



Montague – CTE Scholar Alexei Sokolov (2004-2005) College of Engineering



**CENTER FOR TEACHING
EXCELLENCE**
TEXAS A&M UNIVERSITY

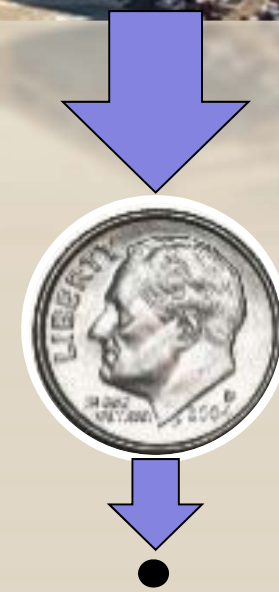
Hands-On Experience Aids Science Education

Lecture demos provide a valuable component to a physics course. With the aid from the Montague-CTE Scholar Award, we have developed new demos including a Hovercraft and an inclined car racing track.

Demos are fun; they allow students to take a break from “being lectured,” and help focus everyone’s attention. Right demos help see what various concepts and laws mean in terms of real-life objects, and improve comprehension.

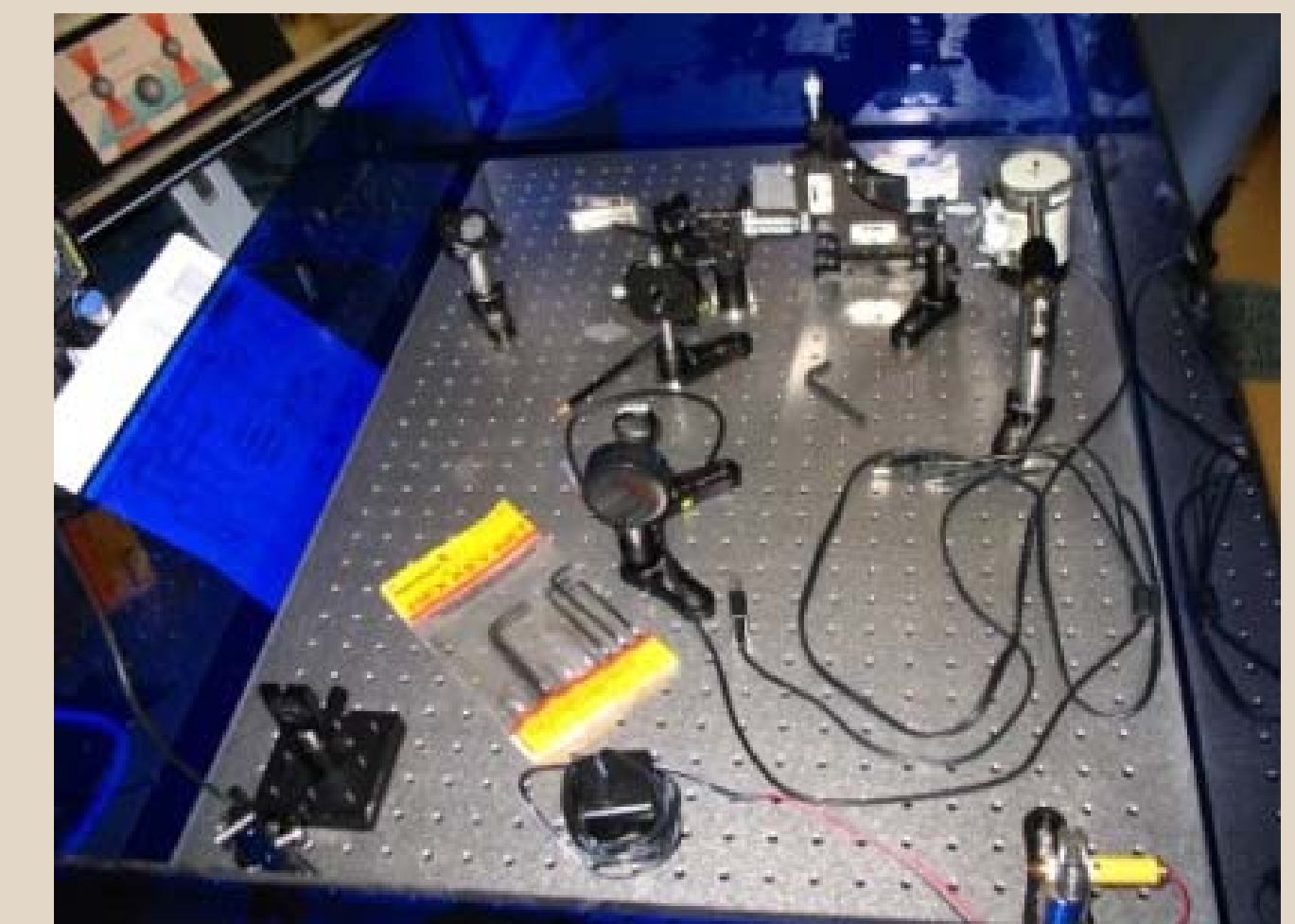
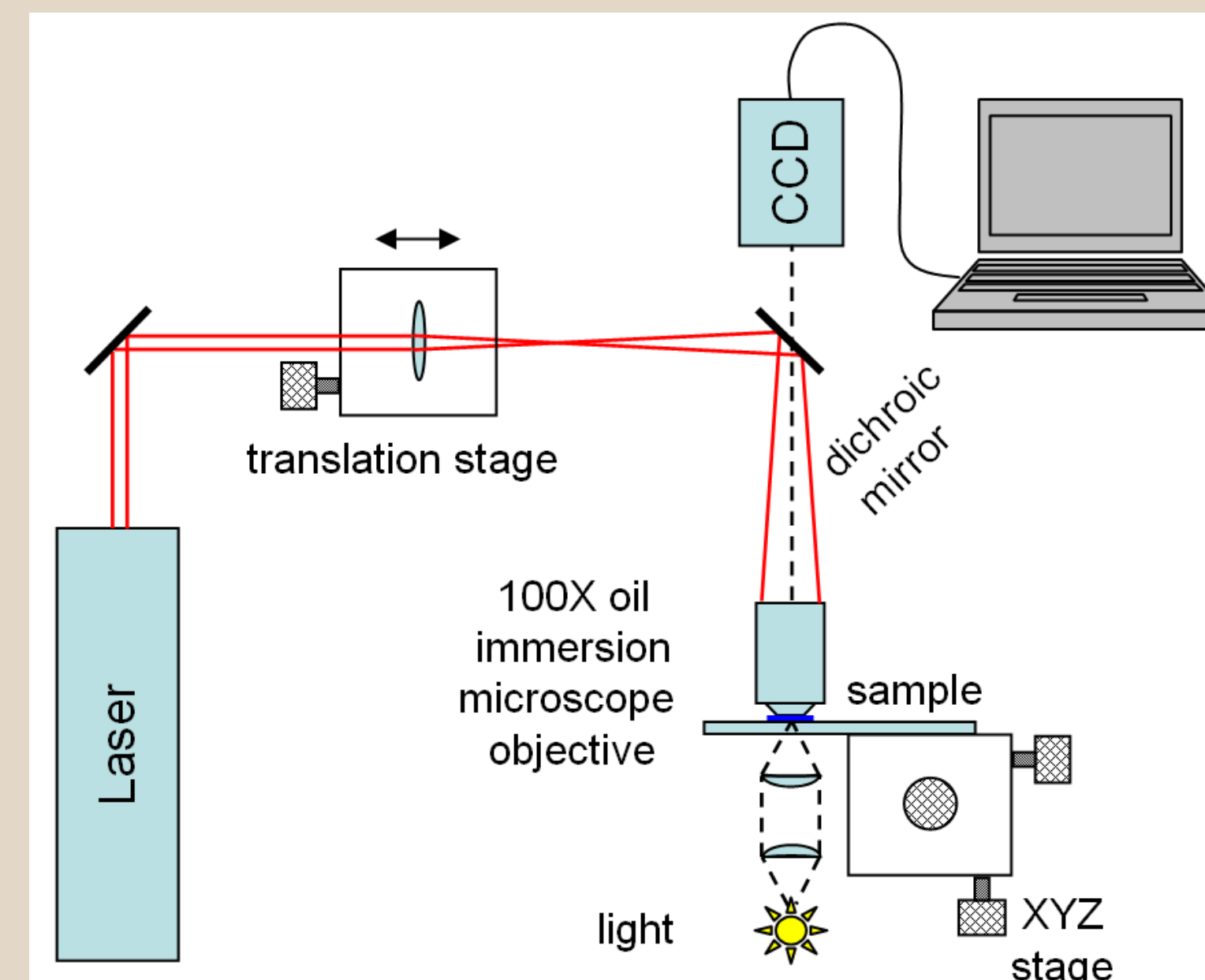


The Montague-CTE Scholar Award allowed us to develop and install an optical tweezers setup, which was used in a directed studies/research course (PHYS 485) in spring of 2005, and is now becoming a part of PHYS 426 laboratory. Optical tweezers utilize tightly focused laser beams to trap and manipulate microparticles, such as simple dielectric spheres, or biological cells, or spores.



A microsphere to a dime is like a dime to a football field

Due to their simplicity, inexpensiveness, and high effectiveness at the same time, optical tweezers have found widespread use in modern biological laboratories. The setup includes a home-built microscope and is a nice representative optics experiment, ideally suited for undergraduates.



For course description and a movie demonstrating optical tweezers at work, see:
<http://faculty.physics.tamu.edu/sokol/courses.htm>

PASCO’s Hovercraft is designed to help students experience frictionless motion, thus better understand Newton’s Laws.



Navy’s Dawn Blitz Hovercraft lands at Marine Corps Base Camp Pendleton

U.S. Marine Corps photo by Lance Cpl. Joshua A. Rucker

Same demos have been used in yearly Physics Festivals.

