

# PHOENIX Physics with Homemade Equipment & Innovative Experiments

Phoenix is a hardware and software framework that can be used for developing computer interfaced science experiments without getting into the details of electronics or computer programming. Several experiments have already been developed and the equipment is being used by various institutions. Phoenix utilizes the power of personal computers for experiment control, data acquisition and processing. The hardware is inexpensive and the software development is done using Free Software tools. Phoenix is part of the programs by Inter University Accelerator Centre to improve the experimental physics teaching and research at Indian Universities. IUAC organizes awareness and training programs for physics teachers from the Universities. Setup, Screen shots and results of several experiments done are shown below. More details are available at [www.iuac.res.in](http://www.iuac.res.in)

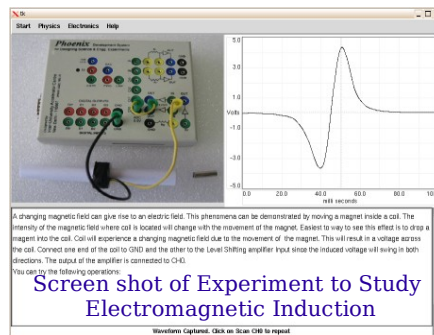
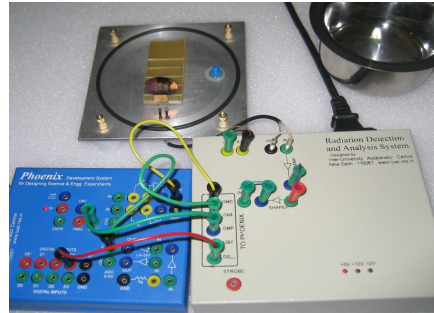


Study of RC integration using Phoenix.

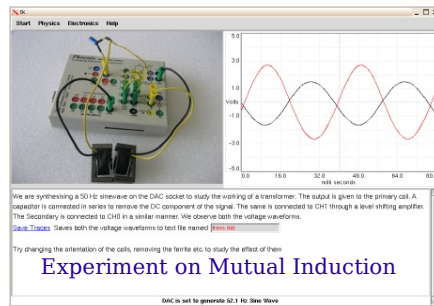
A square wave, generated by Phoenix, is connected to Analog Input CH0 directly and to CH1 after RC integration.

The Python program listed below sets the frequency of the square wave and makes CH0 and CH1 to function like a CRO. The output of the code is shown in the photograph above.

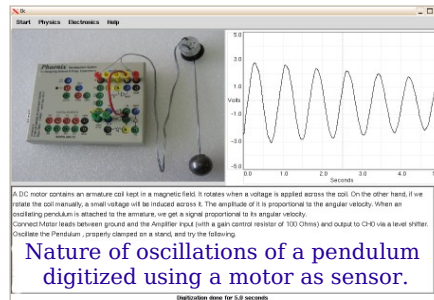
```
import phm
p = phm.phm()
p.set_frequency(100)
p.add_channel(0)
p.add_channel(1)
x = p.multi_read_block(200,20)
p.plot(x)
raw_input()
```



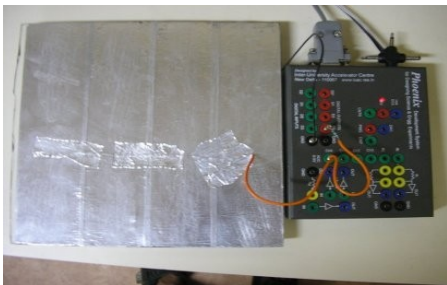
Screen shot of Experiment to Study Electromagnetic Induction



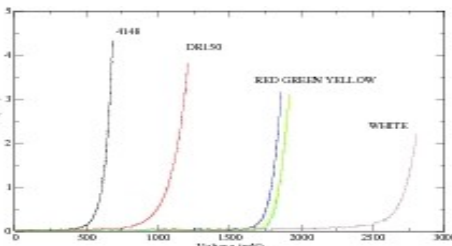
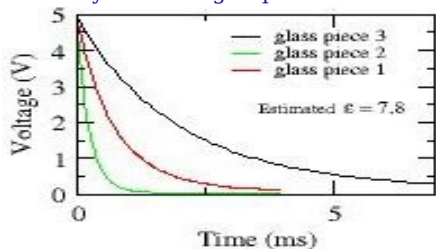
Experiment on Mutual Induction



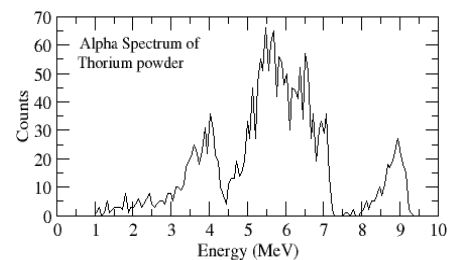
Nature of oscillations of a pendulum digitized using a motor as sensor.



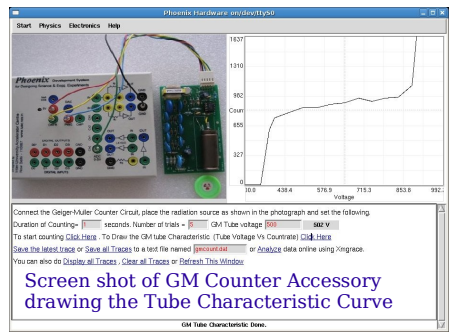
Dielectric constant of glass by measuring Capacitance



Diode V-I Characteristics



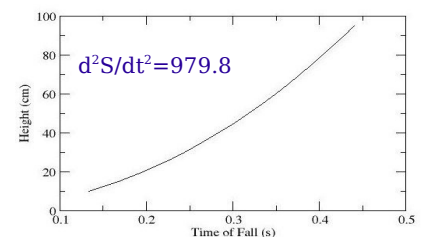
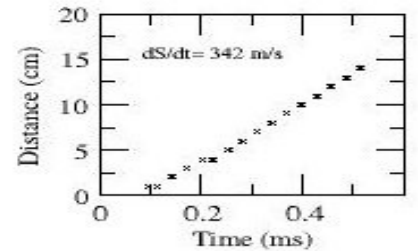
Alpha Spectrum of Natural Thorium using Phoenix Radiation Detection Accessory



Screen shot of GM Counter Accessory drawing the Tube Characteristic Curve



Velocity of Sound using Piezo Transmitter and Receiver



Acceleration due to gravity from Time of Free Fall.