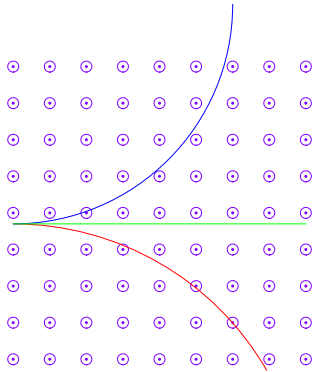
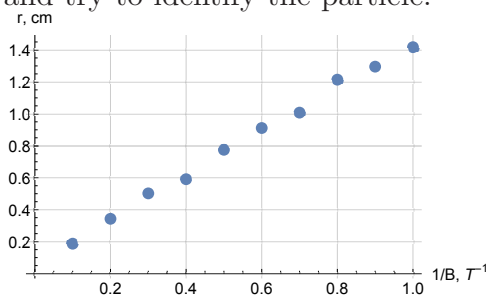


1. Identify the sign of charges



2. An electron moves at $v=3 \cdot 10^6 \text{ m/s}$ through a region in which there is a magnetic field of unspecified direction and magnitude $B=0.08 \text{ T}$ out of the page. (a) What is the largest possible magnitude of the acceleration of the electron due to the magnetic field and the direction of revolution? (b) what is the period of revolution? (c) What is the smallest acceleration?

3. The figure below shows the radius of revolution as a function of inverse magnetic field for a particle accelerated through a potential difference of 10 kV. Find q/m and try to identify the particle.



4. . An electron has velocity $\vec{v} = 3\hat{j} + 3\hat{k}$ in m/s . The magnetic field at its location is $\vec{B} = 4\hat{i} + 4\hat{j}$ in teslas. The electrons mass is $m_e = 9.11 \times 10^{-31} \text{ kg}$. Find the resulting acceleration.

5. What is the speed of a beam of electrons when the simultaneous influence of an electric field $E = 1.56 \times 10^4 \text{ V/m}$ and a magnetic field $B = 4.62 \times 10^3 \text{ T}$, with both fields normal to the beam and to each other, produces no deflection of the electrons?

6. A straight, vertical wire carries a current of 1.23 A downward in a region between the poles of a large superconducting electromagnet, where the magnetic field has a magnitude of $B = 0.557 \text{ T}$ and is horizontal (direction is "east").
What is the direction and magnitude of the magnetic force on a section of the wire with a length of 1.00 cm?

7. The plane of a rectangular loop of wire with a width of 5.0 cm and a height of 8.0 cm is parallel to a magnetic field of magnitude 0.17 T . The loop carries a current of 6 A. What torque acts on the loop?

8. A singly charged ion of ${}^7\text{Li}$ (an isotope of lithium) has a mass of $1.16 \times 10^{-26} \text{ kg}$. It is accelerated through a potential difference of 290 V and then enters a magnetic field with magnitude 0.730 T perpendicular to the path of the ion, out of the page.
 - (a) find the direction and radius of the revolution
 - (b) find the frequency of revolution