

Electron Spin Resonance

1 Introduction

The physics of electron spin resonance is described in **Experiments in Modern Physics**, by A. C. Melissinos; Academic Press (1965). Our apparatus is much like that of Melissinos, except that we use a Gunn oscillator as a microwave source, and modulation coils are used to “wiggle” the magnetic field around its steady value. This makes the resonance easier to find. The sample is DPPH, as in the Melissinos book.

The experimenter should observe and record the resonance, and measure the DC magnetic field at the resonance. From that, calculate the g factor of the electron in the DPPH.

The magic tee and ancillary devices are illustrated in the following figure.

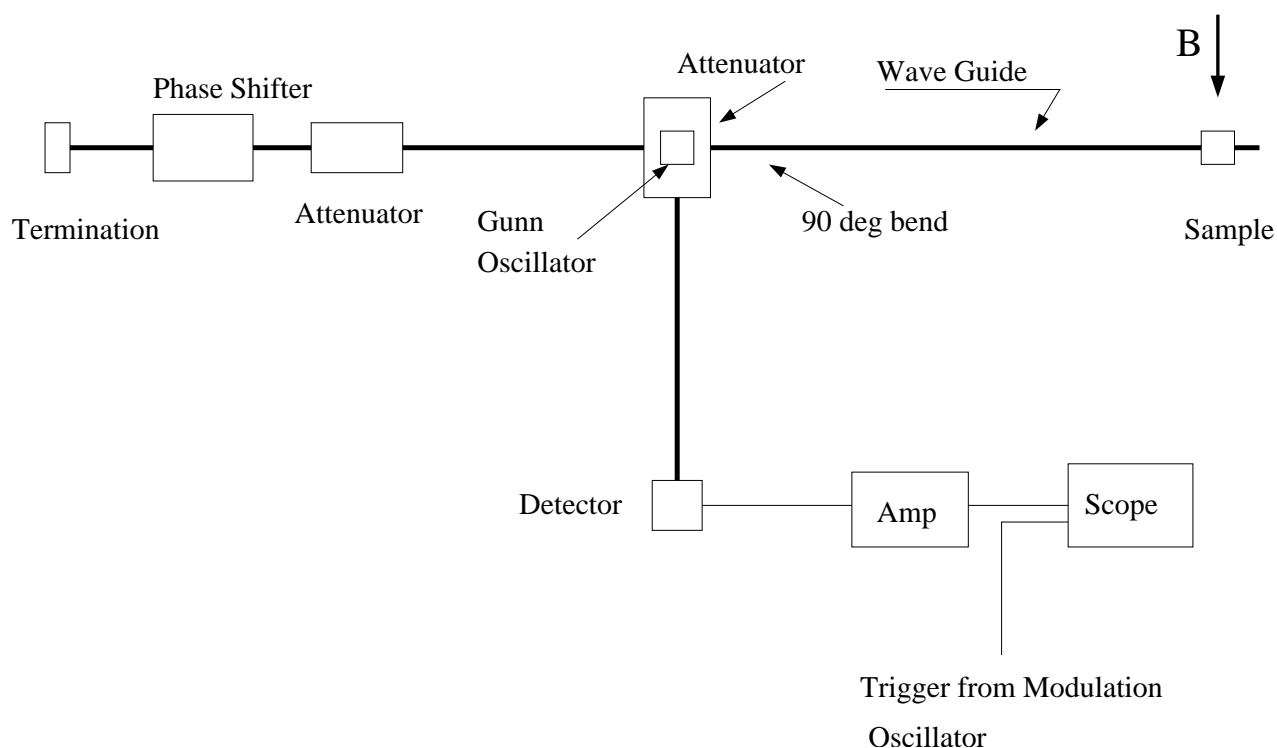


Figure 1: Apparatus for electron spin resonance experiment.

The modulation coils are driven by an amplified sinusoidal signal (use 20 – 40 Hz). The magnet power supply is controlled with an adjustable DC voltage. Schematics of these are:

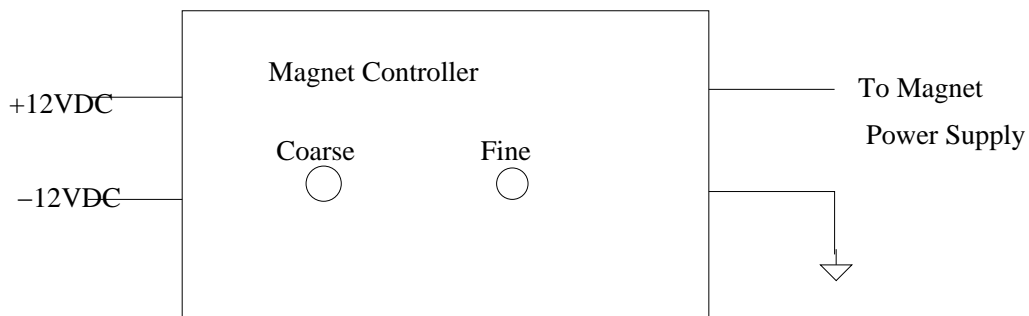
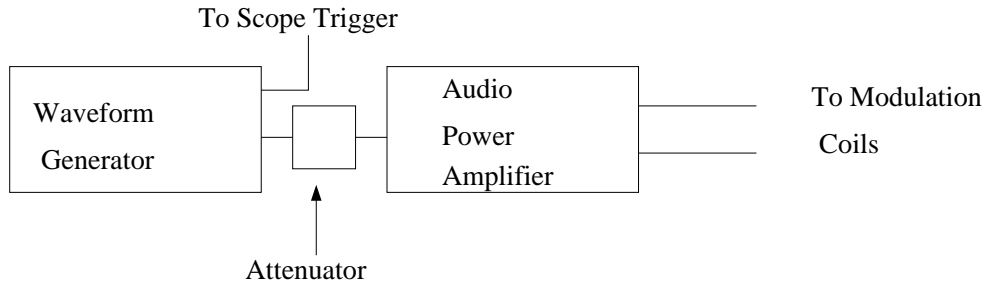


Figure 2: Modulation coil signal source, and magnet power supply controller for electron spin resonance experiment.