Magnetic lec 1 Dr. Rusul Abdul Ameer

The B-field

A charged particle that is moving with velocity **v** in a magnetic field **B** will feel a magnetic force **F**. Since the magnetic force always pulls sideways to the direction of motion, the particle moves in a circle.

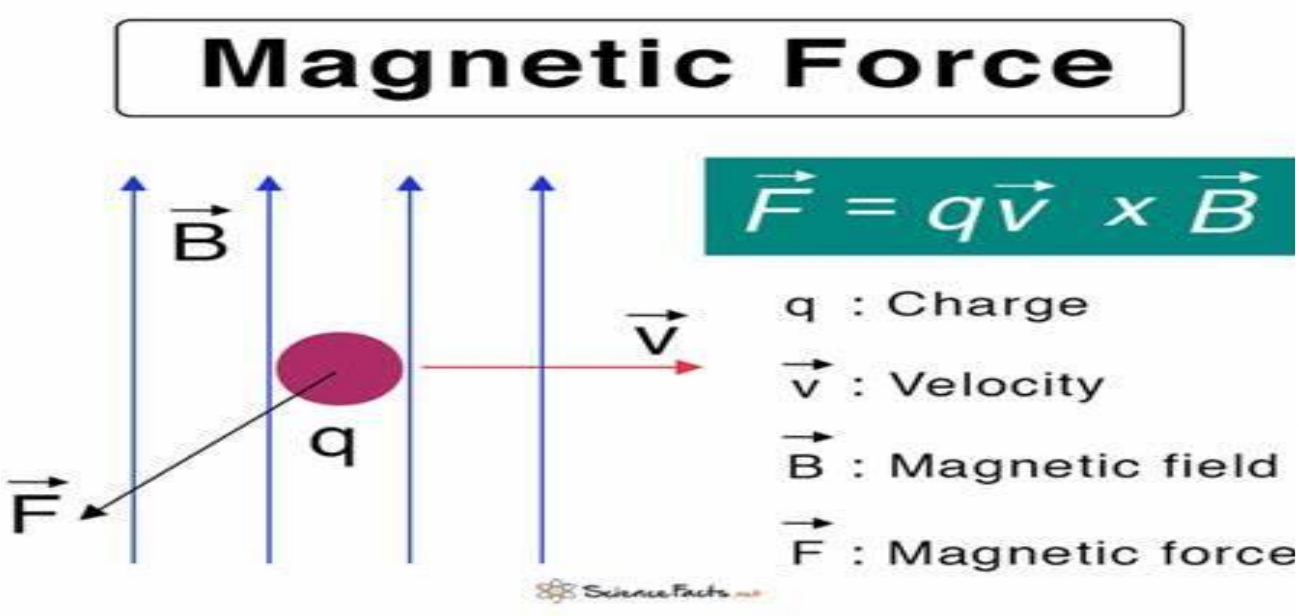
The magnetic field vector **B** at any point can be defined as the vector that, when used in the Lorentz force law, correctly predicts the force on a charged particle at that point

The first term in the Lorentz equation is from the theory of electrostatics, and says that a particle of charge *q* in an electric field **E** experiences an electric force: $Fe = q E$

The second term is the magnetic force

$$Fm = q (V \times B) = q V B \sin \theta$$

Using the definition of the cross product, the magnetic force can also be written as a scalar equation:



where F_{magnetic}, v, and B are the scalar magnitude of their respective vectors, and θ is the angle between the velocity of the particle and the magnetic field. The vector **B** is *defined* as the vector field necessary to make the Lorentz force law correctly describe the motion of a charged particle.