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Working Model of an Atomic Force Microscope KIRSTEN L. BONSON, MICHAEL J. HAMBLIN, DAVID A. HAMMOND, RANDALL L. HEADRICK — Relatively few laboratory experiments are available for introductory lab courses relating to nanoscience and nano- technology. In order to explain the working principles of an atomic force microscope (AFM) to an introductory level physics class, we have created an inexpensive working model of an AFM using a modified phonograph stylus in place of the AFM cantilever and tip. The sample to be studied is positioned under the stylus using a micrometer stage, and a 10 mW laser diode is used to produce a beam, which reflects off a very small mirror glued to the end of the stylus. No electronic detection is used, rather students can measure the deflection of the tip directly from the movement of the laser beam on a piece of graph paper placed 50 cm from the mirror. The laser beam is deflected roughly a centimeter for each 10 microns of stylus deflection, making it simple for students to collect data. A one-dimensional trace is typically performed, however the instrument could be easily modified to produce a full two-dimensional scan.

Kirsten L. Bonson
University of Vermont

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