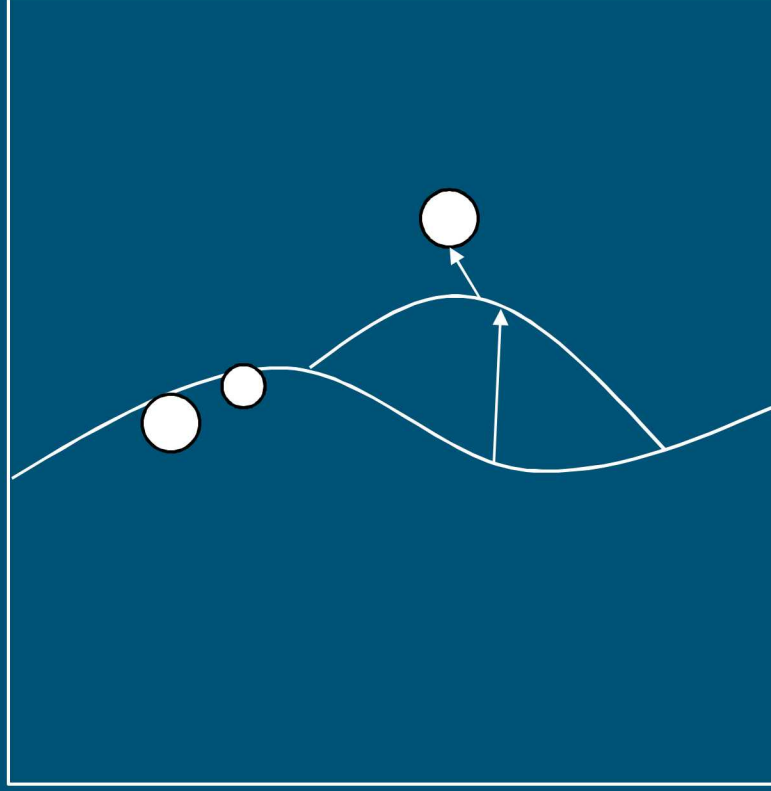
In-situ anneal @ 450°C



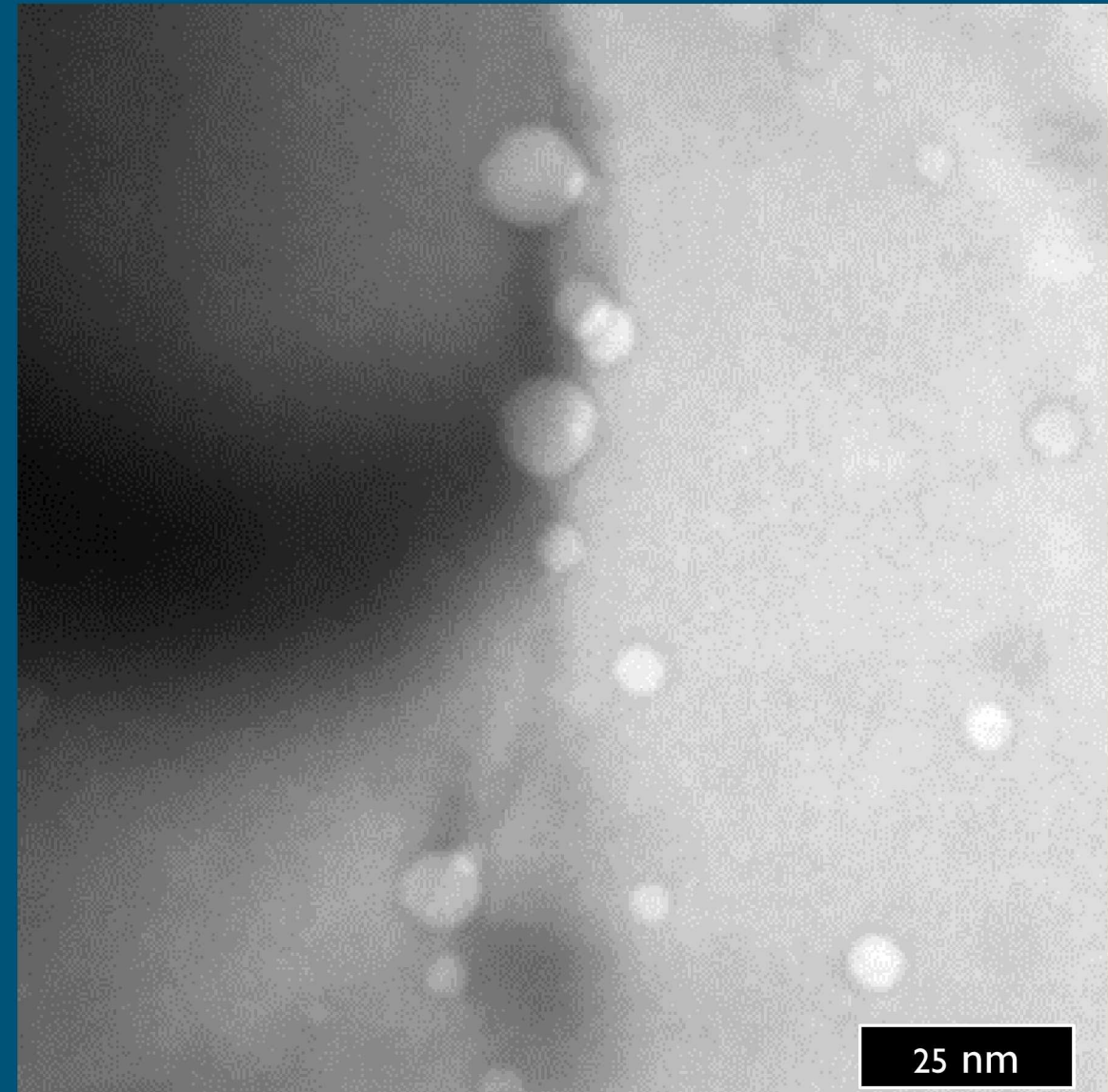
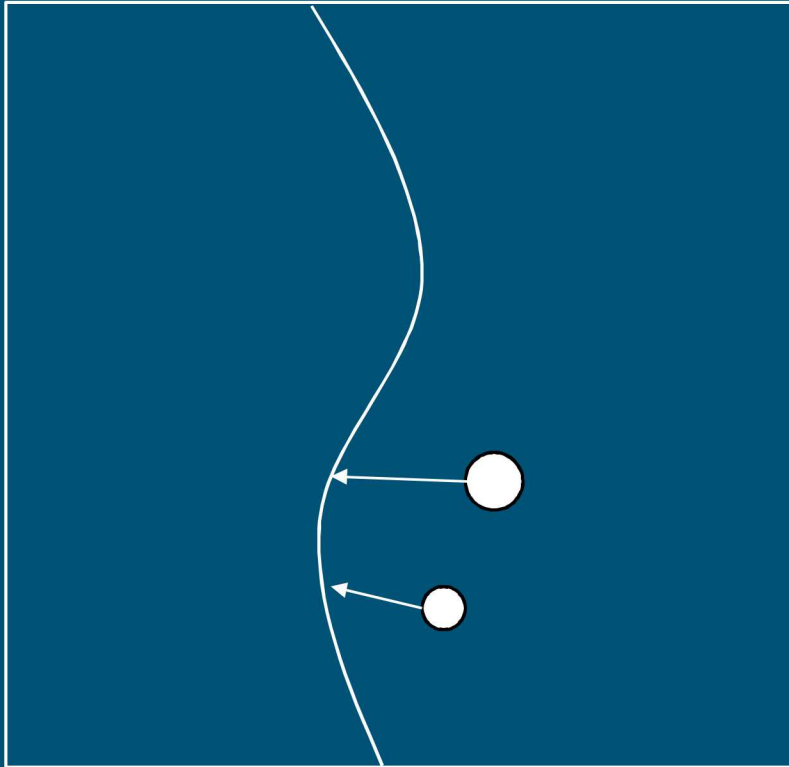
7 | Complex interactions

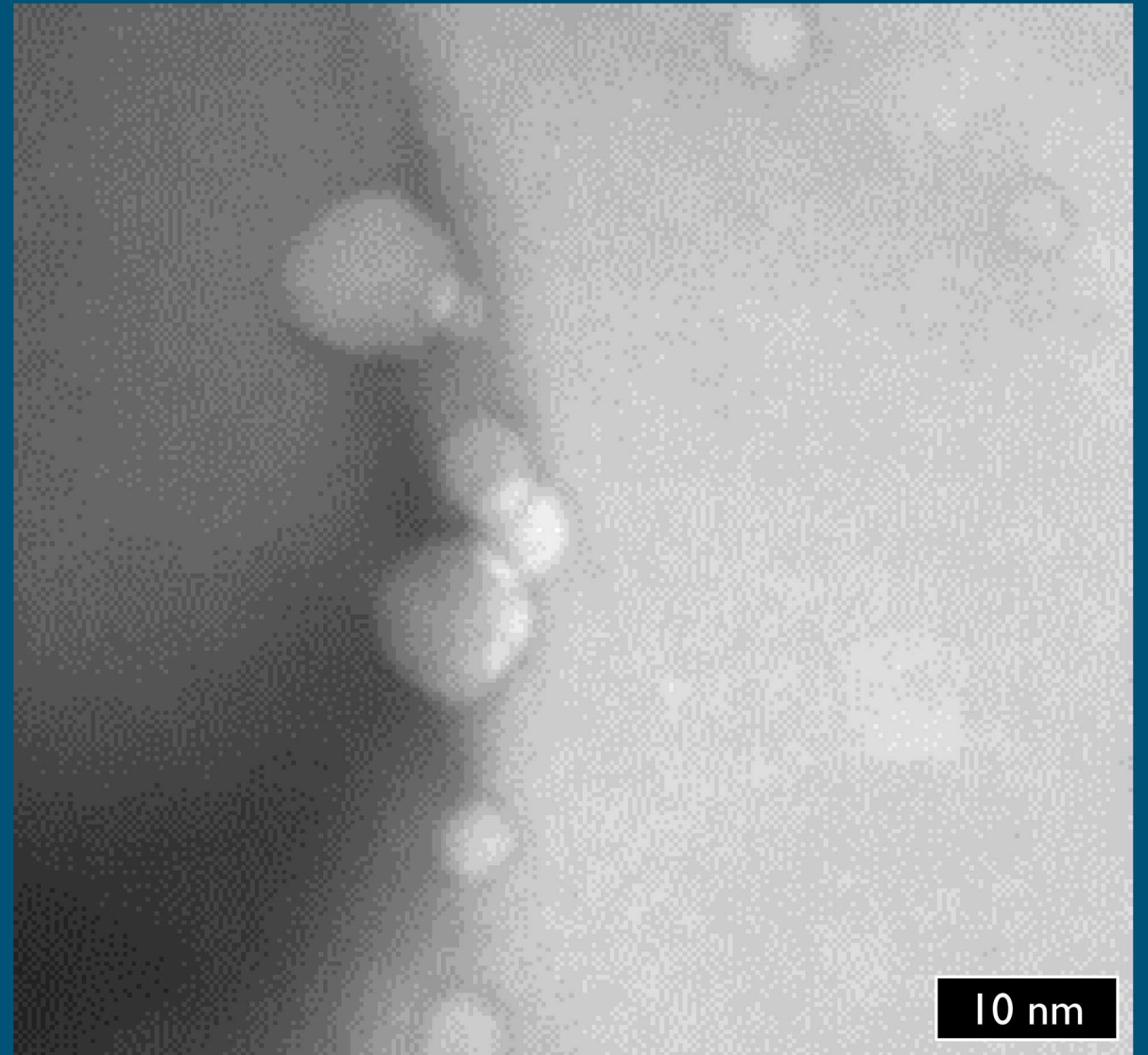
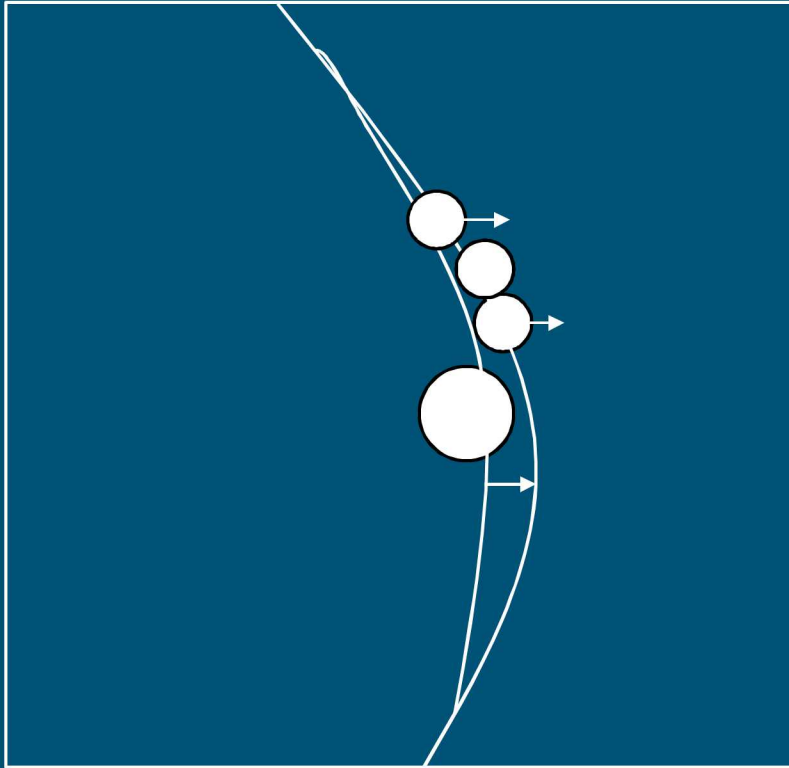






GB trapping of bubbles





Complex bubble – boundary interaction

GB pinning

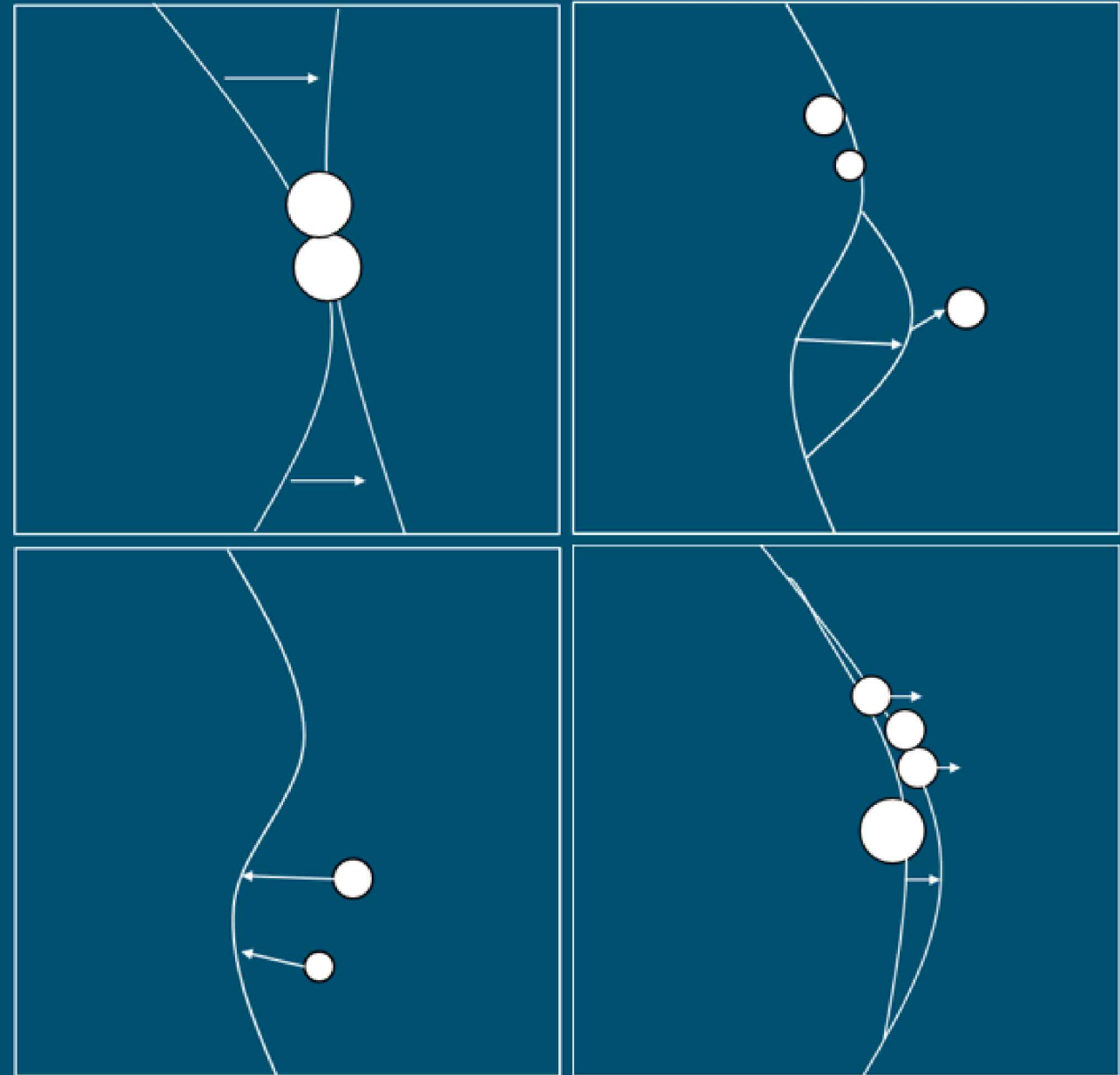
GB bulging

Draggin in GB

Trapping in GB

Escape from GB

Not purely one mechanism



Future work

In situ SEM

Surface morphology

Low energy ion gun

Laser port
Tandem line

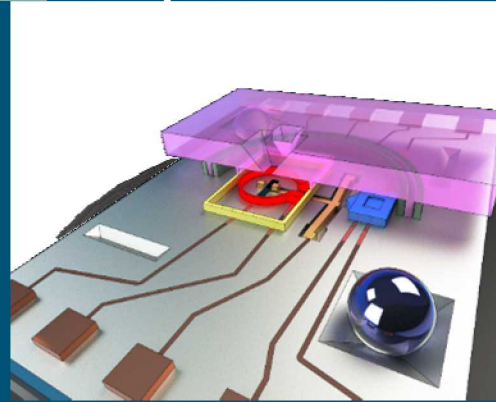


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- Spring and Fall proposals for 18 months
- Rapid Access proposal anytime for 3 months



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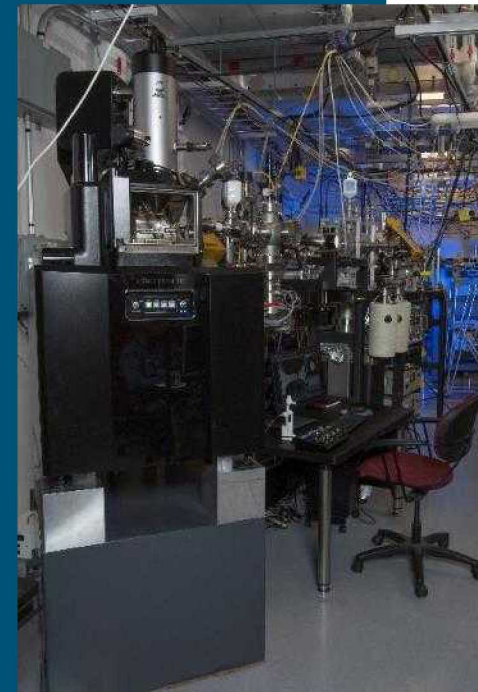
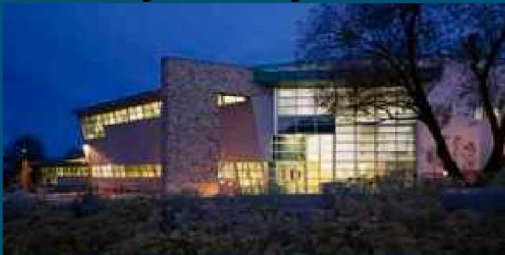
- Three proposal a year for 9 months



Core Facility - SNL



Gateway Facility - LANL



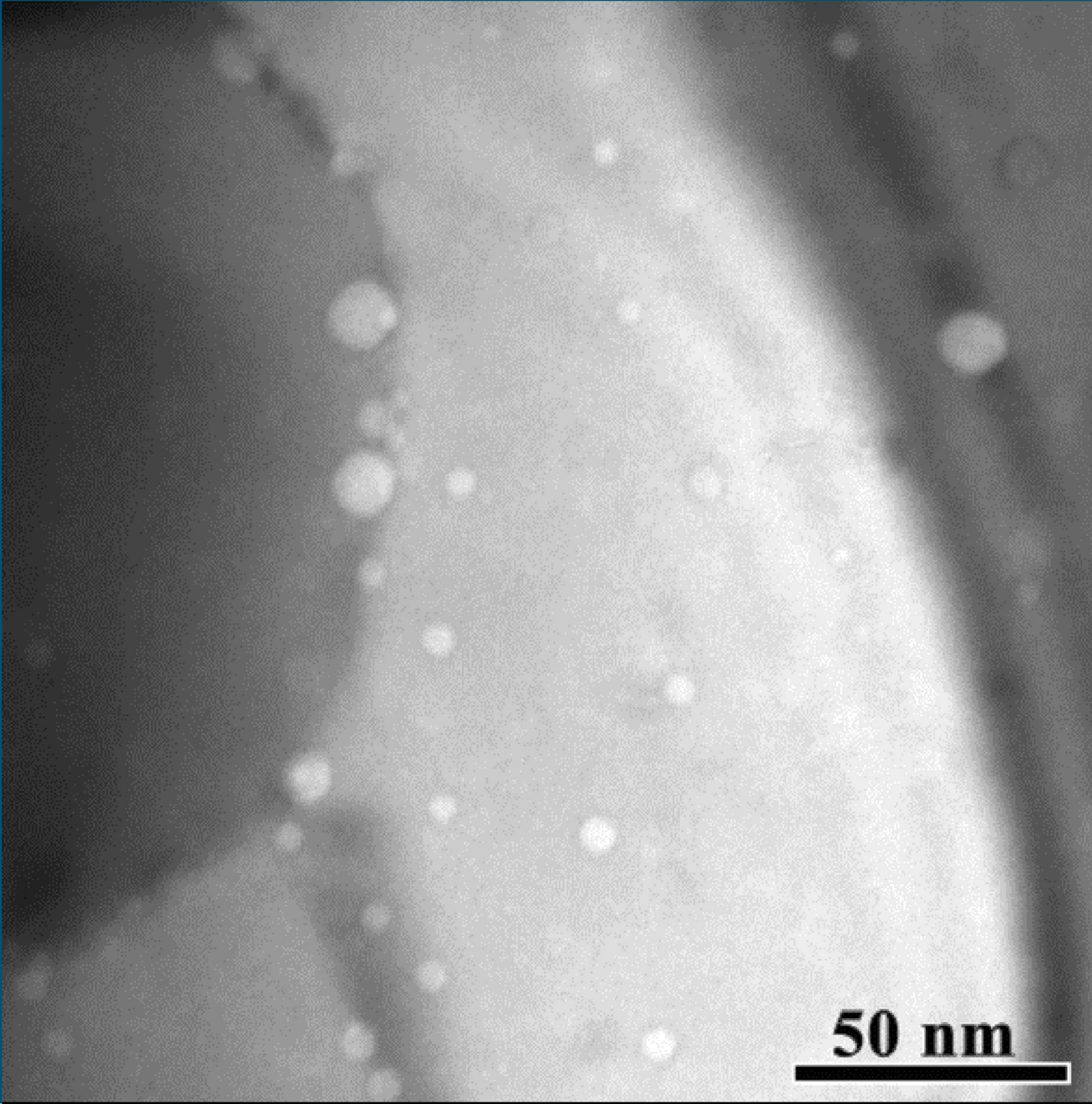
Acknowledgements

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50 nm

Questions