

# **A Hands on Introduction to NMR**

**22.920**

## **Lab and Problem Set #5**

### **2-D Imaging and Slice Selection**

1. Set up a selective  $1/2$  pulse and adjust the slice selection by looking at the projection. Using a 1 ms sinc pulse and a 20 % gradient, what is the selected slice width in cm. How would you calculate this knowing the gradient strength.
2. In order to use the above pulse in an imaging experiment we need to refocus the gradient evolution that occurred during the selective pulse. Do this with a gradient echo. What is the time required for the gradient refocusing pulse (both in theory and in reality). Why are these different.
3. The read encoding also uses a gradient echo. Ideally this should be set to the center of the acquisition time. Note that you can move the echo back and forth by changing either the length of the first gradient lobe, or the relative strengths of the two gradient lobes. Why do both of these work?
- 4 Normally we wish to have the field of view in the two dimensions equal. This can be adjusted by the strength of the phase encoding gradient without needing to readjust any of the previous settings. Why are the two image dimensions independently adjustable?