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Sensitive Imaging by Multifrequency Atomic Force Microscopy

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Multifrequency Atomic Force Microscopy (AFM) has attracted attention during the past couple of years. By exciting the AFM cantilever with higher eigenmode frequencies, material composition in addition to topographical information can be achieved in a single pass. Recently, trimodal AFM has provided the capability of performing subsurface imaging. The higher number of channels to control can make the selection process for the excitation frequency and amplitude to be challenging. In this work, a comprehensive study that shows the effect of each parameter on image quality and information gathered in multifrequency AFM will be provided. By having a controllable *'knob'*, one can modulate the sensitivity during a characterization process. This becomes important when multifrequency AFM is done on soft matter such as biological samples and polymers. This study provides both theoretical and experimental guideline to select excitation frequency and amplitude to either minimize or maximize indentation during AFM imaging.

Biography:

Babak Eslami received his Ph.D. from the George Washington University in DC. During his Ph.D. he worked on developing and optimizing multifrequency AFM techniques for surface characterization of soft matter. As an Assistant Professor in Mechanical Engineering Department of Widener University, he continues to work on this topic, focusing on the fundamental understanding of the cantilever dynamics in different environments, seeking to enhance imaging sensitivity and develop new surface modification capabilities.