

OUR NEXT MEETING is at...

Northwestern University
Monday, May 8
6:30-8:30

Art Schmidt will greet us with phood and physics phun, and a useful giveaway. Scroll down for a map and directions.

AT OUR LAST MEETING. . . .

... at **Lake Forest College** on April 12, we were welcomed by **Mike Kash**, who introduced members of the physics faculty: **Tom Senior, Scott Schappe, Nathan Muegenburg, Amy Abe**, and alumnus lab supervisor **David Curie**.

FUTURE MEETINGS. . .

AAPT Summer Meeting, Cincinnati, OH, July 22-26

<https://www.aapt.org/Conferences/sm2017/>

CSAAPT Fall 2017 Meeting, Lewis University, Romeoville, IL

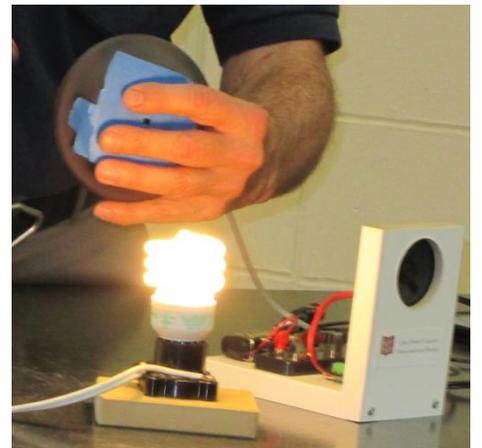
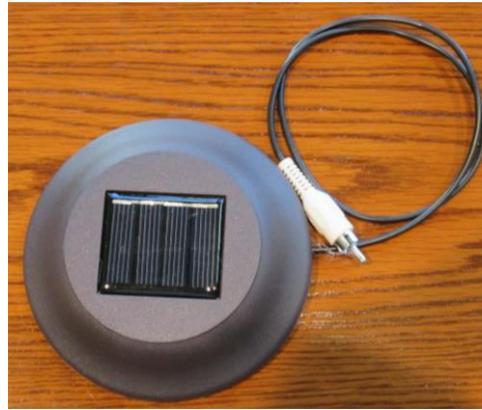
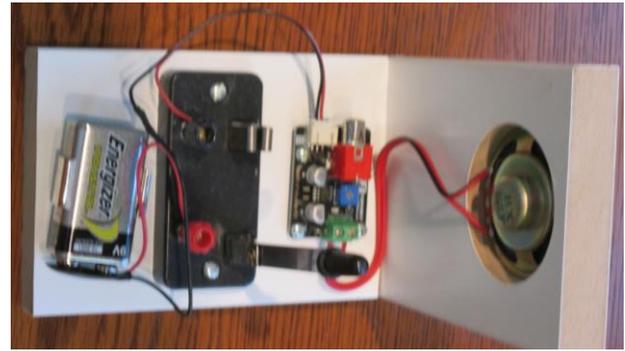
Look for 2017-18 school year ISPP dates in the May Reminder.

Amy Abe gave us a very informative three-page handout, "Implementing a Spandex Fabric of the Cosmos demo." I counted fourteen different web links on the handout! She and a helper assembled the demo, using 18% Spandex and 82% nylon fabric clipped to a hoop made of fiberglass tent poles. She simulated a gravitational well by placing a heavy steel sphere at the center of the Spandex surface. Then we saw smaller spheres tossed onto the sheet "orbiting" in the gravity field or behaving like binary star systems. Amy said she wants to work on the use of this apparatus to demonstrate gravity waves.



Tom Senior introduced and showed some uses of the very elaborate and versatile giveaway for detecting magnetic fields and solar cell output. It consisted of an amplifier model that uses an LM386 audio amplifier IC connected to a speaker, a SPST switch, an input socket for a pick up coil (solenoid wound around a bolt), and a 6-Volt battery. Included with the amplifier were a 30 turn, 6 inch diameter coil and a solar cell.

Uses (Tom demonstrated some of these): (1) of the pick up coil: hear the magnetic field around a coil from a phone or radio, hear the magnetic field next to an AC current, and find the speaker in a computer in a phone by its magnetic field. (2) of the solar cell: hear the IR signal from a remote control, Hear the light variation from bulbs, hear the refresh rate from some LCD screens, hear the variation in a AM laser beam.



Art Schmidt (Northwestern U) brought pairs of TV screen filters that we had seen and first received from **Pete Insley**. We saw that if you could see through a pair, this property changed if you lifted one filter off the other. He then had us look at an illuminated calcite crystal that produces a pair of beams. He showed us, using a polarizing filters, that the two beams from the tv screen material are not polarized like this from a calcite crystal. One side of a filter is silvered, just as the back side of a prism is a mirror, and the other side is a bit rough, and this led to the (tentative?) conclusion that the surface consists of an array of small prism-like pieces. (See Art's drawing on the right.)



Then Art used a larger "filter" that separates light into two beams and we saw what was projected flip back and forth from the Capital Building to the White House. He said his son wrote software to compare pictures that could be viewed this way to give a three-dimensional image that is not a hologram.

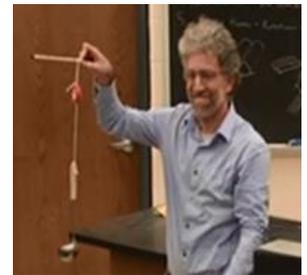


Theo Gotis (Oakton Community College) arranged identical springs and masses as shown at the left and asked his students to predict (on whiteboards) the behavior of the system if one object is lowered and then released. He said some of their predictions were surprising. We saw the expected behavior of these coupled oscillators. Theo leads them into a discussion of resonance phenomena and asks what will happen if the masses are not identical – very little transfer of energy. Theo said that when in the next semester he covers waves, the students remember this demo and can relate it to a fluid model of oscillating particles in SHM as a first approximation, and can relate the phenomenon to energy transfer. He set up the same demo with four connected spring-mass objects.

A discussion ensued about the distinction between periodic waves and pulses, with some reference to Fourier transforms, FFTs and Audacity audio software. These would all be nice topics for future *demos*.



Ross Hyman (Goode STEM HS) spoke of a demo at Lane Tech about the relation of torque to lever arm. He recalled something similar he had once seen and tried to reconstruct it. A string wound over a rod supported two objects, one more massive than the other. He held less massive object as shown at the left and asked what would happen when he released it. As many thought, the connecting string wound around the rod. An analysis can be done in terms of the



friction between the string and the rod. Also, it was pointed out, the increased tension in the string applies a stronger centripetal force to the rotating object.

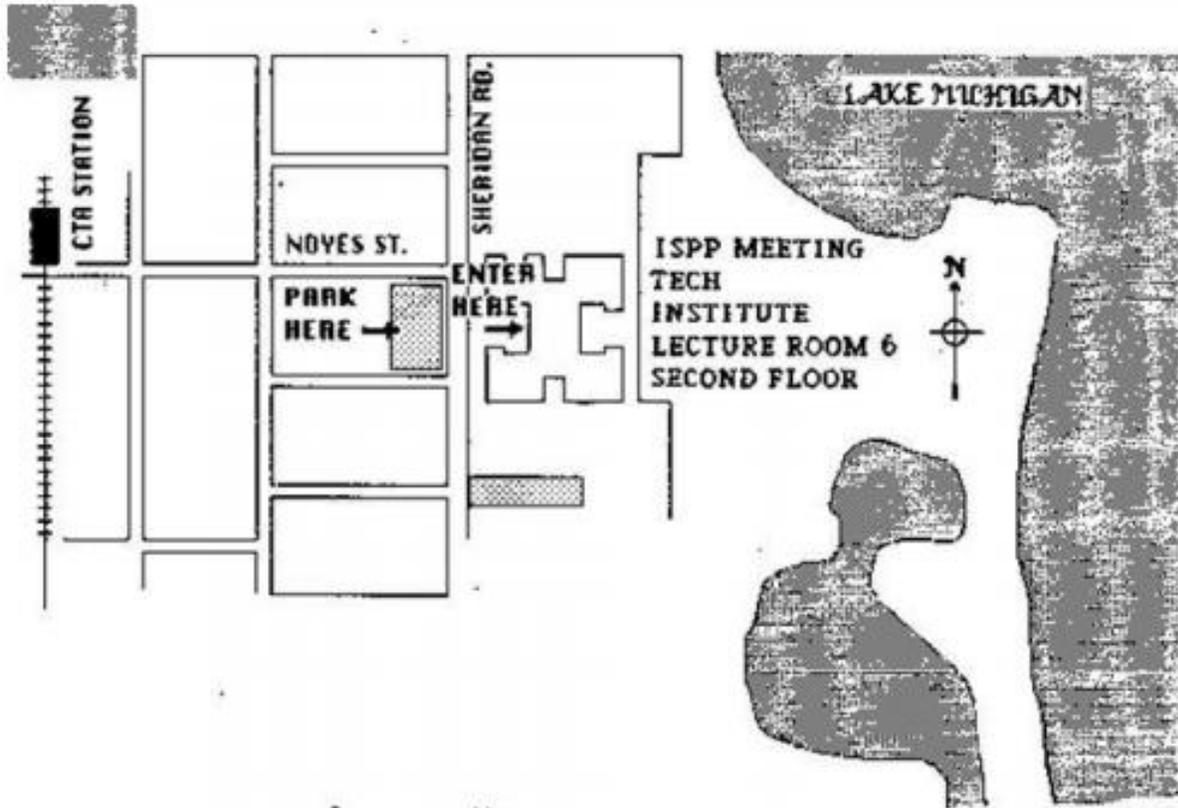
Finally, it was time for the presentation of the annual **Harsld Jensen Award**. **Ann Brandon** gave a brief history of ISPP from its beginning in 1967 and the role of Harald in its early years. This year's award was presented to **Geoff Schmit** from **Naperville North High School**. Congratulations to Geoff.



We left Lake Forest with our outstanding giveaway and having seen and learned from a number of interesting and sometimes challenging phenomena. Our thanks to our hosts from Lake Forest College. Come to **Northwestern on May 8** for the final meeting of this school year – bring a friend or two.

Submitted by John Milton

LINK for directions to Northwestern Evanston Campus
<http://www.northwestern.edu/campus-life/visiting-campus/driving-directions.html>



Room will be next to the usual room.