

# Physics Tempo

The Newsletter of The St. Louis Area Physics Teachers  
an affiliate of the American Association of Physics Teachers  
October 1991

Vol. 2 No. 2

## Notes from the September Meeting

by Debbie Rice

Rex Rice opened the September meeting of the St. Louis Area Physics Teachers meeting at Roosevelt High School 8:30am Saturday, September 21 1991. Twenty-one members were in attendance. Semyon Volshteyn, Physics Educator from the Soviet Union, was our keynote speaker. He spoke to us about physics teaching—the scope and sequence of secondary education in the Soviet Union, and the methods of teaching science, particularly physics. Semyon displayed an incredible collection of Russian language Physics and general science text books, lab manuals and problem sets. Semyon is currently working on his Missouri Teaching Certificate and will likely teach Physics in St. Louis.

**First item of general business**, the needed rewriting of the Six Flags Student (Physics Day) Packet surfaced as we discussed the plans for the Six Flags Sponsored meeting in October. A committee consisting of Joan Biela, Bill Brinkhorst, Frank Cange, Linda Kralina, Bill McConnell, Debbie McKinsey, and Rex Rice, was formed to handle the rewriting. Details for the October meeting were reiterated, and Debbie collected names of the members planning to attend the Six Flags meeting.



Rex Rice

**The St. Louis Area Physics Teachers** will participate in the Fall STOM Convention in November by manning a booth in the Show Me Organizations section. Dave Bross, Rich Langer, Debbie McKinsey, and Val Michael volunteered to staff our booth. There are numbers of other Physics teachers already staffing activities or committees for the Fall STOM Convention. Further business sought members to host a meeting sometime within the remainder of the 1991-92 school year. Margaret Skouby, Ellen Barr and Gene Allard graciously offered their schools for future meetings, and Margaret's school is "on board" for the December 1991 meeting on optics (*see the info on the December meeting*).

The attendees also discussed the delicate subject of funding for our newsletter, Physics Tempo. The membership decided that a voluntary donation of \$5 would be sought to help defray printing



Semyon Volshteyn

contributions will be used (frugally) to assist in the printing and mailing our newsletter.

**For our grand finale**, Paul Discher raffled off three surplus equipment items donated by the Washington University Electrical Engineering Dept.

and mailing costs for the newsletter for the ensuing year. Readers and members not attend the meeting can choose to help us by making a contribution (payable to Paul Discher) and completing a more detailed membership data card enclosed. Send your contribution and/or updated membership form along with your donation to Paul Discher at Washington University Electrical Engineering, Campus Box 1127, St. Louis MO 63130-4899. We will use the information you provide to update our new computer database. Your generous

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## Notes from the October Meeting at Six Flags over Mid-America Park

by Debbie Rice

**The October** meeting of the St. Louis Area Physics Teachers was hosted by Six Flags over Mid-America, Eureka Missouri. Attendees meet at the park's administrative center 8:00am on October 12, 1991. The purpose of this meeting was the refinement of Six Flag's Amusement Park Physics- Physics Day activities. Other business was covered by the membership before the meeting was turned over to the Six Flags host, Dennis Woerner and Ron Weber.

**Linda Kralina** reminded members of the upcoming 1991 Science Teachers of Missouri (STOM) convention to be held on November 15 and 16. She explained that the Friday November 15 portion of the convention would be held at the new St. Louis Science Center, and that preregistration for this event is required and costs \$15.00. This fee includes a buffet dinner, tickets to the opening session of the Omnimax theater, and talk by the scheduled speaker Linda Godwin, NASA Astronaut. The Friday evening STOM event concludes with a telescope viewing courtesy of the St. Louis Astronomical Society. The convention will continue on Saturday November 16, 1991 at Hazelwood Central High School in

Florissant. Advance registration for this portion costs \$10.00 for STOM members and \$20.00 for non-members. On-site registration fees are \$15.00 for members of STOM and \$25.00 for non-members. A registration form is included in this issue for those wishing to attend. Hurry and get it in the mail.

**Dennis Woerner and Ron Weber**, Six Flags officials, updated the group on their plans for support for the annual Physics Student's Day at the park. After proposing several possible ways of handling the event and possible dates, they opened the floor for discussion of their proposals. Most people agreed that it would be best to hold the event on a date that was reserved specifically for Physics students rather than when the park was open to the general public. It was also proposed that the date of the event should be sometime in April to avoid conflict with May field trip cutoff dates imposed by some schools. A Friday in late April, in which we could start the event at around 12:00, noon, and continue until 6:00 p.m., when the park would be open to the public, was discussed. It was agreed to try to slate this time for the event, pending approval by the Six Flags Board of Directors. A safety director for the park then arrived to discuss what could and could not be done by the students on the rides. It was agreed that a limited number of rides would be operational for the event and that the committee for developing the activities would write activities for those particular rides. The rides which will be included are The Ninja, The Screaming Eagle, Highland Fling, AeroFlyer, Yankee Clipper, Rush Street Flyer, Tom's Twister, Hannibalreels and the Mine Train.

**Frank Cange and Rex Rice** showed Amusement Park Physics materials they had collected from various amusement parks around the country. Rex illustrated several possible accelerometer designs and other methods for constructing the accelerometers were discussed by the attendees. Rex also proposed a challenge to members to design an accelerometer using a transparent tennis ball canister and supplied a canister to each person attending. We are looking forward to seeing the results of our member's creativity in this challenge. Rex concluded his presentation by showing a simulation of the AeroFlyer ride that could be made using a coffee can, washers, string, and a turntable. This device could be used to do quantitative predictions of the behavior of the ride and might serve as a good activity prior to taking students to the Six Flags Physics Student's Day.

At the conclusion of the meeting, the good folks at Six Flags gave each person attending vouchers worth \$5.00 toward food at the park, and encouraged us to go and explore the park. Several members ate lunch together and had fun riding various rides. All in all it was an excellent Saturday morning, not hindered in the least by the beautiful fall colors in view during the ride to and from the park.

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## **November 1991 Meeting:**

### **Not Scheduled**

**The St. Louis Area Physics Teachers** will be attending the STOM's Fall Convention rather than hosting a regular November meeting. Enclosed is a registration form and agenda for the STOM Convention, please come and visit with our membership at the "Show Me Membership" booth for the St. Louis Area Physics Teachers.

## **The December 1991 Meeting:**

**Date: Saturday December 14, 1991**

**Time: 8:30am - 11:30am**

**Place: Maplewood-Richmond Heights  
High School  
7539 Manchester**

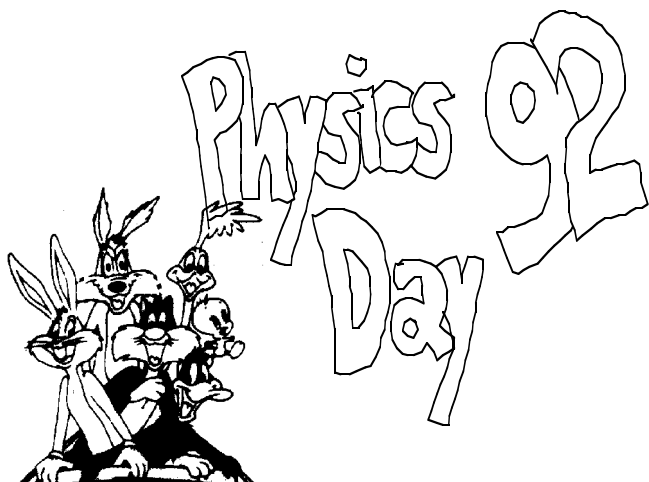
**Host: Ms. Margaret Skouby**

**The regular** scheduled meetings of the St. Louis Area Physics Teachers will resume December 14, 1991 with the meeting at Maplewood-Richmond Heights High School, 7539 Manchester. Our hostess is Ms. Margaret Skouby and scheduled to open the meeting at 8:30 a.m. The Optical Society of America will make a presentation, as well as invited membership.

We would like to continue our tradition of sharing at every meeting. We decided at the October meeting the best way to handle this would be to have those who wish to share a demonstration, lab or any other helpful hint, call the host or hostess of the meeting. The first five who call will be presenters. Since we will be discussing optics in December, we hope that those of you who have something in the area of optics to share will call Margaret at home, 962-1922, or at school, 644-4400, before December 14.

**Directions** to Maplewood-Richmond Heights High School are as follows: Take Highway 40 (Interstate 64) from Illinois West to Hanley Road **South** to Manchester Road. Turn right on Manchester (**west**) one block to Martini. Turn **right** on Martini you will be driving parallel to the east side of the campus at this point. Proceed along Martini to Lohmeyer and turn **left** on Lohmeyer and you will be in front of the high school. Look for the signs that direct you to the meeting room.

**Thinking** about making a presentation or hosting a meeting, if so, please contact Rex or Debbie Rice at 862-2845. We also encourage you to make a contribution to the Tempo Newsletter, an article, cartoon, joke, hint or what ever moves you. We know there are people out there who get this newsletter and are too far away to

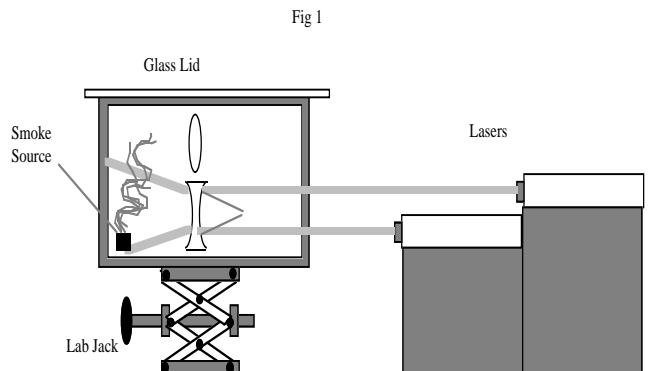


attend the meetings regularly. We would like to hear from you too. Send your contributions to Paul Discher at Washington University Electrical Engineering, Campus Box 1127, St. Louis, MO, 63130-4899. If you read this and have never attended a meeting, please make a point to attend the Fall STOM Convention and visit us at our booth.

## A smoke tank for Optical Demonstrations by Paul Discher

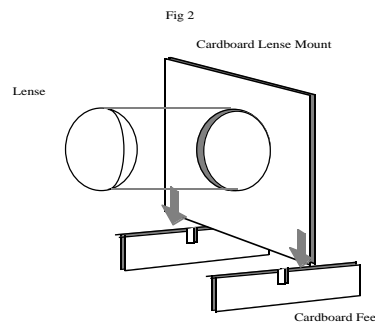
This is an encore presentation of “A smoke tank for Optical Demonstrations” (it seemed timely in “light” of our Optical Program scheduled for December.)

Optical demonstrations that use lasers or collimated light sources all usually require some temporary method of making the light beams visible. Spray bottles, chalk dust, smoke, or clumsy tanks of tinted water are a few of the methods many instructors have used to make beams of light visible for classroom optical demonstrations. Many of the free space demonstrations produce undesirable airborne particles that not only dissipate too quickly, but also pose some environmental problems for the laboratory i.e. dust, water etc. I have employed a method that allows for contrasted light rays for contained optical demonstrations that is long lasting, safe and easily assembled with materials you probably already have in your teaching laboratories right now.



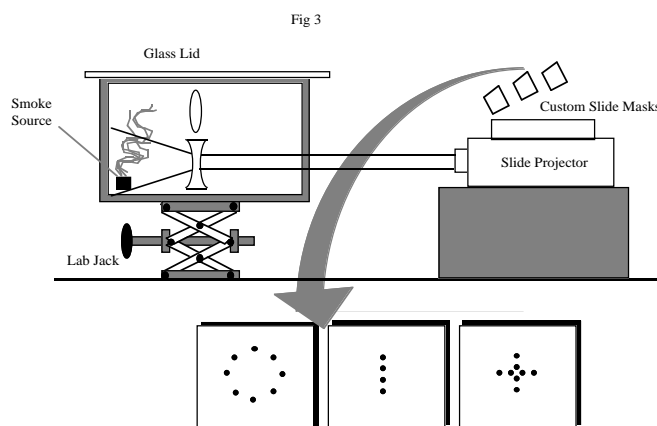
This method uses a smoke filled aquarium with an airtight lid. Optical subjects are mounted inside the tank and surrounded with smoke. Light or laser beams enter and escape through the transparent sides. The contained smoke provides a diffusing medium for the light beams and makes them visible. The back and/or side of the tank can be fitted with black cloth or construction paper to further improve contrast and/or limit the emission of stray beams. Fig 1 illustrates the “generic laser” optical demo I have used. An optional lab jack can be placed under the tank allowing for manipulation of the subject as illustrated. Smoke is supplied by igniting small pieces of rope, or for a delightful after effect you may choose to use incense as a smoke generator. The airtight transparent lid minimizes any fire hazard by depriving the embers the necessary oxygen to support combustion. Smoke residue accumulates on all inside surfaces, and cleaning is necessary at some time. Make certain that your optics are washable!

Fig 2 illustrates temporary cardboard holders that I constructed to hold optics upright inside the smoke tank (or for any other purpose you may need cheap lens holders). The optical holders are pieces of 100 lb cardboard (from throw out shipping boxes) that have



been cut to size. Holes for lenses are made with a sharp blade and slightly under size for the lens. The lens is then force fitted in the cardboard upright. Masking tape can be used as a “shim” medium if the lens fits too loosely. Cardboard cross braces are used for the feet and are made from the same cardboard

slitted for supporting the upright assembly. It is interesting to use the smoke tank without lasers to show the three dimensional focus of lenses and mirrors that is not commonly done in optical demos. This demonstration can be completed with the light from a slide projector and some prefabricated light beam masks.



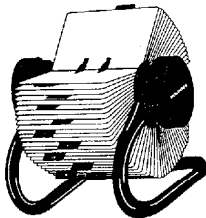
Using pieces of cardboard from the backs of blocks of paper, cut them with a paper cutter into 2" x 2" squares. With the point from a push pin or compass poke several sets of different arrays of holes. Arrange the holes in different geometric patterns, in a circle, forming a Plus (+), and a vertical line. (See Fig 3.) Insert these 2" x 2" cardboard pieces into the slide projector. Aim and pass the beams through the smoke tank and optics. When you use a transparent tank and lid the three dimensional focus of the lens(s) becomes visible. Polaroid photos can even be made of the light beams for further quantification of the lens optical properties.

### Mission Statement

*Physics Tempo* is the free monthly newsletter of and by the St. Louis Area Physics Teachers, an affiliate of the American Association of Physics Teachers (AAPT), and is intended as an organizational support group for the betterment of Physics and Physical Science teachers throughout St. Louis and Illinois.

*Physics Tempo* is dedicated to report achievements and announce the activities of the St. Louis Area Physics Teachers. In addition, *Physics Tempo* is intended to help disseminate useful and innovative information for teaching Physics and Physical Science. *Physics Tempo* is your newsletter. Editorial contributions are encouraged and welcomed. No idea is too small. Send articles, ideas, and subscription requests/address changes to: *Physics Tempo*: Editor/Paul Discher, Washington University-Electrical Engineering, Campus Box 1127, St. Louis, Missouri 63130-4899. FAX articles or Ideas to Washington University- Electrical Engineering Fax Line: 314-935-4842. Please mark your fax mail to the attention of the *Tempo* Newsletter Editor, Paul Discher.

# The Physics Teachers Rolodex



*As you already know the rolodex is where you keep your names and addresses handy. This column of the newsletter is devoted to the listing of sources for useful and innovative science teaching equipment and general classroom services.*

SMALL PARTS INC  
6901 NE THIRD AVE  
PO BOX 381736  
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305-751-0856

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