INTRODUCTION

The electron is an important particle used in the study of classical and quantum mechanics. The electron has applications in almost all areas of Physics from electrical circuits to the makeup of atoms. Its small size makes it an illusive particle to measure and significant details about the electron were only discovered in the past century.

The charge-to-mass ratio was first measured in 1897 by J. J. Thompson. His results proved that electrons were in fact finite particles with their own charge and mass, as opposed to some who believed electrons were waves traveling through a hard to detect ether. With the charge-to-mass ratio successfully measured, other calculations could be performed, such as the mass of the electron, which is difficult to measure due to it's small size.

Our experiment will consist of a beam of electrons being accelerated through a known potential from which the velocity can be calculated. A pair of Helmholtz coils will produce a known uniform magnetic field perpendicular to the electron beam. The magnetic field will deflect the electron beam in a circular path and the radius will be measured. The radius, accelerating potential, and the current within the Helmholtz coils can then be used to calculate the charge-to-mass ratio.

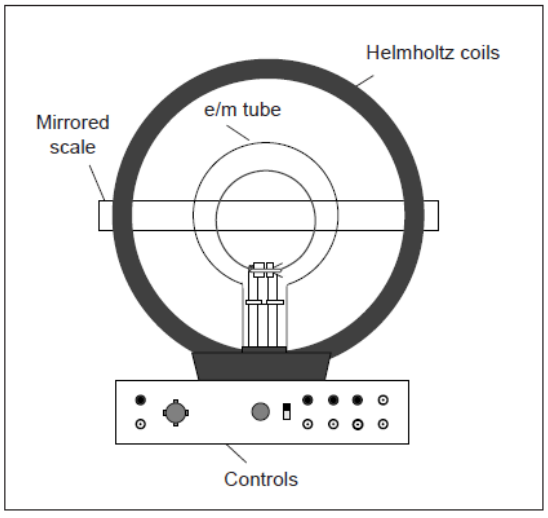

FIGURE 1: EXPERIMENTAL SETUP

We have reviewed this document and fully support its Content – Greg W

– Aric M

– Jeremy W