

## CW NMR Pre-Lab

1. Read Melissinos pp 251-283.
2. For a proton magnetic resonance experiment with signal at 15 MHz, and  $T=300\text{K}$ , what is the ratio of the population of the excited spin state to the ground spin state?
3. What is the magnetic moment of  $1\text{mm}^3$  of water under the conditions of (2)? What is the magnetic field produced by this magnetization at a distance of 1 mm, approximately? (Check Griffiths). This is the magnetic field you will be measuring. How big is it compared to the earth's magnetic field?
4. Why are the magnetic fields of the electromagnet and the magnetic field produced by the coil of the marginal oscillator at right angles?