

OUR NEXT MEETING...

...is at Lake Forest College
 Tuesday, April 14, 6:30-9:00 P.M.

A map and directions are enclosed.

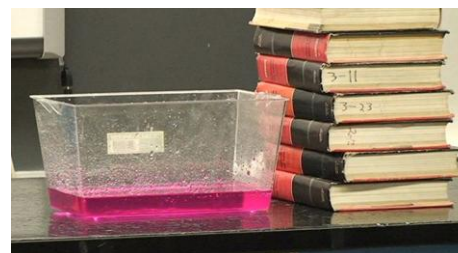
Scott Schappe and his colleagues at **Lake Forest College** will welcome us. What physics pun awaits us? Come and see. As announced at the Elmhurst meeting, the **Harald Jensen Award** will be presented to **Mel Sabella** of **Chicago State University**.

FUTURE MEETINGS...

April 18	Saturday	CSAAPT, Glenbrook South High School	John Lewis
May 4	Monday	Northwestern University	Art Schmidt
June 2	Tuesday	Museum of Science and Industry	Ruth Goehmann

AT OUR LAST MEETING...

We were welcomed to **Thornridge High School** by **Brian Sievers**, **Paul Fritz**, and **Bill Hedden** and a number of their physics students. This was our first meeting at Thornridge, and several teachers from the area schools were able to attend, some for the first time. New Teacher Bags were presented to **Mark Danielson (Thornwood High School)** and **Matt O'Keefe (St. Ignatius College Prep)**. While we gathered and snacked, Brian demonstrated some features of his Smart Board system.

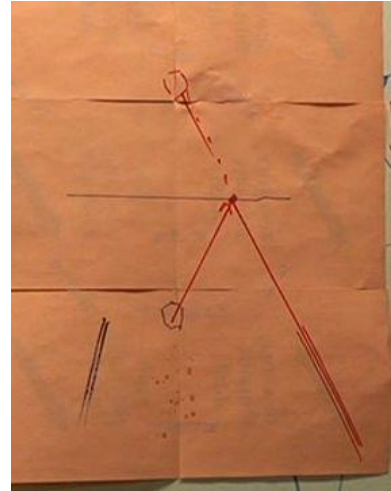
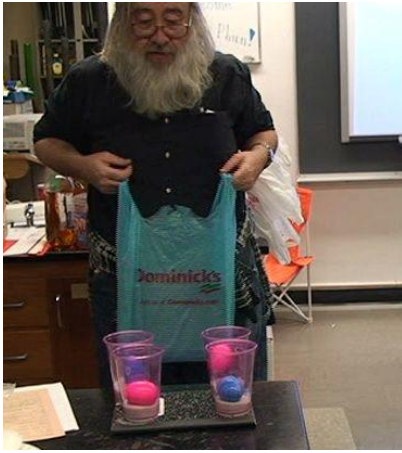


The first phenomenon was a familiar one, done with a little twist. A laser beam passed through a 2-liter bottle and out a hole on the other side. When the bottle was filled with water the laser beam followed the trajectory of the water stream (total internal reflection, as in fiber optics). The stream went into a hidden container and when Brian removed the cover from the container, we could see that he had "trapped" the laser light in the water (a little sodium hydroxide in the water and some phenolphthalein in the container work well). Brian likes to do this for parent nights. **Roy Coleman** suggested adding a small nozzle to the outlet hole to increase the exit velocity.

Announcements followed. **Gordon Ramsey (Loyola University)** passed on thanks and compliments for those of use who participated in the demo show at the AAPT Winter Meeting. There will be summer workshops for high school teachers at Loyola U (AP physics) and at Fermilab. Information was sketchy about Physics Day at Great America. Check their website for dates and prices.

Paul Dolan (Northeastern Illinois University) showed us an inertia demo he did at the winter AAPT meeting. He stacked several notebooks in plastic bags resting on small dowels. Weighted plastic cups formed the lowest layer of the structure and eggs rested on top of the upper dowels. He began with one egg falling into one cup, then moved to four eggs on two stacks, finally to one egg on a stack of four notebooks.

Ann Brandon (Joliet West HS, retired), set up a set of demos using candles and mirrors. She began with a lit candle in front of a plane mirror, then replaced the mirror with a piece of clear plastic in which the image of the candle could be seen. With help from us she moved another candle until it coincided with the image of the lit ("object") candle. The setup was on a large piece of paper and she had Gordon Ramsey line up the image by sighting along rulers at two different locations. Then she taped the paper to the board and drew the lines of sight. We could see that they intersected behind the drawn mirror line at the location of the image. Ann then repeated this procedure with two mirrors at right angles – a corner reflector and we were able to locate three images. As a finale she/we located the images when the angle between the mirrors was not 90°. Several people made suggestions about variations in the procedures. Neat!



Art Schmidt (Northwestern University) brought up two *Genecons* (hand-held generators available from many equipment suppliers). He pointed out that the device can also be used as a motor. He connected one Genecon to another, held by Gordon Ramsey. When Art cranked, Gordon's crank turned. A Thornridge student who cranked the generator when it was connected to a small bulb could feel a reverse force "fighting" his effort to crank. (an application of Lenz's Law). With the bulb removed (open circuit) the cranking was much easier. Then Art used the generator to store energy in a capacitor, cranking clockwise. He asked us to predict the direction in which the generator crank would turn when he let go of it, with the generator now acting as a motor. There was divided opinion. We saw that the crank continued to rotate in a clockwise direction.



Debby Lojkutz (Joliet West High School) showed us a "vibrating tube" set from Fischer Scientific. It consists of two metal bars mounted on hollow tubes, with slightly different frequencies (440 Hz and 441 Hz). When she struck them with a rubber mallet we could clearly hear the beats. Some suggested that we try to see the nodes. Some sand was sprinkled on a vibrating plate and we could easily see the nodes. It was also suggested that the resonant frequencies of the plates could be changed by adding a little clay, but we didn't try this.

Eileen Wild (CPS, retired) found a different way of modeling the expansion of the cosmos. Rubber tubing is sometimes used, but she was unable to find any. She then tried the long thin pieces of rubber sheet material that people in rehab use for exercising arm muscles. She pasted colored dots on the sheet to represent galaxies and when the sheet was stretched we could see that the dots were farther apart. She did see rubber tubing used in a doctor's stethoscope and suggested trying that. She will show this at a meeting of the Chicago Astronomical Society.

Bill Hedden (Thornridge) told us of a trajectory lab he does using a dart gun. He has tried a number of guns; some proved rather fragile, so he asked for suggestions. There is also the problem of having the gun level when it fires. He used a gun with a bubble level mounted on the barrel. The students can then measure the horizontal distance Δx to a target board and mark the initial vertical position of the dart, then fire the gun, use the observed vertical displacement Δy to find the time of flight and use this value to find the initial velocity of the dart. Bill asked for suggestions of reliable guns people had used. Brian Sievers described a crossbow he has used for this purpose. Someone suggested mounting a laser pointer on the crossbow.

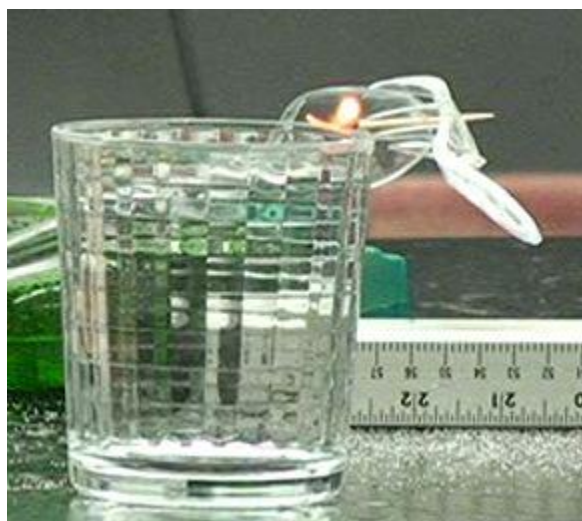
Bill also told us of a website he uses as for a senior capstone project, <http://www.intuitior.com/moviephysics/>. The site describes the bad physics content of movies. (He says this is the best of several such sites.) Students give do poster presentations that describe and explain the physics errors.

Paul Dolan demonstrated a sample from a make-and-take session at the winter AAPT meeting, a triangular platform held by three strings. The platform is swung in a vertical circle with sufficient angular speed so that centripetal force is applied to an object (a favorite is a glass of water – plastic for safety. He cautioned that the string lengths must be equal and sufficiently strong so as not to break under the tension associated with the rotation. He repeated a pun attributed to Larry Alofs – a rotating can of vegetables, described as “whirled peas” (ouch!). **Bill Blunk (Joliet Central High School, retired)** then came on with ten circular platform versions for people to take. He used one to rotate a plastic cocktail glass of water in both the vertical and horizontal planes. He cautioned that if nylon cords are used the knots can work loose if not securely tied. Brian Sievers showed us a similar trick he does with a puck on the blade of a hockey stick.



Paul Fritz told us of a robotics workshop he attended at Purdue/Kokomo. He had a small LEGO robotic vehicle he assembled and programmed with a team (physics, math and engineering). The unit has sound sensors (ultrasonic and audible) and a light sensor. Kits for schools and instructions are available through LEGO Mindstorms and kits may be found at Toy-R-Us. Paul showed us a number of features of the units.

Mark Danielson set up a plastic spoon and fork balanced on the rim of a glass. His twist on this familiar demo was to set the toothpick afire. It burned down to the point of contact with the glass and the system remained in balance! This was a neat finish to a good round of demos.



Our thanks to Brian and his colleagues (and his student helpers) for making us welcome at Thornridge.

Reported by John Milton.

For any information regarding ISPP contact John Milton at DePaul University, Physics Department, 2219 N. Kenmore, Chicago, IL 60614. Phone: 773-325-4238, e-mail jmilton@depaul.edu or glietz@condor.depaul.edu. ISPP home page: <http://condor.depaul.edu/~glietz/ispp/ispp.html>

BRING FRIENDS

BRING IDEAS

SEE YOU THERE

Directions to Lake Forest College

From Chicago Take I-94 (Edens Expressway) north toward Waukegan. When I-94 splits off toward Milwaukee, stay on the Edens, which becomes U.S. Route 41. Exit at Deerpath Road, turn right (east) onto Deerpath and continue through the town of Lake Forest and toward the College.

From points North Take I-94 south from Milwaukee. Just south of the Wisconsin-Illinois line, stay left and follow U.S. Route 41. Exit at Deerpath Road, turn left (east) onto Deerpath, and continue through the town of Lake Forest and toward the College.

From points West & Southwest (including O'Hare Airport) Take I-294 (Tri-State Tollway), which becomes I-94, north to Illinois 60 (Town Line Road). Exit and turn right (east) on Route 60. Continue east to Route 43 (Waukegan Road), turn left (north) for 1/2 mile to Deerpath Road. Turn right (east) onto Deerpath and continue through the town of Lake Forest and toward the College.

The College Once in Lake Forest on Deerpath Road, proceed east through the business district and across the railroad tracks. Deerpath winds through a residential area and the next stop sign is Sheridan Road. Turn right (south) onto Sheridan Road, go one block to **College Road**, and turn **left** (east) into the College through the stone pillars. Proceed to the Johnson Science Center.

