

Abstract Submitted
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Nanoscale Science and Engineering in High School Physics

ROB SNYDER, MORT STERNHEIM, MARK TUOMINEN, University of Massachusetts-Amherst — Integrating Nanoscale Science and Engineering into high school physics is often perceived as a daunting addition to the curriculum rather than as an opportunity for students to apply their understanding of fundamental physical principles and to further develop inquiry skills. Interestingly, there are numerous examples of classroom activities that can build an understanding of this rapidly expanding field while seamlessly being integrated into the STEM curriculum. One example appropriate for both introductory and advanced high school physics is the assembly and manipulation of a simple lever mechanism that requires the management of torques and the reflection of a laser beam by a series of mirrors. This mechanism simulates measurements made by an atomic force microscope (AFM), an instrument that maps materials at the nanoscale. An animation provides an opportunity for students to compare and contrast their simulation of an AFM that involves a rigid lever arm with an actual AFM that utilizes a flexing cantilever. The simulation can also serve as a springboard to an introduction to properties and applications that are unique to matter at the nanoscale.

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