

PHYSICS DAY 2019

Cleveland State University Physics Department

April 26, 2019
9:00am- 12:00pm

**Welcome Campus International students,
teachers and friends of physics!**

AGENDA

Presented by	Topic	Time	Room
Dr. Petru Fodor <i>Chair, Physics Department</i>	Introductions & information about our undergraduate and graduate programs	9:00am	SI-117
Dr. Andrew Resnick	Biophysics Lab Tour: <i>Live cell microscopy: what's living in your mouth?</i>	9:30am I 9:50am II 10:10am III	SI-143
Dr. Petru Fodor	Scanning Electron Microscopy Lab Tour: <i>High resolution field emission scanning electron microscopy. How do we image objects with scattered electrons?</i>	9:30am III 9:50am I 10:10am II	FH-29
Dr. Kiril Streletzky	Optics Lab Tour: <i>Applications of optics in biomedical research and laser demonstrations.</i>	9:30am II 9:50am III 10:10am I	SI-140
		Break ~5 min	
Ms. Tara Peppard	Physics Demonstrations <i>"Flying Circus of Physics"</i>	10:40am	SI-117
SPS	Lunch with SPS ~ Dr. Kiril Streletzky, SPS Faculty Advisor ~ SPS Officers	11:30am	SR-147

Student Leaders: Caroline I, Erin II, Priyanka III
CSU Physics Day Demonstrations for Students and Teachers
SI-117 10:40am- 11:30am **4/26/19**

Air Pressure— Place ball on top of tube while closed at the bottom—then open the tube. Ball will drop down through the tube. *Why?* Opening the tube releases the air pressure.

Weight of Air—

Why can't we lift the rubber mat from the table top? Exactly how much pressure is being applied to the rubber mat from the air? 14.7lbs of air per square inch -- 30lbs per 2 square inch! Read the spring scale.

Magdeburg Spheres—

The power of atmospheric pressure! How easily can you pull them apart?



In 1657, Magdeburg, Germany, Otto von Guericke, Mayor of Magdeburg calculated that a force of almost 2700 pounds would be needed to pull the two hemispheres apart. The hemispheres were made of bronze and were about 1.2 feet across.

Blow Tube—

How powerful are your lungs? Watch how they blow a steel ball through a tube.

Bernoulli's Principle—

Why does the ping-pong ball stay up in one place? Where is the air from the blow dryer moving the fastest? When the speed of air particles increases, pressure decreases.

Basketballs & Softballs—

Why does the softball bounce differently from the basketball?

Person Sits on Rotating Turntable—

What changes when you move your arms in and out? Inertia— Conservation of angular momentum.

Bicycle Wheel—

Which direction does the stool turn when you change the direction of the spinning bike wheel? Why?

Atoms— ...consist of negatively charged electrons moving around a positively charged nucleus. Atoms normally have equal positive and negative charge and are therefore neutral. Metals have free electrons and are conductors. Other materials that do not have free electrons are insulators.

Charging by Friction— Rub Bakelite with silk—which has a greater affinity for electrons? Bakelite or silk? Both materials are insulators, but electrons pulled off the Bakelite onto the silk remain on the silk. *What happens with wool? Plastic?* Check with electrometer.

Electrophorus— Electrons on the hard rubber repel the electrons to the top side of the copper plate. Touch top of plate to drain off these electrons leaving the copper plate positive.

Ping-Pong Electrometer—

Did the Electrophorus plate really get charged? Use Electrophorus plate to charge electrometer.

Wimshurst Machine—

Automatically works like the electrophorus but over and over at a high rate. Watch out—makes sparks 3 inches long!

Electrical Levitation—

Ping-pong ball painted with metallic paint to make it conductive is inserted between parallel aluminum plates which are in turn connected to the Wimshurst machine. *Why do they bounce?* The balls take on the charge of the plate they are in contact with and are therefore pushed up from the bottom plate and down from the top plate.

Jacob's Ladder—

5000 Volts between wires inside glass tube. *What makes the arc rise?* Arc rises as air warms up in the tube.