Updating a Display Case

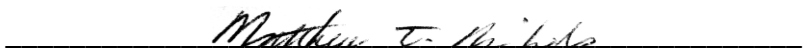
University of Louisville chapter of the Society of Physics Students

Zone 8

University of Louisville, Louisville, KY, 40292

Tax ID 61-1029626

Prepared by



Matthew T. Nichols

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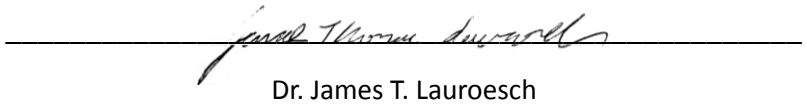

Dr. James T. Lauroesch

Professor, University of Louisville

A Request of $300

Submitted 14 November, 2012

Abstract:

The University of Louisville's chapter requests $300 to purchase materials to update a departmental display case. The case represents a form of outreach to the university community and includes interactive exhibits for students of varying physics backgrounds. Updates include new equipment, new backdrop cloth, and security locks to protect materials.

The University of Louisville (UofL) chapter of the Society of Physics Students has a long history of outreach to kids of all ages, their parents, and university students. Currently, we collaborate with the UofL Speed School of Engineering to reach a large audience at their Engineering Exposition held each April. We also join them in their campus days, which include tables for demonstrations and fun activities. The UofL Department of Latin American and Latino Studies has also gotten us in contact with the Kentucky Science Center to construct Day of the Dead altars honoring physicists each October and November. Our local chapter is also responsible for a departmental display case which sits outside of one of the major lecture halls and is passed by hundreds of students daily. Our goal with the Marsh W. White funding is to update this case to act as an interactive form of outreach for college students.

The current displays inside the case were put in place 5 years ago and include a Galileo thermometer, virtual Coke can with a parabolic mirror and light, precariously balanced forks showing center of mass properties, and a computer with an automated PowerPoint by the American Institute of Physics on job opportunities and statistics of physics majors. While these exhibits work, they have been read by everyone who passes and are largely ignored. The display area of the case is 12ft long and 4ft tall with plenty of space to fit multiple topics.

Over the coming Christmas break in December, we plan to overhaul the display case. Buttons on the exterior activate plugs in the back, allowing for interactive exhibits. Some of these buttons require repairs and possible replacement. A thorough cleaning, new lining material, and new exhibits should make the case more appealing and have the ability to teach simple physics concepts. Over time, rotating the old and new displays should keep the case interesting for students each semester.

New exhibits include a K'Nex roller coaster, demonstrating the transfer of energy from potential to kinetic. Finding the mass of the car, we should also be able to determine its speed along the track. A Wilberforce pendulum made of PVC, springs, and binder clips would also demonstrate multiple modes of

oscillation. The pendulum would be activated with the help of a few small motors. Energy transfer can also be taught with a radiometer and a bright desk lamp. Transfer of momentum is popularly demonstrated with a Newton's cradle. With the use of a simple magnet and a small motor activated from an exterior button, the cradle would be automated. A Faraday flashlight is also in the plans, where LEDs are lit by current induced when a magnet travels through a coil of wire. Optics demos with laser pointers, prisms, and diffraction gratings are also in the works. A budget is listed below for the required materials.

MATERIALS	COST
Radiometer	$13
K'Nex Roller Coaster	$25
Hobby motors	$16 for 4
Prisms	$50 for 5
Diffraction grating	$5 for 2
Laser pointers	$70 for 2
AC power adapters	$20 for 2
Display case locks	$40 for 2
Backdrop cloth	$48 for 5 yards
Wilberforce Pendulum	$15 for PVC, cement, and binder clips
TOTAL	$302

The remaining costs for electrical equipment to repair the buttons and additional supplies for cleaning and touch ups would be handled by fundraising events happening this spring. This project should be accomplished over the course of a few weekends for constructing the equipment and performing repairs prior to installation. It is certainly feasible to complete this project during the winter holiday and will last for quite a while, especially when rotating new demos with the current items. Explanation sheets will tell the science and the push buttons will show physics in action.

We believe this upgrade will have an impact on hundreds of students who wait outside of the lecture hall every day. Rather than serving as simply something to lean against, the display case has the potential to teach physics concepts at multiple levels and be interactive.

We are thankful to SPS National for the consideration of our proposal for the Marsh W. White Award to improve our outreach program and to upgrade our display equipment.

Approved By:

Jenna Lichtenberger,

President

Sarah Pagan,

Vice President

Richard Judge II,

Treasurer

Jared Keown,

Secretary

Chapter President Jenna Lichtenberger, member and proposal writer Matthew Nichols, and faculty advisor Dr. James T. Lauroesch in front of the button-operated virtual Coke can in the display case.

case.

Photo courtesy M.T. Nichols