Demonstrations for Physics

To request a demo please use the Physics Lab web site or email the lab assistant. Please include the day, time, and the location. For more help you may also contact the lab supervisor. We will set up the demonstration in the classroom if you wish, or bring it to you before class. If you wish your students to see these demonstrations but do not feel that you have adequate lecture time, some of them can be done in the discussion or lab. Please give us two days notice for each demonstration (as some equipment is borrowed or used by several individuals).

Mechanics

The following is a list of demonstrations currently available for Physics 1011 and 2111.

1) Rotating Candle Apparatus

2) Centrifugal Force Paradox: the apparatus consists of a curved clear plastic tube with two plastic balls inside. When rotated, the balls will move to the ends of the tube.

3) 2nd Law of Motion Apparatus:

The device will launch 2 balls simultaneously; one will be launched horizontally, the other dropped straight

4) Roll two Campbell's soup cans of the same shape, volume, and approximately the same mass, but of different variety, down an inclined plane. One will clearly finish before the other.

5) A hoop and a disk of approximately the same mass - when rolled down an incline, the disk rolls down faster.

6) Newtonian Demonstrator

7) Bicycle wheel gyroscope and rotating platform

8) Standing wave apparatus allows you to display a standing wave on a string and the relationship between frequency and the number of nodes.

9) Tacoma Narrows Bridge Collapse on VHS format.

10) Gravity demo- both balls fall at same rate in evacuated tube.

11) Bimetallic strip, wand with ring and ball, thermos for liquid nitrogen, and propane torch for coefficient of expansion.

12) Bell jar to pump out marshmallows, balloons, etc.

13) Radiometer

14) Box of springs and huge Lucite holder

15) Air hockey to demo collisions

Electricity and Magnetism

The following is a list of demonstrations currently available for Physics 1012 and 2112.

Electrostatic Potential:

1) Van de Graft generator capable of charging to 400,000 volts

2) Accessories: ribbons to attach to the generator, a fluorescent bulb to light, electric whirl, discharge electrode for easily and safely discharging generator

Ohm's Law:

1)6V battery with "antenna" + 3 light bulbs

Capacitance:

1) Large demonstration parallel plate capacitor with movable plate can be used to show relationships between capacitance and plate separation, voltage and plate separation, voltage and charge stored. Plexiglas can be inserted between the plates to show the relationship between voltage and dielectric constant.

2) 1 Farad capacitor

Lorentz' law demonstrator:

1) Circular Lucite + magnet + battery + NaOH shows the force exerted on a charged particle moving in a magnetic field. In this case, the moving charged particles are in the form of current flow through an electrolytic solution developed by an applied voltage that can be used on an overhead.

2) Show magnetic field lines with a Lucite box filled with oil and iron filings, which allow you to pass a magnet thru it. This demo is ideal for passing around the class

Magnetic fields:

1) Long straight wire apparatus (Oersted's demonstration); demonstrate the direction of B around a current carrying wire.

2) Demonstrate magnetic attraction with an electromagnet that can lift almost 150 lbs. when powered by a flashlight battery

3) Demonstrate the Meissner Effect with a superconductive ceramic disk cooled with liquid nitrogen and a rare-earth magnet

4) Move a magnet thru a solenoid and show needle deflection on a galvanometer (the galvanometer may be used with the overhead projector)

5) Demonstrate the formation of eddy currents in a conductor moving thru a magnetic field with two conducting plates (one has slots cut in it) that swing between the poles of a magnet

6) Jumping ring demo attaches to an electromagnet that connects to an AC wall source. AC coil with iron core + rings

7) Use a hand electric generator to charge a capacitor, release the handle and the handle turns on its own as the capacitor discharges

8) Solenoid: wires winding around nail + battery

9) Handheld generator/electric motor

10) Big magnet + square current loop + handmade electric motor coil (turning loop)

Polarization demos:

1) Polarizing sheets

2) Microwave transmitter, receiver, and grid

3) Lucite cubic container + wood block for light collimator

Faraday's Law:

1) Handmade electric motor coil (turning loop)

2) Faraday's Law flashlight

Lenz's Law:

1) Eddy current apparatus (double tube of aluminum and acrylic)

Wave motion:

1) Different sizes of springs allow you to demonstrate transverse and longitudinal waves, reflection and transmission at a boundary

2) Standing wave apparatus allows you to display a standing wave on a string and demonstrate the relationship between frequency and the number of nodes

Other:

1) Fiber Optics used with a He-Ne laser demonstrate how optical fibers work (total internal reflection)

2) Calcite crystal

3) Cloud chamber