Experiment 9: Biot-Savart Law with Helmholtz Coil

Introduction

In this lab we will study the magnetic fields of circular current loops using the Biot-Savart law. The Biot-Savart Law states the magnetic field \( B \) from a wire length \( ds \), carrying a steady current \( I \), is given by

\[
B = \frac{\mu_0}{4\pi} \int_{C} \frac{I ds}{r^3}
\]

where

- \( \mu_0 \) is the permeability of free space.
- \( r \) is the distance from the current element to the point where the field is measured.

The Biot-Savart Law is a fundamental law in electromagnetism and is used to calculate magnetic fields due to currents. It is named after Henri Biot and Jean-Baptiste Savart, who independently discovered it in 1820. The law states that the magnetic field is directly proportional to the current and inversely proportional to the square of the distance from the current element.

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1122352 Experiment 9 Biot Savart Law With Helmholtz Coil french in 1836 and was the co-originator of the biot-savart law, along with jean-baptiste biot.

Biot Savart's Law in vector form: \( dB = \frac{\mu_0}{4\pi} I dl \times r \), where \( dl \) is the current element and \( r \) is the distance from the current element to the point of interest. The direction of the magnetic field is determined by the Right Hand Screw Rule.

Magnetism: Oersted's Experiment, Rules, Biot Savart law ...

As mentioned earlier, the Biot-Savart law deals with a current element. A current element is like a magnetic element in that it is the current multiplied by distance. However, a current element does not exist in a single point.

PhysicsLAB: A Guide to Biot-Savart Law

Lab 5: The Biot-Savart law - magnetic fields due to current carrying coils 1 Introduction Coulomb's law describes the electric field of a point.

Lab 5: The Biot-Savart law - magnetic fields due to current ...

In physics, specifically electromagnetism, the Biot–Savart Law \( (I \ b \ i: \ \phi \ s \ a \ \nu \ a: r / \ o / \ b j \ \phi \ s \ a \ \nu \ a: r / ) \) is an equation describing the magnetic field generated by a constant electric current.

Biot-Savart law - Wikipedia

Module 3 : MAGNETIC FIELD Lecture 15 : Biot- Savarts' Law Objectives In this lecture you will learn the following Study Biot-Savart's law Calculate magnetic field of induction due to some simple current configurations.

Module 3 : MAGNETIC FIELD Lecture 15 : Biot- Savarts' Law

The results of the experiments are summarized as Biot-Savart law. Biot and Savart, the magnetic...
induction dB at P due to the element of length dl is (i) directly proportional to the current (I)

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