Our next meeting…

…is at Northwestern University
Monday, May 3, 6:30-9:00 PM

A Map and Directions are Attached

At our last meeting…

We were greeted by Scott Schappe and his colleagues at Lake Forest College. Scott began by showing us an additive color mixing box. We saw white where red, blue and green overlapped. Then he connected three LEDs to three separate power supplies and we saw that the LED color depended on the threshold voltage. Scott was able to point the diodes towards the screen so that the overlap of the colors could be seen. The diodes were part of the giveaway, along with a UV diode and circuit diagrams and spec sheets. The UV wavelength is 400 nm, longer than a UV lamp. It was suggested that one could illuminate minerals, bond paper and ALL detergent for some interesting effects. Art Schmidt referred to a TV commercial that promotes a TV screen that adds yellow to the usual RGB mix to give a brighter display.

Announcements included a reminder of the April 24 CSAAPT meeting and the upcoming Northwestern and MSI meetings. The MSI meeting will be preceded by a dinner meeting of host school reps to set next year’s calendar.

Tung Jeong (Lake Forest College, retired) told us about holographic TV that uses a Mylar screen (reported in Optics and Photonics News). Then he told us of being invited to conduct a holography workshop in a “third world country” that turned out to be Cancun, where he taught about single mode holograms. He showed us how he did it using a sandbox holography setup. Finally, he spoke about the phenomenon of “quantum entanglement.” He had set up a microwave analog using two Plexiglas 30-60-90° prisms with a small separation between the diagonal faces. Mike Kash (Lake Forest) showed us that how much radiation passes through and how much reflects depends on the separation of the diagonal prism faces.

Tom Senior brought out some sump pump corrugated tubing that comes in 24 foot lengths (not vacuum cleaner hose) and was able to create a nice straight line graph of frequency vs. the reciprocal of tube length. His data were collected by a free Apple program that is similar to Vernier’s Logger Pro. He also collected data for a set of palm pipes. That plot of \( f \) vs. \( 1/L \) was also a straight line. Tom gave us a write-up that included the graphs. He also passed out a paper on a pan pipe made from McDonald soda straws, with a similar graph, and instructions for constructing the palm pipe.

Roy Coleman showed us a Power Point presentation on the “Storms” exhibit now open at the Museum of Science and Industry. The exhibit includes a large scale twirling smoke demonstration of tornados; smaller versions are available for visitors to play with. A large slowly rotating apparatus illustrates landslides. A large circular ripple tank projects wave interference patterns. A heavy string from floor to the high ceiling demonstrates standing waves. There is a Foucault pendulum and a table that can project light that impinges on large pieces of plastic to project optical patterns, a very large Newton’s cradle, a setup that uses carts on a ramp to illustrate acceleration, and a trajectory apparatus. There is also a cabinet containing a variety of classical physics instruments.
Some students of Art Schmidt (Northwestern University) sent him information about the “Big Pipe Drum” (two concentric PVC pipes) – look on UTube. Art wanted to illustrate resonance phenomena related to quantum mechanics – Bessel functions. He put a plastic bottle about 1/3 full on a vibrating plate. As the frequency changed we saw changes in the resonant modes. He also showed the nodal (Chladni) patterns obtained when the plate is vibrating with sand on it.

Andrew Morrison (De Paul University) told us about an article he had come across in a book of reprints about physics demonstrations. It was from The Physics Teacher, May 1968 and the author was none other than Harold Jensen. Andy set up a magnet with a horizontal length of nichrome wire above the magnet. The wire was clamped to hold it in tension and was connected to an AC supply (Variac). It took a little adjusting to get the length and tension right, but finally the wire was oscillating in resonance. When there was sufficient current in the wire the nodes of the standing wave pattern were glowing, but not the antinodes. In his article, Harold points out that the moving antinodes were cooled, so that they did not glow. This is what we saw. Neat!

John Milton (De Paul University) brought a PVC palm pipe. When he hit one end of the pipe against his palm we heard a sound pulse and the sound was captured by a Vernier microphone connected to a Logger pro unit set to record the sound waveform and the frequency spectrum (FFT). It took a few tries to get triggering and then we saw that the pulse that reflected from the open end of the pipe had displayed several odd harmonics of the fundamental frequency.

Before we departed, Ann Brandon showed this year’s Harold Jensen Award, a nicely finished “Jensen Bar” useful for teaching about torque and rotational equilibrium. The plaque on the bar indicated that this year’s awardee is Shannon Mandel of Barrington High School; Shannon was unable to attend the meeting. The award had been announced at the January Tri-Physics meeting at Elmhurst College and Shannon was present for that announcement. Congratulations.

Our thanks to Scott and his Lake Forest colleagues for another interesting evening of physics phun.

Reported by John Milton

COME TO NORTHWESTERN! BRING FRIENDS!

Future Meetings (Some dates to be determined)

Northwestern, Monday, May 3
MSI, Tuesday June 1
LINK for directions to Northwestern Evanston Campus

http://www.northwestern.edu/visiting/directions/index.html