Assignment #1:
Make a figure and caption suitable for publication

The heart of an experimental paper is the experimental data. This data is most effectively presented graphically. A figure should communicate at a minimum your experimental data and its reliability. A data point should be represented by a symbol. Each symbol should have an error bar associated with it—or, if all the points have the same error, then you can just put the error bar on one of them. The error bar should indicate the part of the error that will move one point with respect to the others—for example, random error associated with some noise in the system. If there is an overall error in the scale of the data (like if you are measuring length with a stretched tape measure), that should be noted in the caption or elsewhere. An error in overall scale is an example of what is called systematic error. In general, data points should not be simply connected by lines, although sometimes this is done to aid the eye. If possible, lines on a graph should be reserved for curves with which you fit data, or for plots of the predictions of a theory. Most of these rules are violated in actual papers, but I'm trying to instill good habits in you now.

The axes of a graph should be labeled. There should be tick marks on all four axes, though in general only two are labeled. There should be no grid lines through the figure. All of the labels should be large enough that they can be read when the figure is reduced to the size it will be in the journal. (For Physical Review Letters, minimum character height is 2 mm).

A program which I like to use is Kaleidagraph, but there are many other possibilities (Origin, Mathematica, Excel, Igor, . . .).

I have attached a paper from a recent issue of Physical Review Letters. You will not understand the paper, but it is useful to look at the figures for this assignment. Figures 2, b, d and f are of the type I would expect in this class. There are also some fancy color figures in the paper. They're pretty, and can be quite useful, but it is actually difficult to extract quantitative information from them, and to quantitatively compare them with a theoretical prediction. You probably won't make any of those in this class.