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【169】 Orbit of an oscillating scanning probe microscope tip

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The ability to resolve individual bonds within a single molecule represents one of the greatest feats of atomic force microscopy (AFM). The imaging mechanism is based on a functionalized tip that dynamically responds to tip-sample interactions. However, these interactions depend on a convolution of sample and tip that puts aspects of the tip's behavior into focus. Here we demonstrate how to trace the orbit of an oscillating AFM-STM tip in three dimensions. We construct the tip-trajectory by applying voltage pulses at varying phases within the oscillation cycle. Lateral shifts in topographic features indicate a skewed oscillation or a dynamical tilting of the functional tip unit. Our method allows to control aspects of AFM imaging and spectroscopy.

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