Optimization of AFM Probes for More Accurate Nano-Material Characterization

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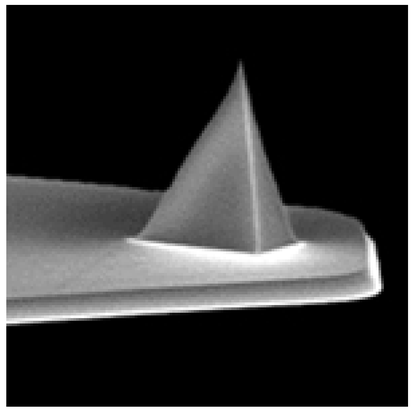
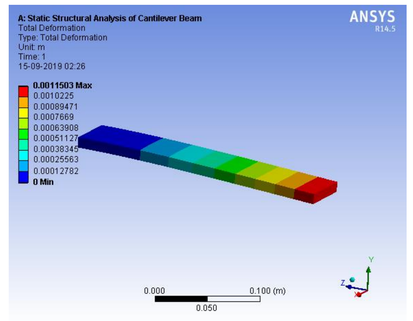
Research Question: What will be the most efficient geometry for an AFM probe tip to maximize its accuracy in nano-material characterization?



Future Impact: AFM is utilized in various industries including material science, semiconductors, and cell biology. The optimization of AFM probes will be extremely beneficial as it will improve the accuracy of the AFM measurements, thus paving the way for ground-breaking research and revolutionary discoveries for each of the industries. Optimizing AFM probes has the potential to pave the way to finding the cure to cancer due to the ability to analyze biological samples and even cell tissue at an extremely high resolution.

Anticipated Result: The expected outcome of this research is to analyze a variety of AFM probe tips and decide on the probe with the most efficient geometry and material and optimize it until it achieves the same target stiffness, frequency, and tip radius that were desired.



Current Progress: The desired specifications of the probe parameters are being determined, specifically the spring constant, frequency, and tip radius. Afterwards, an optimization study of AFM probe and tips will be conducted with the utilization of Finite Element Analysis. The geometry of the probe will be designed on ANSYS and be subjected to simulations to evaluate the performance and sensitivity of the probe.

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