

Abstract Submitted
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Designing an atomic force microscope (AFM) for a wider range of researchers¹ ELIZABETH REINER, THEDA DANIELS-RACE, Louisiana State University — Atomic force microscopy (AFM) is a technique used in a variety of research fields to characterize samples at resolutions approximately 1000x better than optical microscopes. A standard AFM relies on the interaction between the atoms of a needle-like cantilever and the atoms on the sample surface to repel the cantilever from the sample. The instrumentation of even a so-called "plug and play" commercial AFM still requires the user to exercise intense dexterity and control to calibrate a laser before the sample can be characterized. In this project, we have researched and designed the parameters needed for a prototype AFM which makes this equipment and technique that much more accessible to a wider range of researchers. The end goal of this work is to design and produce a homemade atomic force microscope (AFM) that is accessible to more researchers by meeting the following goals: (1) less expensive than a commercial AFM, (2) portable/modular, and (3) easier to use than a conventional AFM. Thus, in this project we have researched, selected, and designed a customized AFM probe-controller system best suited to these criteria while, in addition, successfully simulating and testing critical circuit operations.

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