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Underlying physical principles of subsurface force microscopy LAURENE TETARD, ALI PASSIAN, THOMAS THUNDAT, Oak Ridge National Laboratory ; Department of Physics, University of Tennessee, NANOSCALE SCIENCE & DEVICES TEAM — The understanding of material nanosystems necessitates the development of tools that can capture their spatial and temporal behavior with minimum disturbance. Atomic force microscopy has emerged as a powerful tool for such measurements. As many forms of nanoparticles are emerging, a better understanding of their physical properties and response in various environments is of great importance. We used a variation of force microscopy that utilizes elastic excitations to determine if mice that have been exposed to nanoparticles by inhalation possess cells invaded by manufactured particles. We demonstrate that the high resolution non-invasive imaging is also of potential for characterizing extensive as well as intensive material properties of nano-bio systems. Distributions of single-walled carbon nanohorns, and silica nanoparticles located within macrophages from the mice lungs were imaged with a resolution of a few nanometers.

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