TAAPT

The Tennessee Section of the American Association of Physics Teachers

2008 Annual Meeting
March 28 and 29, 2008
Austin Peay State University
Clarksville, Tennessee

Austin Peay State University

Parking:

Parking on the APSU campus is open parking after 5:00pm and on weekends. The only spaces you cannot park in are Handicapped (unless you have a handicapped permit) and dorm parking (brown parking space). The primary parking lot for the meeting is the Trahern Lot in the east-central area of the campus. The paved lot on the corner of 8th Street and College is also convenient for Saturday morning. Maps of Austin Peay State University with parking lot designations can be found at http://www.apsu.edu/map/

Friday March 28

5:00 – 6:30pm Morgan University Center Lobby

Registration and reception

6:30 – 7:30pm Morgan University Center Room 305

TAAPT Banquet

7:30pm Music/Mass Comm Concert Hall

Welcoming Remarks:

Dr. Timothy Hall, APSU President

7:45pm Music/Mass Comm Concert Hall

Keynote Address: Dr. Leon Lederman

"A Sensible Science Sequence for High Schools"

It is long since time that we revise the hundred-year-old sequence of 9th grade biology followed by 10th grade chemistry followed by (but not always!) 11th or 12th grade physics. This sequence was created about 1890 and preserving it ignores the great revolutions in 20th century science.

We are aware of the awesome difficulties of modifying our curriculum. However, the kind of transformation that is now required is more profound than simply changing the sequence. This proposal is designed for all students and future scientists, engineers, journalists, politicians, citizens. It is in short a 21st century revolution.

Saturday March 29

7:30am Sundquist Science Center Atrium
Continental Breakfast and Registration

8:00am Sundquist Science Center Room E-106
Opening Remarks

Dr. J. Allyn Smith, APSU Department of Physics & Astronomy Chair
Dr. Spencer L. Buckner, TAAPT President

8:15am Sundquist Science Center Room E-106
Presentations

8:15 – 8:30am: Teaching Fluid Dynamics with Hurricane Katrina

Peggy Bertrand, Oak Ridge High School
127 Providence Road
Oak Ridge, TN 37830

Fluid dynamics can be related to real-world phenomena, such as hurricanes. Hydrostatic pressure can explain why levees fail, the buoyant force can explain why cars and even houses float in a flood, and fluid flow continuity can explain why levees are overtopped when the storm surge accompanying a hurricane enters a man-made channel. Physics students apply all of these concepts from fluid dynamics in the study of Hurricane Katrina.

8:30 – 8:45am: An Approach to Ohm's Law Experiments: Pedagogy and Apparatus

James Parks, The University of Tennessee
401 Nielsen Physics Building
Knoxville, TN 37996-1200

Ohm's Law and simple DC circuits are relatively simple concepts with many practical applications. Unfortunately, student mistakes in constructing and testing simple DC circuits can lead to damaged equipment and costly repairs in both time and money. In a large university setting, several hundred students perform laboratory experiments in small sections taught by graduate teaching assistants. In this environment, lack of knowledge, ineptitude, and failure to pay attention to details can lead to many instances of damaged and nonfunctional equipment. A set of apparatus for studying Ohm's Law and simple DC circuits is presented and discussed with regard to improving the conceptual understanding, performance, and analysis of the experiments while minimizing equipment damage

8:45 – 9:00am: Determining the Distance to Stars

Paul Lee, Middle Tennessee State University
Dept. of Physics & Astronomy
Murfreesboro, TN 37132

A simple device consisting of a flashlight and fishing line will be described and shown for measuring the distance to bright stars. The assumptions and results will be shared as well as the implications for galactic structure studies.

9:00 – 9:15am: Using Cartoon Physics Books to Supplement a Physics Curriculum

Terry King, Ravenwood High School
1724 Wilson Pike
Brentwood, TN 37027

Using Introducing Quantum Theory, Introducing Relativity, Introducing Stephen Hawking, and Einstein for Beginners as readings in an A P Physics class. These books are relatively easy to read [no pun intended!] and introduce ideas as well as a bit of the history of modern physics to students who would otherwise have limited exposure to these topics. Included in the presentation are candid comments from students and a rationale for making these assignments.

9:15 – 9:30am: Protons vs. Electrons: Particles Used in Radiative Cancer Treatment

Victor Montemayor, Middle Tennessee State University
Dept. of Physics & Astronomy
Murfreesboro, TN 37132

Treatment of tumors with beams of high-energy electrons is a fairly common occurrence in cancer clinics. The Vanderbilt University Medical Center is planning on constructing a proton-beam facility that will be used to treat tumors along with possibly other diseases, despite the fact that they already have four electron accelerators for treatment with electron and x-ray beams. Considering the fact that an electron-treatment facility costs on the order of millions of dollars, while a proton-treatment facility costs on the order of hundreds of millions of dollars, an important question to ask is, “Is a proton-treatment facility really worth the money?” This presentation will compare the physics of electron- and proton-beam treatment, and give some of the pros and cons for the construction of a proton-treatment facility.

9:30 – 9:45am: Developing an Online Network for High School Physics Teachers

Matthew Perkins, Oak Ridge High School/University of Tennessee
127 Providence Road
Oak Ridge, TN 37830

Secondary physics instructors come from various backgrounds and preparations. Many schools have only one physics teacher on faculty, making it difficult to collaborate and develop new ideas. The Tennessee Physics Teachers are an online group dedicated to providing a forum for physics teachers across the state to discuss ideas, share information, and develop community. In light of the new state science requirements, this forum may serve as a voice for physics teachers to share their collective concerns.

9:45 – 10:15am: Panel Discussion on Physics First in Tennessee

Linda Jordan, Tennessee Department of Education
5th Floor, Andrew Johnson Tower
710 James Robertson Parkway
Nashville, TN 37243-0379

10:15 – 10:45: Coffee Break and Viewing of Posters

10:45 – 11:15: Business Meeting

11:15 – 11:30am: Student Variable Star Research at the APSU Observatory

Dr. J. Allyn Smith & Dr. Spencer Buckner, Austin Peay State University
Department of Physics & Astronomy
Clarksville, TN 37044

APSU is constructing a dark-sky observatory in rural Montgomery County, TN. Initial instrumentation will be small with an emphasis placed on teaching and techniques oriented courses. However the early instrumentation will allow basic research to be conducted. We anticipate observation of variable stars will be among our initial research efforts as they are plentiful and may result in student publications while allowing teaching of several observational techniques. To this end, we have begun to construct catalogs of variable star candidates obtained from the Sloan Digital Sky Survey which will require follow up observations. We present plans for our observing programs, student involvement, and learning outcomes.

11:30 – 11:45am: Physics at the Space Institute: Focusing on Laser Materials Processing

Yelena White, Lloyd Davis and William Hofmeister, UT Space Institute
411 BH Goethert Parkway
Tullahoma, TN 37388

This talk will begin with a brief presentation of the Physics program at University of Tennessee Space Institute and research opportunities for graduate students, focusing on interdisciplinary and materials science projects within the Center for Laser Applications. Lasers provide an enabling means for direct writing of milli- to nano-scale features. There is interest in fluidic and photonic component fabrication of waveguides, and micro- and nano-channels and nanopores, especially in materials suitable for lab-on-a-chip devices. Fused silica is particularly of interest as it has low background fluorescence and hence is an attractive material for devices used in single-molecule spectroscopy. Due to the high precision of femtosecond ablation, laser-machined features can be added to lithography-prototyped devices. To that end, we have conducted parametric studies of laser interrogation of materials of interest. Femtosecond laser ablation studies of glass, PDMS plastic, fused silica, and diamond films are presented, including single- and multi-pulse laser machining for fluidic and photonic devices.

11:45am – 12:00noon: Keeping the Sky DARK at Night

Chuck Higgins, Middle Tennessee State University
Dept. of Physics & Astronomy
Murfreesboro, TN 37132

When is the last time you saw the Milky Way galaxy in the sky? Are we losing our night skies due to artificial lighting? How can we find a balance between keeping the skies dark with the need for night lighting for safety, recreation, and business? These questions will be highlighted, as well as, a presentation of other pros, cons, and myths about keeping the night sky dark.

12:00 noon – 12:45pm: Lunch

12:45pm: Presentation of Outstanding High School Teacher Award

12:55pm: Presentation of Awards for Best Student Poster and Best Student Presentation

1:00 – 1:20pm: Panel Discussion on The Evolution of the Undergraduate Degree in Physics

Jaime R. Taylor, Austin Peay State University
College of Science and Mathematics
Clarksville, TN 37044

A “round table” discussion on what undergraduate programs in the State of Tennessee are doing. What career choices are physics graduates making? What types of graduate studies are they pursuing? Are there ways we can work together to increase the number of students pursuing undergraduate degrees in physics?

The afternoon demonstrations will take place in B-107 and B-111

1:00 – 1:20pm: College Physics Lab Demonstrations

Pei Xiong-Skiba, Austin Peay State University
Department of Physics & Astronomy
Clarksville, TN 37044

Teachers who are interested in lab activities for their College Physics (algebra based) course or AP physics course may choose to visit room B-111. Six of our favorite lab activities, including Significant Figures, Projectile Motion, Car Collisions, Batteries and Bulbs and Simple Circuits, Reflection and Refraction Using Ray Box and Electric Motor will be on display. Instructions for these lab activities are also provided.

1:20 – 1:40: Activities and Demonstrations with Electricity & Magnetism

Terry King, Ravenwood High School
1724 Wilson Pike
Brentwood, TN 37027

Several lab activities and demonstrations relating to concepts in electricity & magnetism will be presented using simple equipment.