APPLIED MATHEMATICS COLLOQUIUM

NANOSCALE STRUCTURES DIRECT OBSERVATION OF FLUCTUATION AND EVOLUTION

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ABSTRACT:

The special properties of small structures provide much of the exciting potential of nanotechnology. One aspect of small structures – their susceptibility to thermal fluctuations – may create or necessitate new ways of exploiting nanostructures. This presents a challenge in describing structural evolution, as both deterministic and continuum approaches may be expected to fail in the limit of very small structures. In this talk, the direct observation of structural fluctuations and the related evolution of nanostructure using scanned probe microscopy will be presented. Using the techniques of statistical mechanics, in particular using the continuum step approximation, the observations can be evaluated to develop a predictive understanding of how structures evolve in response to external perturbations. Examples to be presented include the observation of coupling of nanoscale fluctuations to the real-time relaxation of lead crystallites, the direct observation of persistence in wandering of nanoscale structures, and the meaning of system size in observations of structural fluctuations.

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4:15 PM
Building 4, Room 231

Refreshments at 3:30 PM in Building 2, Room 349.

Applied Math Colloquium: http://www-math.mit.edu/amc/fall04
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Lead crystal at 110°C with (111)-facet