

# Numerical Modeling of Surface Roughness Effects on the Natural Frequency of a Silicon Cantilever

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**Abstract** - This paper presents a numerical model showing the effects of surface roughness on the resonant frequency of a cantilever beam. The model developed incorporates non-uniform cross-sections to represent surface roughness. Results show that as roughness increases, resonant frequency increases. The model presented here also has good agreement with FEM simulations.

**Keywords:** Deep reactive ion etching, Finite Element Method, Microelectromechanical Systems, Surface roughness