

ISPP REMINDER

September 2014

OUR NEXT MEETING...

is at...

Oak Park River Forest High School

Wednesday October 22, 2014

6:30 – 9:00 PM

Kevin McCarron

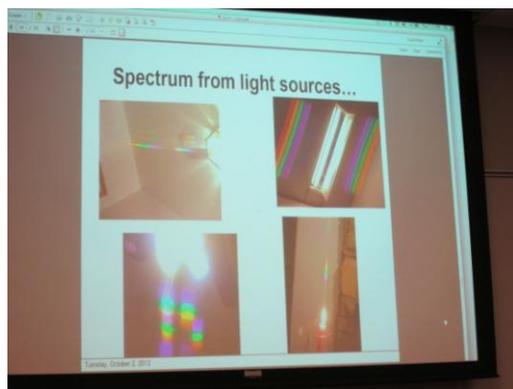
See last page for map and directions.

FUTURE MEETINGS:

Oct 24-25 (F-Sat)	ISAAPT	Bettendorf HS, Bettendorf, Iowa	
Nov 8 (Sat)	CSAAPT	Lewis University, Rockport, IL	Joe Kozminski
Nov 6-8 (R-Sat)	PSAPS		
Dec 2 (T)	ISPP	De Paul University	Eric Landahl/John Milton
Jan 3-6 (S-T)	AAPT Winter	San Diego, CA	
Jan 14 (W)	Tri-Physics (34 th annual)	Elmhurst College	Brian Wilhite/Venkatesh Gopal/Earl Swallow
Feb 19 (R) ?	ISPP	NEIU	Paul Dolan
Mar 2-6 (M-F)	APS	San Antonio, TX	
Mar (?)	ISPP	Loyola University	Gordon Ramsey
Mar 12-15 (R-Sun)	NSTA	Chicago	
Mar/Apr ? (S)	CSAAPT		
Mar/Apr (F-S)	ISAAPT		
May 4 (M)	ISPP	Northwestern University	Art Schmidt

Bridge Contest information: <http://bridgecontest.phys.iit.edu/>

AT OUR LAST MEETING...



Sheets of diffraction grating are available from Educational Innovations (www.teachersource.com)

Chris White, our host at IIT, has been playing with his diffraction gratings and taking iPhone photos of the fluorescent lights in his office and some other objects including a candle.

Pete Insley bought one of the new LED bulbs at a store where the clerk told him it had one very bright diode inside. First Pete passed out diffraction gratings he made by punching a hole in an index card and taping a small diffraction grating piece over the hole.



Pete had us look at a CFL bulb and a small 3-color diode device that turned white when all 3 colors were lit. He said he was expecting to see spectral lines in the diode bulb. When he turned on the LED bulb the spectrum was clear and continuous.

When the bulb is broken and taken apart there is a disc with 16 diodes, and in the base some electronics including a transformer and a couple capacitors. Pete thought it was a rectifier. The diodes were rectangles about 2mm by 4mm. 3.5 volts DC applied on the long axis caused the diode to light brightly and draw about 10 ma. Reversing the leads, the diode did not light but drew 1.6 amps current. The short axis had no effect at all. When the voltage was reduced to 2.5 volts the current dropped and the diode was dim but the spectrum was still continuous and contained blue! I was surprised since a blue diode requires more than 3v to fire. The current dropped to 0 on my ammeter where .01 is the lowest reading.

I must say it's a mystery to me.

John Milton brought a nice opening day exercise. He printed a sheet with 9 squares from 10mm to 30mm and instructions for the students to measure the sides, calculate the areas and form a data table (including units). Then sketch what you think an area vs side length will look like. Now actually draw and label a graph. Finally write an equation for the relationship. He said the students worked in groups of four with minimum help from the teacher and all groups were finally successful.

Martha Lietz (Niles West High School) made a nice angular motion device from pieces of PVC pipe. She took a couple half-inch pipes about 40cm long and attached them to a "T" connector. She put a third piece that had a string wrapped around it into the stem of the T connector. Then she lowered the stem onto a ring stand so that the pole supported the device at the T and it spun freely. The string was passed over the pulley and a 100g mass attached to it. As the weight fell, the whole apparatus turned and we could see it accelerating.



Martha asks the students to calculate the angular acceleration (they measure the acceleration of the falling weight) and the torque to calculate the amount of inertia. Pipes can be added vertically and/or horizontally to change the moment of inertia. Friction in the system produces some error but all the principles are clear to the students. Bolts can be placed into the pipes to increase mass. Martha also passed out a sheet showing how to use PVC pipes to build a white board stand (or easel).

Al Gladowski (IIT) brought out two weighted PVC pipes he uses to show moment of inertia. One is weighted in the center and the other at the ends. Although they weigh the same, one is much easier to spin than the other.

Karlene Joseph (Lane Tech) brought her little pull back cars. She has a constant velocity car she uses to introduce motion in a straight line. Students measure distance and time to plot a graph.

She then has students attach ticker tapes to "pull back" cars and run tapes of their forward motion. She uses 6 dot intervals to get velocity time tables and graphs for various cars and pull back distances. Karlene says using the ticker tapes gives the students valuable experience with measuring and graphing before introducing sonic rangers and programs that measure and graph for you. We all agreed.

Al Gladowski got out the IIT Van de Graaff electrostatic generator. He showed it make a 10cm spark to a globe and then showed how a sharp point discharged the generator. This is the way a lightning rod works. **Bill Blunk** said you can use the point to spray a charge on a volunteer's hair. **Melissa Zagorski** volunteered. She stood on a milk crate and touched the generator. Her hair rose a little. She stepped off the crate and Bill stepped up on it and, touching the generator with one hand, used a knife to spray charge into Melissa's hair (which is an insulator). After a minute Melissa took Bill's place on the crate and all her hair sprung up. Very impressive! All of us who have been disappointed with the hair trick should try this.



Roy Coleman reminded us that Rollin Porter used to light a neon discharge tube by putting it in his mouth and leaning backwards towards the generator so it sparked to the back of his head (proving electricity passes through a vacuum). **Pete Insley** volunteered to try it and sure enough it worked.



The **John Rush Award** was bestowed upon **Karlene Joseph**. She successfully peeled her apple! Well deserved!

Chris White ended the meeting with a giveaway of packs of four highlighters that could be used for color addition. The three primary colors should produce black. I got a kind of gray. Thanks for a very nice meeting!

Submitted by Pete Insley

Directions to Oak Park River Forest High School
210 N Scoville Ave, Oak Park, IL 60302
Kevin McCarron, 708.434.3285

From downtown Chicago and the Loop:

1. Take the Eisenhower Expressway (I-290) west, to Austin Boulevard. Exit from the left. Turn right (north) onto Austin Boulevard. Travel about 1 mile, just past the overhead "L" tracks, and turn left onto Lake Street. Go west on Lake Street to Ridgeland Avenue (3 stop lights). Turn right onto Ridgeland Avenue and go 3 blocks north to Superior Street. Turn left, go to Scoville Avenue (2 blocks). Turn left on Scoville (south) and look for parking.

or

2. Take the Eisenhower Expressway (I-290) west, to Harlem Avenue. Exit from the left. Turn right (north) onto Harlem Avenue about 1 mile, past the overhead "L" tracks, to Lake Street. Go east on Lake Street to Oak Park Avenue. Turn left onto Oak Park Avenue and go 3 blocks north to Superior Street. Turn right on Superior and go 4 blocks to Scoville Avenue. Turn right and look for parking.

From the Western Suburbs:

From most locations take either the Eisenhower Expressway (I-290) or the I-88 extension to I-290. Exit from the left lane onto Harlem Ave. Turn left (north) onto Harlem Ave. for about 1 mile, past the overhead "L" tracks to Lake St. Turn right onto Lake St. Go east on Lake St. to Oak Park Ave. Turn left on Oak Park Ave. and go north to Superior St. Turn right on Superior and go 4 blocks to Scoville Ave. Turn right and look for parking.

From Evanston and the North side of Chicago:

1. Take the Edens/Kennedy Expressway south to the Eisenhower Expressway (I-290) junction. Take a right onto the Eisenhower and proceed west about 10 miles to Austin Boulevard. Exit from the left lane. Turn right (north) on Austin Boulevard. Go 1 mile (past overhead "L" tracks, and turn left onto Lake Street. Going west on Lake Street, take a right on Ridgeland Avenue and proceed to Superior Street. Turn left and go to Scoville Avenue. Turn left on Scoville and look for parking.

or

2. An alternate route is to take Cicero Avenue (US 41) south to North Avenue. Take a right on North Avenue (west) and proceed to Oak Park Avenue take a left (south) to Superior Street. Turn left on Superior Street (east) and go 4 blocks to Scoville Avenue. Turn right on Scoville and look for parking.

The meeting will be in room 241(teacher's cafeteria). Use the main entrance on Scoville Avenue.

PARKING: There is a parking garage on the south side of the school, but it is not free. (Village-run, so we have no say-so on that.) Parking is free if you park on the curbs touching the school. The curbs across the street are reserved.

