TARANG SCIENTIFIC INSTRUMENTS

THE WAY TOWARDS PRACTICAL SCIENCE

FIELD INSIDE AN OPEN COIL

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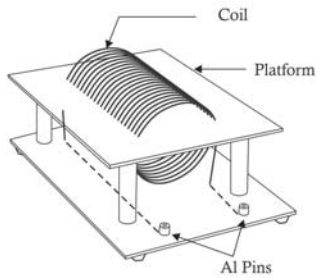
FIELD INSIDE AN OPEN COIL

Explore the magnetic field inside a current carrying coil using plotting compasses.

Assembly :
Consists of a coil made from insulated copper wire of 19 gauge. The coil has 21 turns and is 60mm in dia. This coil is spiraled through the holes made on a 2 mm acrylic plate. This plate with coil is again fixed on another 3 mm acrylic plate using 4 acrylic rods (of 10mm dia & 45mm length) as shown in the diagram. The ends of the coil are connected to the two aluminium pins which are in turn fixed on the base acrylic plate as shown. These pins are used to pass current through the coil. 10 plotting compasses are part of the kit. A sample plastic sheet of the platform size is also part of the kit.



Plotting Compasses

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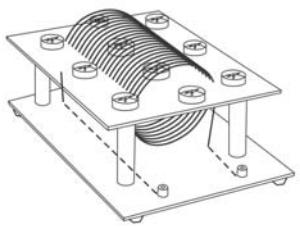
To do and Observe :

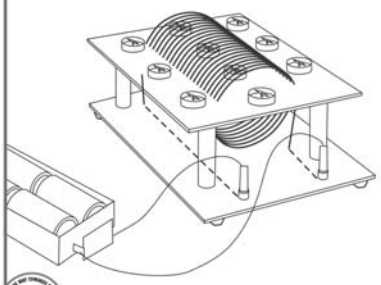


Step 1: Place all the plotting compasses on the platform inside the and around the coil as shown in the diagram.

Step 2: Now arrange all the compasses such that the needles align along the North and south directions.

Step 3: Using 6V DC supply (4 cell holder box) pass current through the coil as shown in fig.

observe the direction of the alignment of the needle inside and outside the coil. You will see that the field inside the coil is in the opposite direction to the field outside the coil.



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Step 4: Now reverse the direction of current through the coil and observe in the direction of the field.

What is going on ?:
When current flows through the coil it produces magnetic field. The magnetic field produced inside and outside the coil is indicated by alignment of the needles
The magnetic filed lines are straight inside the coil and curved outside the coil.

Followup :
Using the given sample plastic sheet, cut a similar one in paper. Place this paper on the coil platform, inside and around the coil. Then place compasses above the paper as shown in step 1. After passing the current through the coil mark all the north points of the compasses. Remove the paper and trace the lines of magnetic field.

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