ISPP Reminder **May 2016**

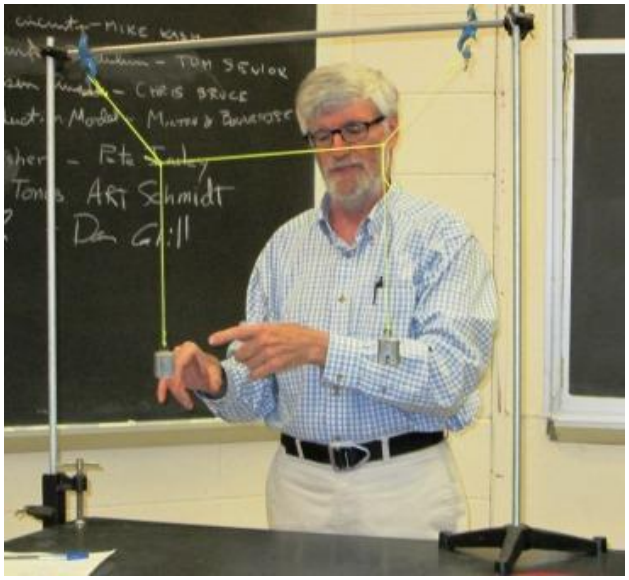
OUR NEXT MEETING…

…is at **Northwestern University Monday May 9, 2015, 6:30 pm to 9:00 pm**
NOTE that the date has been changed from May 2 to **MAY 9**.
Go to the end for directions and map.

AT OUR LAST MEETING…

… at Lake Forest College on April 20, after snack time, **Mike Kash** bade us welcome and we saw our first phenomenon of the evening.

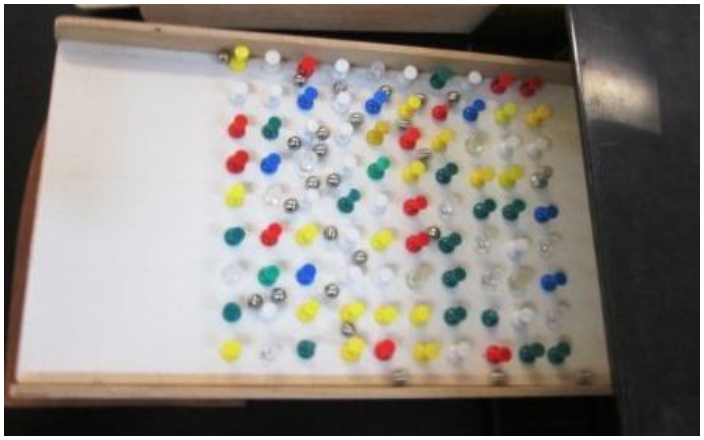
Tom Senior (Lake Forest College) had set up a pair of coupled pendula. We saw that the coupling string length affected the time required for a complete transition from the first to the second pendulum and back – the shorter the coupling string, the shorter the time.



Announcements followed. The Chicago Section (CSAAPT) Spring Meeting is Saturday, April 30 at Chicago State University. Online registration (before 12 PM April 29) is $20. Registration at the door is $25. (All fees collected at the door.) Plenary speaker is Robert Morse, a significant figure in physics education for many years.
https://sites.google.com/site/chicagoaapt/

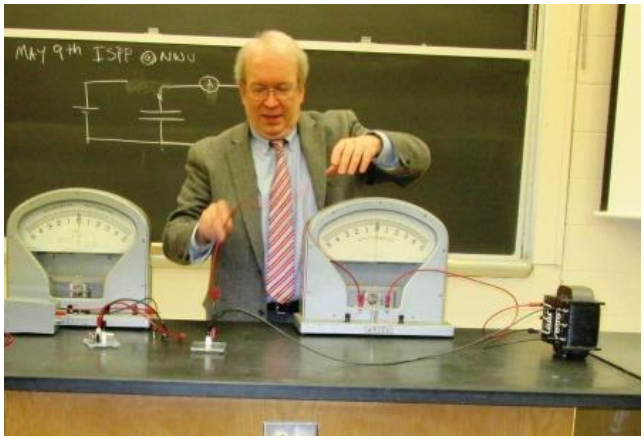
As noted above, we were reminded that the next ISPP meeting date is moved from May 2 to **May 9.** Dates are set for next year's meetings. The September meeting is at Oak Park-River Forest High School. **Eileen Wild** (CPS, retired) brought a collection of physics odds and ends and made them available. Reminders of retired Lake Forest professor T. H. Jeong were also available – rolls of holograms.

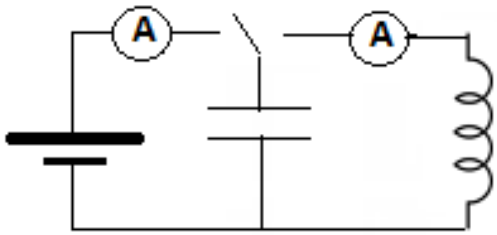
Ann Brandon gave a new teacher bag to **Tony Valsamis** from Glenbrook North High School.



John Milton (retired) and **Kumkum Bonnerjee** (Cristo Rey St. Martin) use two small boards with an array of pushpins to present a simple model of electrical conduction (see picture above). The "electrons" are 5/16" diameter steel ball bearings. (American Science and Surplus, item 95315, $2.50 pkg of 50.) The pushpins represent atoms. Students are asked how to get the bearings to roll down a board; they will say something like "Tilt the board," and with a little prompting, indicate that the bearings must begin with some potential energy. They see the bearings move down the board in irregular paths, colliding with the push pins. If they start from a higher point the "average" speed is greater. The bearing "current" is also higher if the path is wider (a thicker conductor). The links below provide a somewhat more detailed look at the process of conduction.
http://www.doitpoms.ac.uk/tlplib/thermal_electrical/printall.phphttps://www.st-andrews.ac.uk/~www_pa/Scots_Guide/info/comp/conduct/movechrg/movechrg.htm

Mike Kash had set up a series LC circuit that included two large display analog galvanometers. He estimated the inductance to be about 38000 H. He charged the capacitor, then discharged it through the inductor; we could easily follow the current change during discharge.



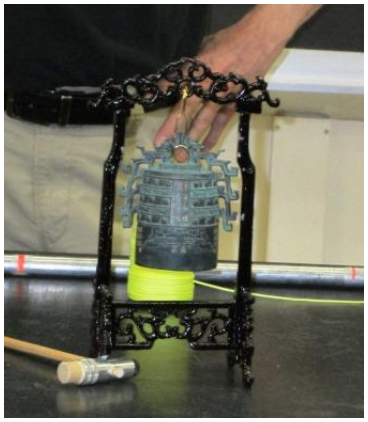


Tom Senior set up a familiar vertical spring and mass oscillator and we saw there was a coupling between the vertical oscillation mode and the spring-mass acting like a pendulum. (I seem to recall that this phenomenon came up a few years ago, and that the coupling was more noticeable when the stretched spring length was close to the pendulum length needed to give the same frequency.) Tom set the Wilberforce pendulum (our giveaway) into oscillation. We each received one, with a very useful handout that gave us details on the materials used and the construction process. The units we received were not "tuned" so teachers and students can work with them to adjust the moment of inertia of the hanging so that the rotational and vibrational frequencies are close to each other.

The **Harald Jensen** award was next on the agenda. This year's winner was **Chris Bruce** from **Conant High School. Ann Brandon** spoke of the origins of ISPP and the important role that Harald played in those early years. Chris then received the "Jensen bar" and our congratulations. Chris also received a copy of the best-seller, *The Boy Who Harnessed the Wind*, a gift from Harald's daughter.

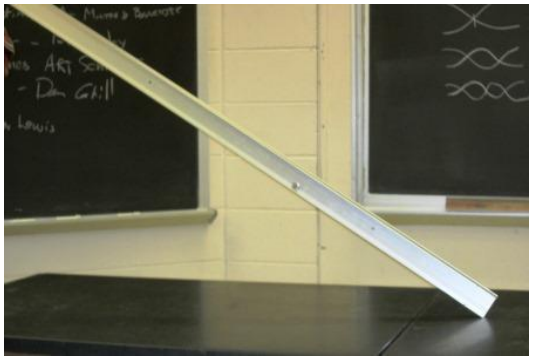
Pete Insley (retired) found some small flashing LEDs. When he looked at one through a diffraction grating he saw what looked like a continuous spectrum. Some of the units had dead batteries (LR41 watch battery). Pete also brought several balloons. He put a nickel inside an inflated balloon and was able to make the nickel roll in a circular path along the balloon's inner surface. He said it is possible, though a little more difficult, to do this with two nickels. But three or more will not work.

Art Schmidt (Northwestern University) used *Audioscope* software to show us the results of striking a steel rod in different places. First he struck the rod at one end (along its long axis), then in a direction perpendicular to the long axis. When the rod was struck end-on the fundamental frequency was about 2000 Hz; when it was struck across the long axis the fundamental was about 1000 Hz. When Art struck the rod at other places along its length we saw other harmonics. Then Art struck what looked like a ceremonial bell and we heard a variety of frequencies, depending on how the bell was struck. Art suggested with drawings that the bell surface normal to its vertical axis was vibrating in different 2-D modes.



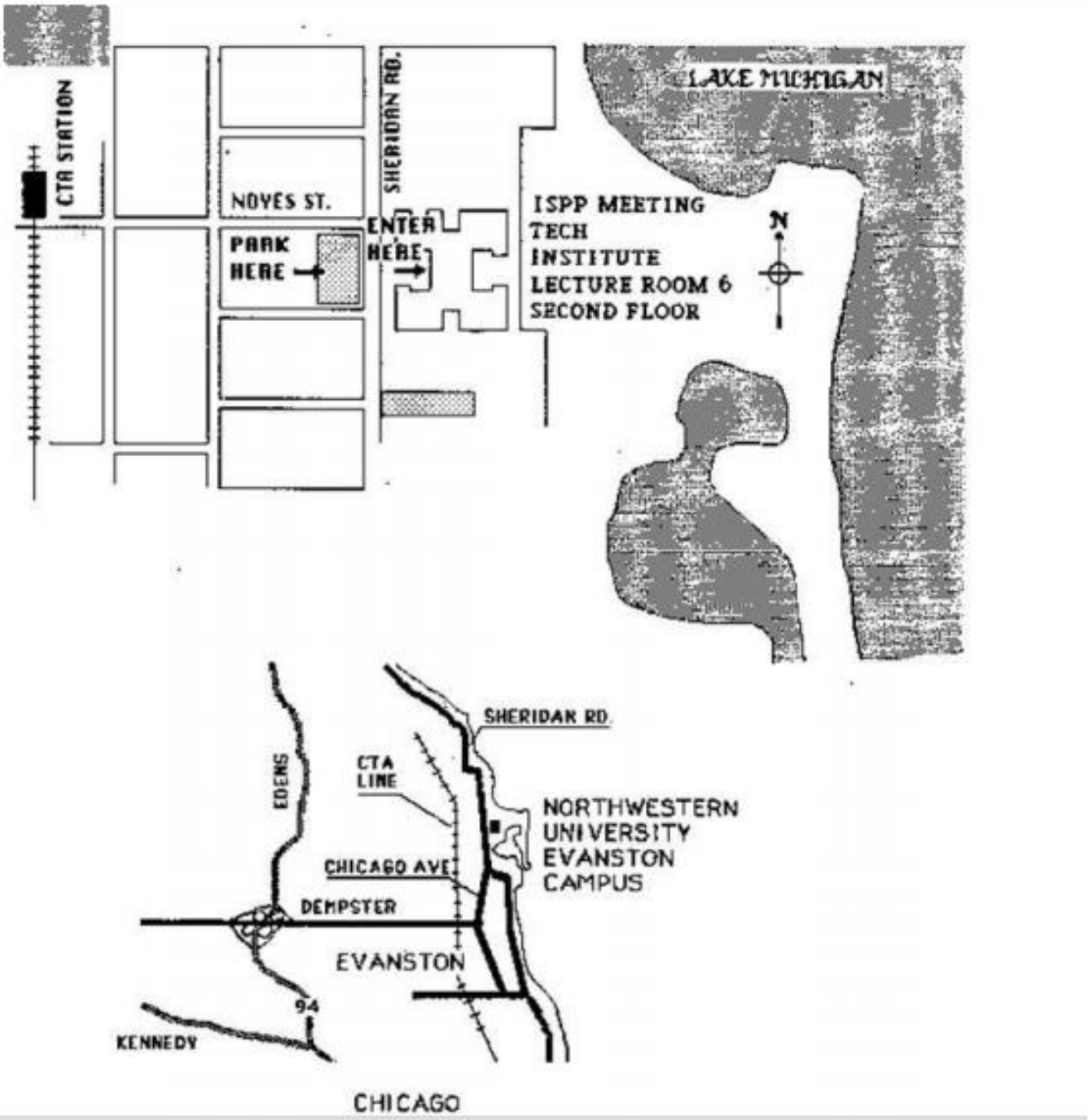
Dan Cahill (Grayslake Central High School) posed a question from some of his students. They have been looking at the behavior of an electron in a magnetic field. In particular, they asked what an electron stationary in a uniform magnetic field would do if this uniform field moved relative to the fixed location of the electron. Neither the magnitude nor the direction of the field really changes. Or does it? Does the electron experience a force? No definitive answer came from the group. (This discussion can continue at Northwestern.)

John Lewis (Glenbrook South High School) brought a long aluminum track from a shower stall. He had marked 10 cm divisions along an edge, placed a butter knife at each point and struck it with a hammer, creating small grooves 10 cm apart. We observed the sliding and rolling motion of washers down the tilted track. Then John let a small cylindrical magnet slide down the track with its flat side on the surface. We saw that the magnet quickly reached a terminal velocity. Students can be asked: Aluminum is not a magnetic material, so what is happening? This is a good example of Lenz's law at work. The moving/changing magnetic field induces Eddy currents in the aluminum. The magnetic field due to these currents opposes the moving field; this is an example of magnetic braking.



Look at ISPP on the Web: http://www.ispp.info/
Reported by John Milton

LINK for directions to Northwestern Evanston Campus
http://www.northwestern.edu/visiting/directions/index.html



Meeting location is changed; We will meet two doors to the right of the usual meeting room.