

## The Effect of Tip Parameters on Vibration Modes of Atomic Force Microscope Cantilever

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**Abstract :** In this paper, the effect of mass and height of tip on the flexural vibration modes of an atomic force microscope (AFM) rectangular cantilever is analyzed. A closed-form expression for the sensitivity of vibration modes is derived using the relationship between the resonant frequency and contact stiffness of cantilever and sample. Each mode has a different sensitivity to variations in surface stiffness. This sensitivity directly controls the image resolution. It is obtained an AFM cantilever is more sensitive when the mass of tip is lower and the first mode is the most sensitive mode. Also, the effect of changes of tip height on the flexural sensitivity is negligible.

**Keywords :** atomic force microscope, AFM, vibration analysis, flexural vibration, cantilever

**Conference Title :** ICMAM 2015 : International Conference on Mechatronics and Applied Mechanics

**Conference Location :** Istanbul, Türkiye

**Conference Dates :** October 26-27, 2015