

P3.W – Electron Dynamics

1. Make a diagram and describe the motion of a charged particle in a uniform magnetic field when the particle is launched with a velocity perpendicular to the field. Write down the equation of the force on the particle due to the magnetic field. How is this force related to the centripetal force?
2. We will be using Helmholtz coils in lab. What is the equation that relates the current in coils of wire and the generated magnetic field? What is special about the magnetic field generated by Helmholtz coils? How will we test this theory in the lab?
3. Look at Equation 3.5 in the lab manual. Write the equation and define all the variables in it. What is the goal of the lab, i.e. what quantity will be determined in the experiments? Of the remaining variables, which can be measured and/or varied using the Helmholtz coils shown in Figure 3.4?