Abstracts of the Spring Meeting of the SACS-AAPT
Beaufort, SC
March 30-31, 2001

Contributed Papers

Shooting a Soccer Ball

Randolph M. Brooks, Dreher High School, 701 Adger Road, Columbia, SC 29205, (803) 783-6190, randd1@aol.com

Using springs, bungee-cords, and trebuchets, students built devices to project soccer balls from 10 to 50 meters into a hula hoop target. In addition, the projectile motion was analyzed and EXCEL and MATHCAD compensations for air drag resistance and wind direction were made.

Some Sound Lab Work for Students

Phyllis Boudreaux and Shannon Causby (Lassiter H.S) and Joan Dutter (Walton H.S.), Lassiter and Walton High Schools, 2601 Shallowford Rd, Marietta, GA 30066, (770) 591-6819, phyllisboudreaux@cobbk12.org

Open and closed pipe resonance labs using computer interfacing will be demonstrated. Directions for the construction of inexpensive resonance tube apparatus will be provided.

Physics in Pre-college Summer Programs

Bob Powell, State University of West Georgia, Carrollton, GA 30118, (770) 836-4316, bpowell@westga.edu

Physics is an integral part of two summer programs for pre-college students at the State University of West Georgia. One of these is Project STARRR, the summer component of the Post-secondary Readiness Enrichment Program. (PREP) of the University System of Georgia. This PREP activity has been offered to students in at-risk situations beginning in June, 1996 at no cost to the participants. Currently, two two-week sessions are being offered; about 100 students attend each session and to study physics via demonstrations and astronomy. A second program is the Young Scholars Institute for mathematically and scientifically talented and interested rising eighth and ninth graders. This one week residential program has been offered for two summers and allows 24 students to participate in demonstrations and measurements in physics and astronomy presentations.

The Magic of Physics

Fred Watts , College of Charleston, Charleston, SC 29424, (843) 953-8075, wattsf@cofc.edu and Ntungwa Maasha, Coastal Georgia Community College, Brunswick, GA 31525, (912) 262-2325, Maasha@bc9000.bc. Peachnet.edu

We shall present several demonstrations which can be used to arouse interest in physics especially among beginning students because their results are either puzzling or counterintuitive.

PowerPoint Slides as a Method of Presenting Classroom Notes

Donald M. Pearl, Georgia Perimeter College, 555 North Indian Creek Dr., Clarkston, GA, 30021, (404) 294-3535, dpearl@gpc.peachnet.edu

The availability of powerful and reasonably priced computers is creating new opportunities for creating multi-media lectures. One popular software program that can be used to make a multi-media type presentations is PowerPoint, the capabilities of which are discussed and demonstrated in this talk. PowerPoint allows an instructor to present their notes to the students in a concise and organized manner. Pictures, figures, video clips, charts, and special effects can be added to create a more interesting and more understandable lecture. In addition, links can be made from PowerPoint slides to other applications or the Internet.

October Astronomy Lab

Dan Overcash, University of South Carolina, Columbia, SC 29208, (803) 777-4180, overcash@mail.psc.sc.edu

This lab gives our fall honors astronomy students early observational and resource-search experience. They also gain experience in identifying bright star names and constellations, estimating magnitude and classification, and using stellar coordinate systems.

An Inexpensive Solar Telescope for Eclipse and Sunspot Observation

Terry R. Richardson, Department of Physics and Astronomy, College of Charleston, Charleston, SC 29424, (843) 953-8071, richardsont@cofc.edu

A design and method of construction for making an simple solar telescope for image projection is described. Off the shelf inexpensive lenses and cardboard boxes and tubes are used along with a filter to remove chromatic aberration inherent in the design. The telescope design is safe enough for elementary students and useful enough for older students to monitor larger sunspot groups.

Lenz's Law in the Kitchen

Richard Summers and Missy Daniel, Reinhardt College, 7300 Reinhardt College Circle, Waleska, GA 30183, rds@mail.reinhardt.edu, missydaniel@yahoo.com

We will describe what Lenz's Law is. We will also give a demonstration of Lenz's law using items found in a person's kitchen.

Ground Fault Interrupters and Faraday's Law.

Matthew J. Marone, Mercer University, Department of Physics, Macon, GA 31207, (478) 310-2597, Marone_mj@mercer.edu

The ground fault interrupter (GFI/GFCI) is an important application of Faraday's law. The physics of the ground fault interrupter will be discussed and demonstrated. Under normal circumstances, the current flowing into a load is equal to the current flowing out of the load. A ground fault interrupter responds to an imbalance in the current flowing into and out of a load. An imbalance occurs when some of the current to flows through an external path. The external path might be your body! A simple torodial transformer is used to sense the imbalance. Since the device can be found in any home (or at least it should be), it is a powerful example of "The Physics of Everyday Life".

Updating Our Electronics Courses

Andy Hauger, Augusta State University, Dept. of Chemistry and Physics, 2500 Walton Way, Augusta, GA, 30904, (706) 667-4516, jhauger@aug.edu

An electronics course developed for science majors will be described. The course introduces students to traditional analog electronics, but much of the digital electronics work is based on using commercially available data acquisition hardware. The advantages and disadvantages of the changes made in developing the course will be discussed.

Influence of teacher's enthusiasm and employment of diverse background on the teaching-learning process in a Liberal Arts Institution

Mikhail M. Agrest, College of Charleston, 87 Droos Way, Charleston, SC 29414, (843) 556-2997, agrestm@cofc.edu

Sir Winston Churchill once said:

> The first duty of a university is to teach wisdom, not a trade; character, not technicality.

What should students carry with them from the classroom? Enthusiasm of their teacher, understanding of the basic concepts, understanding of what they should work on at home and, of course, some notes...It was my dream, since 1966 when I was a student of the St. Petersburg University, and later as a professor in Russia, to have some handouts so students wouldn't have to concentrate their whole attention on copying from the chalkboard or from the screen, but instead would concentrate on the professor's words and just make notes in the provided workbooks. I designed a number of examples, which relate concepts of Physics to a variety of concepts in other areas of knowledge and/or human activity. This approach is based on my experience of teaching students with diversity of backgrounds, educational goals and objectives. Copies of my transparencies are included in my students' workbook.I have tested this method in my Physics 101 through Physics 202 classes at the College of Charleston during some past years. The teaching-learning effectiveness has been increased and I receive positive feedback from my students. In my presentation I will expose some materials from my handouts.

Midway Physics Day at the S. C. State Fair

Edwin R. Jones, Department of Physics & Astronomy, Univ. of South Carolina, Columbia, SC 29208, (803) 777-6714, rjones@sc.edu

Each fall since 1997 the U. S. C. Department of Physics & Astronomy and the S. C. State Fair Association have hosted Midway Physics Day at the South Carolina State Fair. In Aug. 2000, invitations were sent to all high schools in the state offering students and teachers free admission to the fairgrounds along with free rides on the midway for three hours. Several weeks before the fair, booklets containing ride details, physics of the rides, suggested activities, and questions are mailed to the teachers. On Midway Physics Day, Oct. 12, 2000, 36 faculty, graduates students, and SPS members donned Mentor shirts and assisted nearly 3150 high school students and 430 teachers from 61 schools in their activities. CBL sensors, computers, projectors, and printers were available for data analysis. Photos of the students and some of their results were then posted on the Midway Physics web page (http://solomon.physics.sc.edu/~tedeschi/midway/bigtop.html). We report on the activities from October 2000 and present some of the student measurements.

What I Learned About Homework From Being A Flight Instructor

Laney Mills, College of Charleston, Charleston, SC, 29424, (843) 953-8072, millsl@cofc.edu

After a decade of teaching physics, I became a full time flight instructorat a major airport for two years. The experience taught me more aboutteaching physics than I could have ever learned otherwise. Before thatexperience, I was firmly convinced that well prepared, crystal clear lectures aimed at making the material perfectly transparent was a teacher's ultimate classroom goal. "People can do anything they clearlyunderstand," I thought. To my amazement, I learned that, under stress, people can pretty much do only what they

have done before. The result was a deeper insight into how a correct use of homework can vastly improve the extent to which students become functional in a physics class.

Workshops

Introducing Xplorer, Pasco's New Datalogger

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Come see the Xplorer, the new datalogger from Pasco Scientific. Easy to use and versatile, Xplorer is another educational tool from Pasco. The Xplorer has plug-and-play capability-plug in a sensor and you're recording and displaying data! Xplorer can be used with all PASPORT sensors. It can be used as a datalogger without a computer for stand-alone operation. Extend the data-logging flexibility back in the classroom by plugging in the Xplorer to the USB port of your computer. Extend your teaching and learning environment with DataStudio, Pasco's data collection and analysis software. Xplorer allows students to capture and display data in near real time.

String and Sticky Tape Experiments

Ron Edge, University of South Carolina, Columbia SC 29208, (803) 777-6830, redge@sc.rr.com

"Physics Anxiety"- it can be a real problem. Want to cure the students' headaches and make physics fun? Tie equations to reality? Try the "String and Sticky Tape" medicine. Use the "hands on" approach. Employ cheap, easily available materials to perform meaningful fundamental experiments. Physics is an experimental science, and only by doing experiments can students get a feel for it. Actually seeing how physics works in practice, rather than equations on the blackboard, has a very positive effect- taking physics from the realm of a dull dry subject to one which is really interesting. Students no longer feel that physics does not relate to "real" life. After a short introduction on the "wheres" and "whys" of string and sticky tape, we shall do several experiments as a group. All the materials for the experiments will be available. These cover the gamut of elementary physics. Come and enjoy.