Michigan Section of the American Association of Physics Teachers

2009 Fall Meeting
October 9 & 10, 2009
Midland Center for the Arts
Alden B. Dow Science Museum

Friday Workshops

9:30 – 5:00pm **AAPT/PTRA Dark mater & Quantum Physics**
Al Gibson, Rochester Adams HS (retired) fziksman@yahoo.com
Nicole Murawski, Royal Oak HS murawskin@royaloakschools.com
Laura Ritter lritter2@troy.k12.mi.us

You will receive confirmation of registration
Advance registration required, registration Fee $60

6:30 – 9:00pm **Relativity First Workshop**
Elisha R. Huggins, Dartmouth
http://www.physics2000.com/Pages/Author.html

Saturday Sessions

8:00 - 8:30 **Registration/Breakfast (lobby of museum)**
Meeting fee $15 (includes Einstein exhibit)
Order box lunch at registration $8.00

8:30 – 8:45 **Meeting call to order and opening comments**
Drew Isola, MIAAPT President
Welcome by Debbie Anderson
Curator of Education
Alden B. Dow Museum of Science & Art

Morning Session I

8:45 – 10:45 **Oral Presentations** (arranged from submitted abstracts)

8:45-9:15 Physics Goes Underwater: The Construction of an Underwater Remotely Operated Vehicle
Keith F. Forton, Traverse City Central Senior High

9:15-9:30 Bullion to B-Fields: The Silver Program of the Manhattan Project
Cameron Reed, Alma College

9:30-9:45 Update on the National Task Force on Teacher Education in Physics
Drew Isola, Allegan High School

9:45-10:00 Meet Me On Facebook: Social Networking For Supplemental Office Hours
Philip Edward Kaldon Western Michigan University

10:00-10:15 Converted Shear Waves
Kandiah [BALA]Balachandran, Kalamazoo Valley Community College

10:15-10:30 Teasing Apart Voltage and Current
David Van Baak, Calvin College

10:30-10:45 **??? volunteers???** Contact hfish@kvcc.edu to be added to the schedule

10:45 – 11:00 Break

Morning Session II: Invited Talk

11:00 – 12:15 Invited Talk: Starting with Relativity
Elisha Huggins, Dartmouth

What laws of physics apply to everything, and have no known exceptions? We can think of two--the principle of relativity and the uncertainty principle. Our goal has been to construct an introductory physics course with emphasis on these two laws. To do this, we begin with the principle of relativity, a law understood by Galileo, and end with the uncertainty principle after focusing on the particle-wave nature of matter. In our talk we will start with the way we handle the time-energy form of the uncertainty principle, and then describe some of the steps we took to get there. The most important step was introducing special relativity in week one.
physics 2000

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Lunch

12:15 – 1:15 Lunch

1:15 – 1:45 MIAAPT Business Meeting & Elections
Drew Isola, MIAAPT President
Officer's Reports

1:45 – 2:00 Share-a-thon
Diagnoser
Drew Isola, Allegan Highschool
Openings available-contact hfish@kvcc.edu to be added to the schedule

Afternoon Session

2:00 – 5:00 Tour of Museum – Einstein Exhibit

Parking available (free) in front of the museum

Abstracts

Bullion to B-Fields: The Silver Program of the Manhattan Project
Cameron Reed, Alma College

During the World War II Manhattan Project, over 14,000 tons of silver borrowed from the U.S. Treasury were used to create magnet coils utilized in the separation of Uranium-235 for the Hiroshima Little Boy bomb. This paper briefly relates the story of this little-known "Silver Program."

Update on the National Task Force on Teacher Education in Physics
Drew Isola, Allegan High School

The Task Force (T-TEP) was formed in the spring of 2008 under the sponsorship of APS, AAPT & AIP. It is composed of 14 individuals consisting of teacher education and physics faculty, university administrators, professional society liaisons, and a high school physics teacher. The task force has been investigating the current state of physics teacher education in the U.S. using online surveys, telephone interviews and site visit case-studies. A final report is due out in Feb 2010 at the joint APS/AAPT Winter meeting in Washington, D.C. This talk will describe some of these activities and share some preliminary findings of the Task Force.

Meet Me On Facebook: Social Networking For Supplemental Office Hours
Philip Edward Kaldon, Western Michigan University

Every semester it's the same battle to get students who need help to come to office hours. You can offer tons of office hours, provide students with your e-mail address and even a home phone number, but still I can usually predict that I'll get about six "regulars" every semester to come to office hours except right before exams. Since January I have been trying a closed Facebook group, "Dr. Phil's Physics Class On Facebook". The cardinal rule of the Internet is: Lurkers vastly outnumber active participants!

Physics Goes Underwater: The Construction of an Underwater Remotely Operated Vehicle
Keith F. Forton, Traverse City Central Senior High

Currently little opportunity exist for applied physics and engineering projects in the marine environment, especially at the high school level. Construction of an Underwater Remotely Operated Vehicle (ROV) provides the platform to apply many of the topics covered in a general physics curriculum. Now in its 5th year, the presentation will provide an overview of the project, short video clips, visual demonstrations and resources. It is the vision of this project to create unique challenges that would allow students to put physics and other STEM concepts into practice.

Converted Shear Waves: Effect of Fluids on Compressional to Shear Conversion in Rocks
Kondiah Balachandran, Kalamazoo Valley Community College

Converted shear waves (P- to S-) are clearly seen at large offsets in conventional seismic reflection profiling using 3-component seismometers. However, at normal or near normal incidence it is unusual. One such observation where the horizontal component signal was more pronounced than the corresponding vertical component prompted this inquiry. Possible explanations are scattering and anisotropy. A different possibility considered here is the conversion due to lateral motion of fluids in the reservoirs. This lateral motion of fluids induces shearing forces on the rock matrix due to a combination of viscous drag and pressure differences. The results of laboratory experiments are mixed. Further work is in progress.

Teasing Apart Voltage and Current: Using Light-Bulbs' I-V Curves
David Van Baak, Calvin College

Students working on resistor circuits have difficulties formulating separate concepts of voltage and current, in part because these always vary in proportion for resistors. So light bulbs have a useful role to play, not only because they give a visual, semi-quantitative, indication of current, but also because they display a less trivial current-voltage relation. Experimental work shows that a dependence $I \propto V^{(\approx 0.5)}$ is a fair description of the current-voltage relation. A simple blackbody-radiation model suggests why there's a power-law relation at all, and what that exponent ought to be.