

**Massachusetts Institute of Technology  
Physics Department**

**8.01X**

**Fall 2002**

**PROBLEM FOR EXPERIMENT FO: FALLING OBJECT**

**Handed out: September 20. Due: September 27 at 4 pm in 4-339B.**

**Experiment FO is difficult to build. There are a large number of steps in the building of the apparatus. You need to check-off your apparatus during the Lab hours.**

**Problem: Experiment FO**

1. Measure and record the value for the LVPS settings during the free falls. Did this value change during your measurements?
2. Set your apparatus so that the wire nut falls about 0.2m. Carefully measure and record the distance  $h$  your wire nut falls. Run five trials at this distance and record your voltage measurements for the charging of the capacitor. Calculate your average value for the charging voltage for these five trials. Repeat your five measurements for heights of about 0.15 m, 0.1 m and 0.05 m.
3. Calculate the average time of free fall associated with each distance. Repeat this for three different free fall distances. Include all your data.
4. Plot the square of the time (vertically) against height  $h$ . Use a best straight line fit (by eye or software) to find the slope. Use this value for the slope to calculate your experimental value of  $g$ .