PHYSICS | Magnetism

Magnetic Field of a Circular Loop Current

General Aim

Determination of magnetic field of a circular current loop along its axis.

Method

Inducing of magnetic field by electric current

Learning Objectives (ILOs)

- Enumerates the factors affecting the magnetic field due to circular coil carrying current.
- Set up an experiment to study the magnetic field produced by current passing through a circular coil along its axis.

Theoretical Background/Context

A current passing through wire produces a magnetic field in the region around the conductor that can be calculated using Biot-Savart's law.

When a circular coil of radius r, carrying a current I. At a point P along the axis of the coil a distance z from its center. the field is given by

$$B = n\mu_0 i \frac{R^2}{(R^2 - Z^2)^{3/2}}$$

Principle of Work

Studying the variation of magnetic field produced by a circular turn carrying current I, at different points along the axis of the coil.