

NJAAPT

NEWSLETTER

September 2004

President's Message

The summer has drawn to a close and a new year beckons with a great deal of promise and excitement. On behalf of the entire executive board, I would like to take this opportunity to provide you with some of the events that are planned for the upcoming year.

You may be aware of the fact that beginning this October and continuing to February 2006 has been designed as the World Year of Physics. This is to commemorate the centennial of the publication of Albert Einstein's three groundbreaking papers published in 1905. Although this concept had its origins in the European scientific community, the science associations in the US have embraced the goals of the international committee (refer to the brief article in the newsletter). Our participation as a section of the AAPT will be to hold events throughout the year with the WYP 2005 as our theme. What the section needs is your participation in the activities and maybe organizing some for your school or community. In an article on the WYP 2005 there are some suggestions as to how anyone can become involved in bringing physics to the general public and to our students.

The calendar of events begins with a workshop at Six Flags Great Adventure in October and continues through the year into May. **Please look at the schedule and make your presence known at some of the functions.** The Holiday Treats is back and we would like to have as many participants who have not had the opportunity of attending in the past. Talk to those that have made a time of it and you will hear of the great give away items that you can get for your class and yourself. Lastly, please take the time to become an ambassador for the section. We need your assistance in recruiting new members to maintain the vitality of the physics teaching in New Jersey. There are many physics teachers in the state that are not members either because they do not know that we exist or that we have not had success in contacting them. We are all aware that a person may be teaching two or three sciences and that belonging to all of the associations may be a financial burden. However, we have not raised our dues in recent memory. If you know of any physics teachers that are not members, try to convince them that we are here to assist them in any way possible to make their teaching more worthwhile. Have a good year and I look forward to meeting you at some of the events we sponsor.

Ray Polomski

Calendar of Events

Oct. 2 – Amusement Park Physics – Six Flags Great Adventure

Oct. 23 – Fall Make and Take – Monmouth Regional HS

Nov. 13 – Workshop at Anchor Scientific - Sound

Dec. 4 – Holiday Treats – Rutgers University

Jan. 15 – Physics Olympics – Monmouth Regional HS

Feb. 5 – Winter Make and Take – Monmouth Regional HS

Feb.81 – Dave’s Demo Night – Rutgers University

Mar. 11 – 12 – NJ – SEPA Joint Section Meeting – Princeton University

Mar. 19 – Electrostatics Workshop – Chatham HS

Apr. 29 – Physics Day – Six Flags Great Adventure

May 6 – Physics Day – Six Flags Great Adventure

May – 100 Years of Science – Rutgers University

The calendar of events is updated periodically and some events may be added or dates may be changed. Please refer to our website for additional information: www.njaapt.org.

Membership

*As noted on the previous page, our membership is dependent upon the activities we provide for our members. If you have not renewed your membership for the upcoming year, please take the opportunity to visit the website for a membership form and continue being a member of our section. If you teach with or if you know of any other teacher whose responsibility is teaching physics, inform them of our existence. **Encourage any teachers of physics to join – they will receive a FREE ONE- YEAR membership in NJAAPT.** We rely on your assistance in this matter to keep the section active and to meet the needs of its members. We are fortunate that we can support our programs through the generous gift of the Frederick and Florence Bauder Fund that is administered by the AAPT. **Please also update the information on your membership – address, phone #, email address, etc. to keep our list current.***

If you are not a member of the AAPT, consider joining the national organization. As a first year member the membership fee is one half the actual dues. You can contact the AAPT: www.aapt.org

AAPT Summer Meeting

The 129th Annual Summer AAPT Meeting was held in warm, sunny Sacramento, CA from July 31 – Aug. 4. Workshops, including the ever-popular physics demonstration workshop conducted by our own Dave Maiullo of Rutgers University, were held on Saturday and Sunday and there was a trip and picnic at the San Francisco Giants home park, PacBell Park that was attended by 125 people. San Francisco greeted the group with its typical weather – clouds and wind, but all had a great time. Monday through Wednesday brought an exceptionally large number of delivered papers with the morning session beginning before 8 AM and lasting until 6 PM. On Monday almost 600 attended the annual picnic and were treated to a number of events. The sponsor this year was Pasco Scientific, which is celebrating its 40th anniversary supplying education with physics equipment. Following the picnic and door prize give away, a demonstration show on the use of sports in teaching physics was performed. Our members, Eugenia Etkina and Alan van Heuveln were participants. Upon returning to the California State University Sacramento campus a star gazing party was held atop one of its buildings. On Tuesday evening a demonstration show was held for the general public and those attending the meeting. Photos of the meeting can be found on our website. Attending from NJ besides Alan, Eugenia, and Dave were Anthony Lapinski, Jim Ferrara, Peter Lindenfeld, and Ray Polomski. If you can make the next summer meeting in Salt Lake City, Utah the experience you will have will be unforgettable.

Ray Polomski

Physics Olympics

The annual Physics Olympics will take place on Saturday 15, 2005 at Monmouth

Regional High School. There are six events, which are described below:

FERMI QUESTION - *To estimate the order of magnitude of a quantity that is difficult*

Or impossible to measure.

GRAB BAG - *Objective to be announced at the competition. The team will be ask to perform a task and/or build a device that will perform a task in a set amount of time.*

TOWER OF CARDS - *To build the tallest tower of playing cards using the fewest number of cards.*

EGG THROW- *To build a device, of minimal mass, that will protect an egg that is thrown against a wall.*

ZERO IMPACT VEHICLE -*To build an air-powered vehicle that will move as close as possible to a wall without touching it.*

STRAW LEVER ARM -*To build a lever arm, of minimal mass, from plastic drinking straws that will hold a 1-kg mass.*

To obtain information about the Physics Olympics contact John Valente at John_Valente@mast.mcvsd.ogr or visit the NJAAPT web site at www.njaapt.org.

John Valente

Amusement Park Physics Workshop – Saturday, Oct. 2

*The adventure begins in class. In the class we will go over some of the important points for using amusement park physics in our teaching. There will be math and solving equations, the conceptual feelings of the rides, making and using demonstrations, making and using measuring devices, and the important points for those planning a trip. The class part of the experience is important for those who may feel uncomfortable with introducing amusement park physics into their course. It will also expand the base for those who already do amusement park physics. This will touch upon those all-important standards with which we deal. Amusement park physics is not an add-on that requires more time – it is an integral part of what you do already. Circular motion, speed, acceleration, and energy transformations take on a new excitement. It is not the speed but the acceleration that one feels. You need to build a circular ride that has a radius that makes the ride thrilling and safe. Students feel themselves stuck to the wall of the **Taz Twister**. They are not struck but trying to move in a straight line and the wall is getting in the way. If you get sick, which way do you turn your head? As you come to the **Log Flume**, where do you want the heavy people to get the biggest splash? Does it matter? Which seat on the roller coaster gives the most exciting ride? What does this mean – **exciting**? Is exciting feeling the speed and jerking of the ride or is it seeing over the top of the hill as the roller coaster slowly goes over the top? What*

*materials do you need to build roller coasters that twist and turn you upside down? Do you ever leave the seat or are you held to the seat? Why the big shoulder harness? What the heck is a **g**? Does a light person swing out further on the swings than a heavier person?*

Ok, so you want to use amusement park physics. Can you use it without coming to the park? If you come to the park, what do you need to bring and what do you need to do before coming? What do you need to do while you are at the park? Also, remember to count noses before leaving.

*So, who wants to go to Great Adventure to spend time with their classes? Ok, we will turn you loose in the park. After class and only if you pass the grueling final exam (I think it is how to spell the last name of the NJAAPT president) will you be allowed to have fun in the amusement park. We will give you ideas as to what rides might be the best to look at, what measurement you can take, and what you can calculate. We will answer your questions about using this in the classroom. **Remember**, this can be used with conceptual students as well as honors students. How do you fashion appropriate activities if you have a wide range of students going? How will you mark their activities?*

We are cruel since we will provide breakfast and lunch. It is up to you to keep it down.

Physics is truly a Great Adventure 😊.

**REGISTRATION FORM IS
AVAILABLE ON OUR
WEBSITE.
CHECKS MADE PAYABLE TO
NJAAPT**

Harry Rheam

Notes on the Millikan Lecture Presented at the AAPT Summer Meeting in Sacramento, CA

The following is a synopsis of the lecture given by Kenneth S. Crane of Oregon State University entitled: "The Challenges of Teaching Modern Physics"

One conclusion drawn by the IUPP (Introductory University Physics Project) is that introductory courses are overloaded with content, lack a coherent "storyline," and pay insufficient attention to contemporary topics. Krane added that introductory modern courses give the impression that modern physics is descriptive, consisting of facts, paying insufficient attention to student reasoning difficulties. They also do not connect with the introductory classical physics courses and are largely not taught with modern teaching methods. There is also confusion about using "V" for the electric potential in classical physics and potential energy in the Schrodinger equation, Krane noted. He also observed that electrical engineers want to relate the photoelectric current to the stopping potential by Ohm's Law. In addition, Krane stated, students attribute the greatest probability to a peak in the wave function because the kinetic energy is the least at the peak in a roller coaster, so the particle spends more time there. He also lamented that wave functions are often superimposed on energy axes in graphs. Ideally, he added, we should have time-dependent animations showing both the real and imaginary parts of the wave function. Krane also advocated illustrating the

wave function by the intensity of a horizontal stripe.

Krane stated that he does not spend much time on the Bohr atom because he doesn't want to ingrain it into the students' minds or for them to spend time to parrot it on exams. He devotes more time to the more important concepts of energy and momentum in special relativity than the more tedious space and time. He cited Greenstein and Zajonc's The Quantum Challenge to make the case that the photoelectric effect does not make the definitive case for the particle theory of light but rather that delayed quantum effects do.

Yet he still includes the photoelectric effect in his course, also the Compton effect, because it allows analysis of a collision with relativistic expressions for energy and momentum. But Krane said that he restricts his wave theory of matter to discussing two-slit interference. He then follows basic quantum mechanics with applications to atomic and nuclear structure with an epilogue on the Big Bang.

Krane also stated that he would like to see modern physics incorporated with classical physics in a unified course as he has seen done by Moore (Six Ideas That Shaped Physics), Sherwood and Chabay (Matter and Interactions), and Holbrow, Lloyd, and Amato (Modern Introductory Physics).

Krane concluded that the introductory physics course could serve as a service course to support specific majors or to impart to students how the universe works. His personal wish is for the latter.

John Roeder

WHAT CAN WE DO FOR YOU?

*Here's an opportunity to let us know what you think the section can do for you. Give us some ideas about how we can be more effective in assisting you in the teaching arena. You may have topics that could lead to the development of workshops that can be very helpful to many. You can go to our website and contact anyone of the officers. **We want to hear from you – it is your section.***

World Year of Physics 2005

The WYP 2005 is meant to be a celebration to bring to the general public the achievements of the great scientist past and present. Since 2005 will mark the centenary of Einstein's three groundbreaking papers, we can participate in various ways to make our students and the community more aware of the contributions made by many to the advancement of understanding how our world works. The official website for the committee, of which Dave Maiullo is a member, is a starting point for all those interested in commemorating this event. The website address is:

www.physics2005.org

To help celebrate this momentous year we are planning some competitions for student participation. There will be further information about this in future mailings and on our website.

AAPT's Team America Rocketry Contest

AAPT will serve as the Team America Rocketry Challenge's sole educational partner for the 2005 competition. As a supporting partner for the 2004 event, AAPT was prominent in providing contest information to the physics education community. The challenge is the world's largest model rocket contest for middle and high school students, with more than 16,000 students participating in the 2003 and 2004 competition. To get more information on the Team America Rocketry Challenge go to: <http://www.rocketcontest.org>.

September 9 Abstract Deadline for 2005 Winter Meeting

The deadline for submission of all abstracts for the 2005 Winter Meeting in Albuquerque, NM, is Thursday, September 9. For information on abstract preparation and submission rules, please go to <http://www.aapt.org/Events/abstractguide.cfm>. Read the current Call for Papers at <http://www.aapt.org/Events/call4papers.cfm>.

Physics Day Workbook Revision Project

*Five members, Ray Polomski, Jessie Blair, Joe Spaccavento, Sue Hoy, Jay Waldstein and Tony Brancato, met with Kat Williams of the Special Events Department of Six Flags Great Adventure. In an effort to revise the workbook used on Physics Day, discussions were held about the best method of improving the book. This will be a joint project of NJAAPT and Six Flags and the result will be a new format. It is hoped that all of the qualitative and quantitative will be placed on a CD. If this can be accomplished, it would afford teachers to individualize the assignments for their students. It was also suggested that movies of the rides be placed on the CD as an introduction to the use of the amusement park as a teaching tool. We are looking for input from our members concerning the nature of the work – what do you think is good about the present book and what do you think should be changed? **Contact any of the officers with comments and suggestions regarding the revision.***

Anchor Scientific Workshop on Sound – Saturday, Nov. 13

*Join Harry Rheam and a host of others at Anchor Scientific for a tremendous workshop on **sound**. This will provide you with the opportunity to pick the brains some of the finest minds in the area on how to liven up the demonstrations and concepts in your classroom.*

Registration form is available on our website.

NJSTA Convention Oct. 12-13

*Are you planning on attending the NJSTA Convention this year? You can go to their website for details on the meeting. Stop by at our table and at the **Physics Demo Den** on both days. The **Physics Demo Den** will present demonstrations two hours each day in the areas of sound, electricity, and magnetism. A cast of thousands, maybe slightly less, led by Borislav Bilash and Harry Rheam will stupefy the audience with their fantastic talents. Don't miss this opportunity, it may not come again.*

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189 Richard Drive
River Vale, NJ 07675