

Abstract Submitted
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Including Nanoscale Investigations in a General Introductory Physics Course¹ KURT VANDERVOORT, STEPHANIE BARKER, RAUL TORRICO, Physics Department, California State Polytechnic University, Pomona, CA 91768 — Modules were developed to introduce atomic force microscope (AFM) applications into a general introductory physics course. The goal was to elucidate fundamental concepts in optics at the nanoscale that would complement existing investigations at the macroscale, and to expose students to advanced instrumentation at an early level. The nanoscale investigations were inserted where necessary and were used to help define and delineate the various topics in optics. In a lab on lenses, students first use the AFM to view smooth glass and rough glass at the microscopic level, illustrating the range of applicability of geometrical optics. In a physical optics lab, students measure patterns from diffraction gratings and then view the grating at the microscopic level, revealing groove spacings and a new feature, the blaze angle. Further investigation yields from the blaze angle a way to separate the effects of the single slit diffraction envelope from the multiple slit interference pattern. Another lab investigates the height of the bumps on a CD surface and exposes students to a direct application of destructive interference. These and other examples will be presented.

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