

Initial Particle-Size Measurements For Arden July 1, 2010

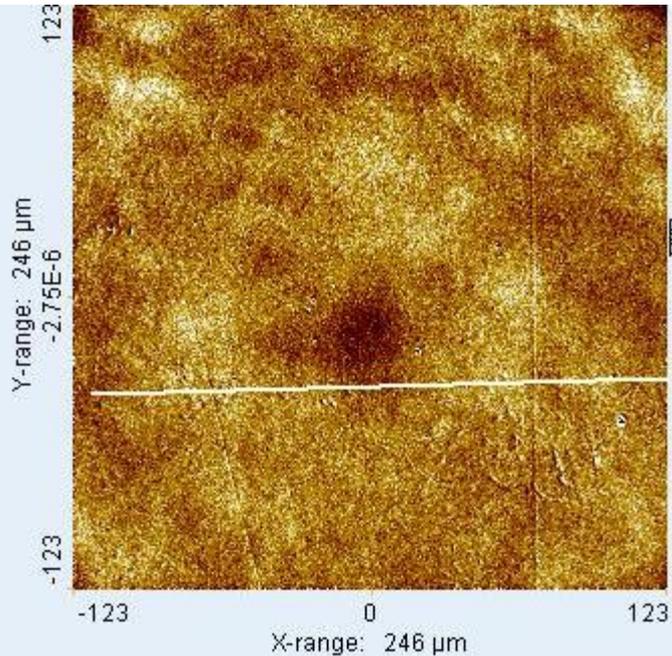
APS

Interference Microscope Tests

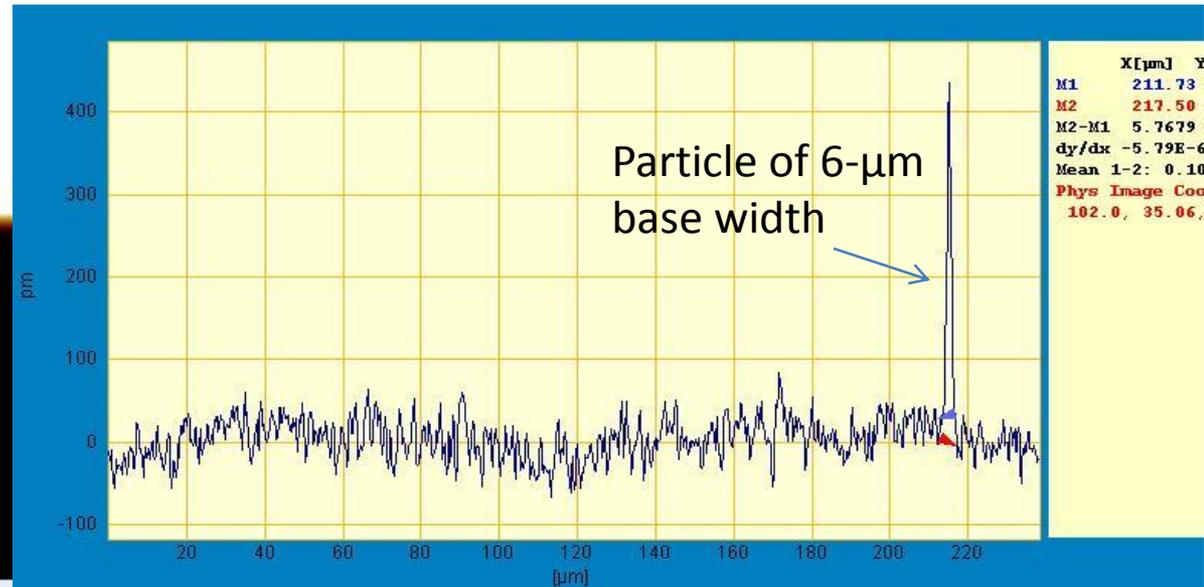
- Microscope operated with 50x magnification and green light. Transverse resolution about 1 μm .
- Used highly polished Si substrate with surface roughness of 1 Angstrom (rms).
- After background image taken of substrate surface, powder samples sprinkled on substrate.
- Background-subtracted image then evaluated for magnetic powder particles which were measured by digital profile sampling. Examples follow.

Transverse Size Measured

2-D Image: 246- μm Ranges

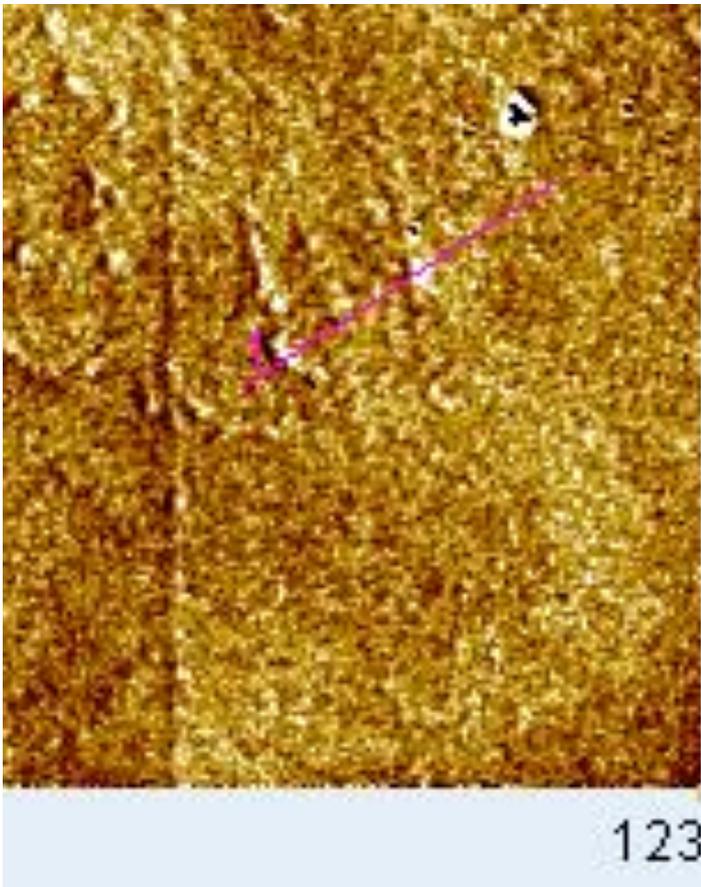


White Analysis Line Profile Through a Particle Location

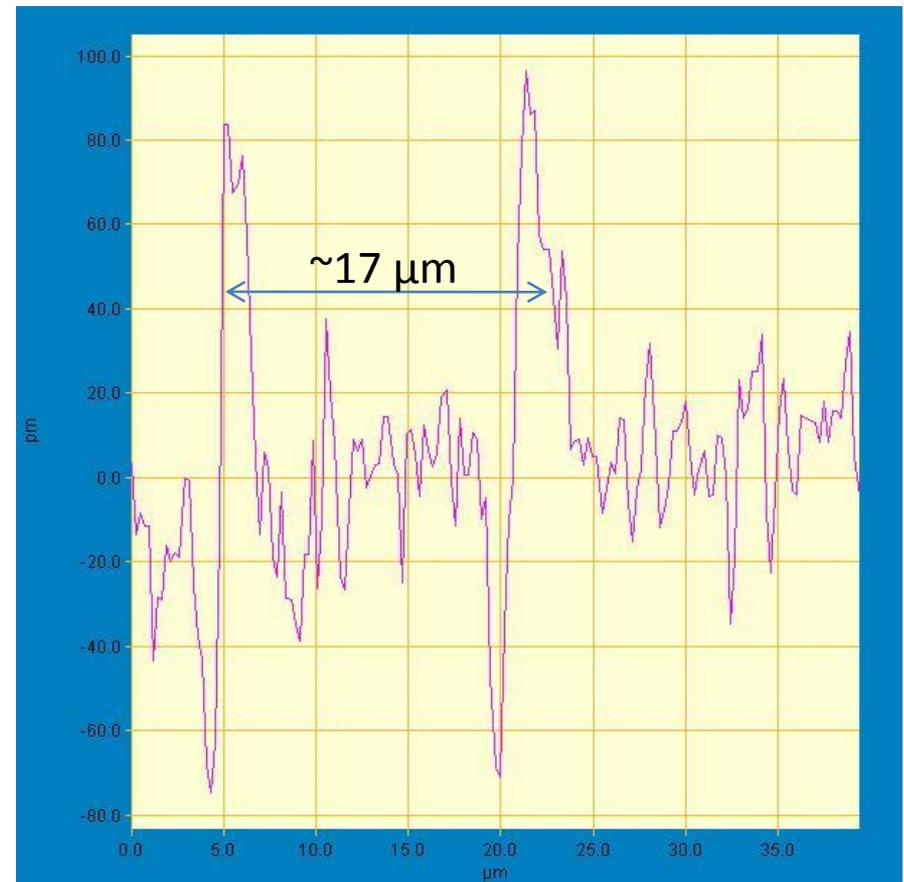


Sampling Across Two Chain-like Clusters

Zoomed-in image: purplish line indicates digital profile sample



Digital profile sample

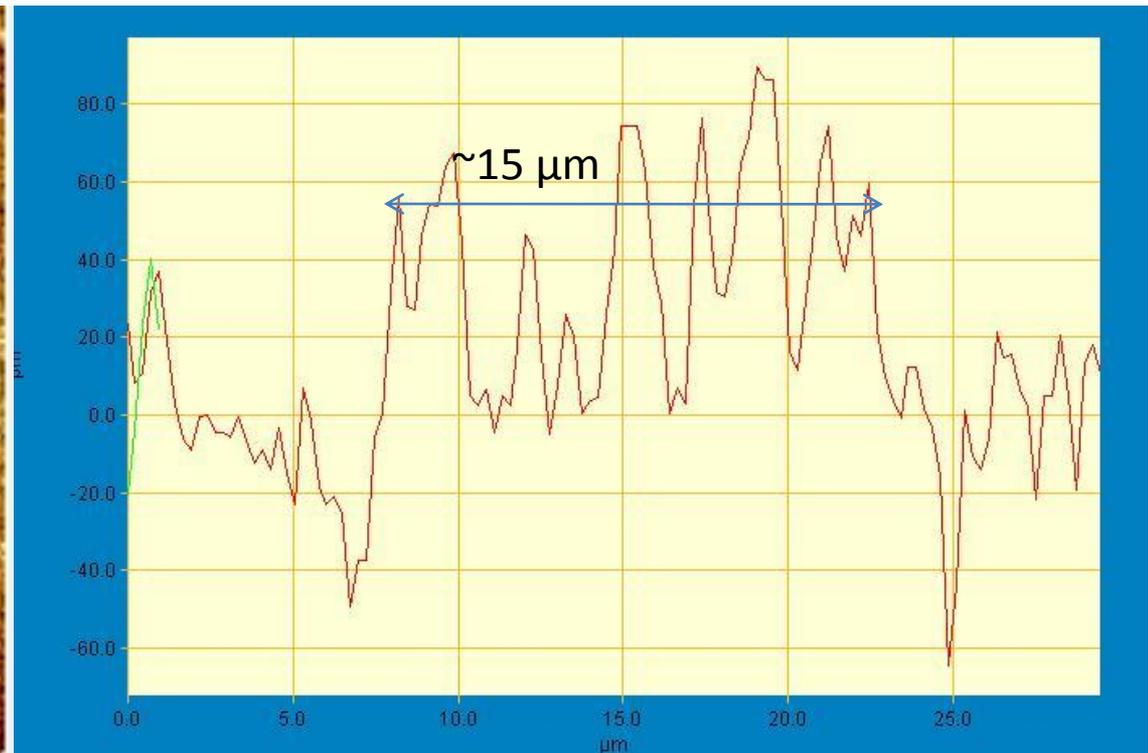
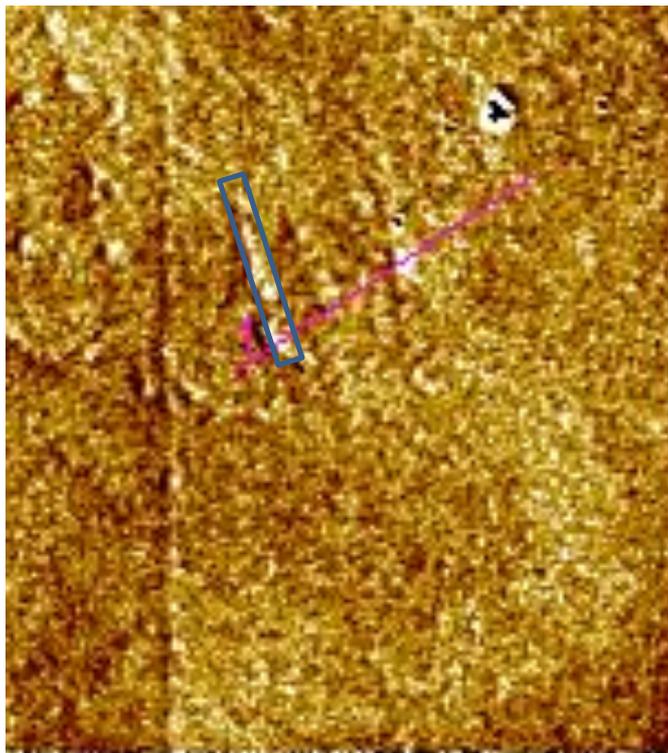


Sampling Along One of Chains

- Line sample was rotated to go along the length of one of chains in image: results shown at right.

Zoomed-in image: blue rectangle
~around digital profile sample

Digital profile sample along a chain



SUMMARY

- A microscope has been used to measure the magnetic powder's transverse dimensions.
- Transverse particle sizes found in the 2- to 6- μm range.
- Some clumping in a chain-like structure seen of about 15- μm extent in the long dimension.
- Further measurements with an atomic force microscope with better transverse resolution are planned.

Acknowledgements

- Thanks to L. Assoufid of the Optics and Detectors Group of the Advanced Photon Source at Argonne National Laboratory who operated the microscope for the tests.