

Abstract Submitted
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The importance of cantilever mechanics in the quantitative interpretation of Kelvin Probe Force Microscopy KEVIN J. SATZINGER, Truman State University, KEITH A. BROWN, R.M. WESTERVELT, Harvard SEAS and Physics — A realistic interpretation of the measured contact potential difference (CPD) in Kelvin Probe Force Microscopy (KPFM) is crucial in order to extract quantitative information. Thus far, simulations of KPFM have treated the cantilever as a rigid object. We present a technique to simulate KPFM measurements by simulating a realistic three dimensional probe above a planar sample. We study three methods of weighing the probe-sample interactions to include cantilever mechanics. (1) The commonly-used force method treats the probe-sample interaction from all parts of the probe equally. This method only allows for translation of the probe. (2) The torque method allows for rotation of the probe, taking into account the fixed cantilever end. (3) The bending method acknowledges the flexibility of the cantilever by modeling it as an Euler-Bernoulli beam. We compare simulated step responses from each method to experimental data. We find the force and torque methods overestimate the effect of the cantilever and that the bending method produces the best agreement with experiment.

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