

Abstract Submitted
for the TSS12 Meeting of
The American Physical Society

Construction of a Single Beam Optical Trap with a Modified Design for Undergraduate Labs¹ DAVID TO, TONI SAUNCY, DAVID BIXLER, Angelo State University Physics — We have constructed an apparatus known as an optical tweezers using off the shelf, fairly inexpensive components. These include a 20 mw HeNe laser, a standard student lab optical microscope, and an inexpensive CCD firewire camera. The trap is designed to work with polystyrene spheres of various diameters, but to be robust enough for more advanced research. The goal of the work is to use the device for undergraduate research projects but also for use in the advanced labs at Angelo State University. Trapping is achieved in the device by focusing the collimated laser beam using a 100x oil immersion objective on the microscope. At the position of the beam waist, the light produces gradient forces that trap the micron-sized spheres. Images are collected and processed using LabVIEW software and measurement of particle size is accomplished through software tools for use with unknown-sized samples. Currently, imaging tests are being performed to improve the focus of the camera on the trapping region. It is expected that successful trapping of the polystyrene spheres will soon be accomplished. Once that is established then we will trap birefringent particles such as quartz or calcite. Birefringent particles should exhibit rotational motion when trapped.

¹This work was supported by the Angelo State University Undergraduate Research Scholarship.

Toni Sauncy
Angelo State University Physics

Date submitted: 02 Mar 2012

Electronic form version 1.4