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NORTH SOUTH UNIVERSITY

Department of Mathematics & Physics

Experimental Physics

PHY-108L

Name of the Experiment: Magnetic Fields due to a Bar Magnet

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Experiments Name: Magnetics Fields Due to a Bar Magnet.

Objective:

- To draw and analyze the magnetic field lines of a bar magnet.

Apparatus:

- Two bar mgnets
- One compass
- A3 white paper 2x
- Pencil, eraser, cutter.

Theory:

The magnetic field near a bar magnet can be represented by magnetic field lines. These field lines pass through the magnet and form closed loops around the magnet. The closed field lines enter one end of a magnet and exit the other end. The end or the magnet from

which magnetic field lines emerge is called the north pole and the other end, where the field lines enter, is called the south pole.

Earth has a magnetic field that is produced in its core by still unknown mechanism. On Earth's surface, the magnetic field can be detected with a compass which is essentially a slender bar magnet on a low friction pivot. The bar magnet or the magnetic needle turns because its north-pole end is attracted toward the south pole of the Earth's magnet located near the Arctic region of the Earth. Thus, the south pole of the Earth's magnetic field is located near the Northern Hemisphere, which is known as the geomagnetic north pole. In the Southern Hemisphere, the magnetic field lines point out of Earth and away from the Antarctic that is away from Earth's geomagnetic south pole.

Magnetic Field Drawing:

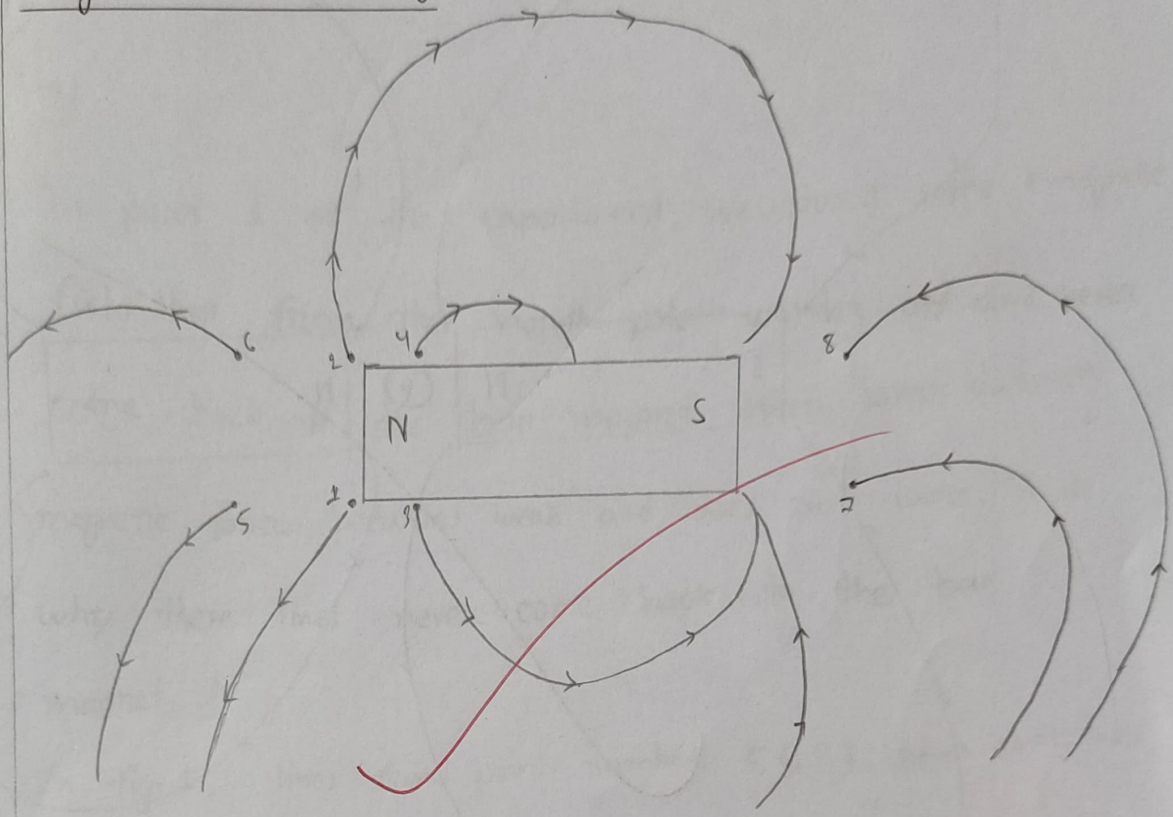


Fig - 1

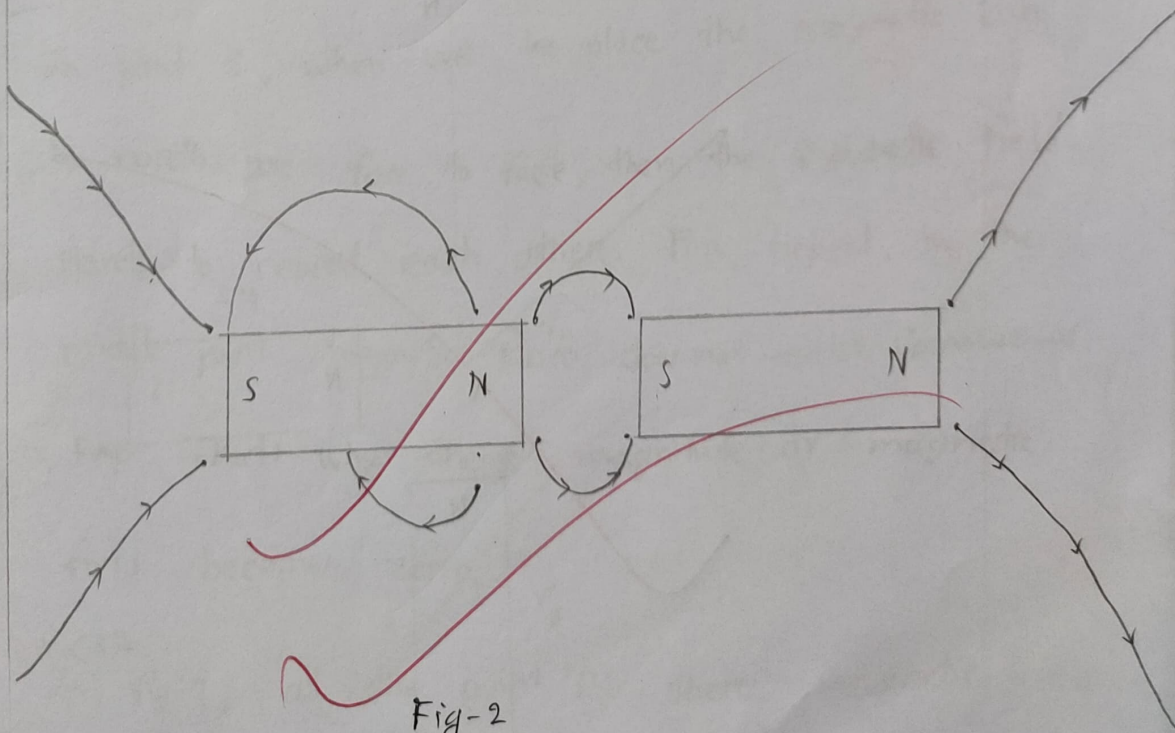


Fig - 2

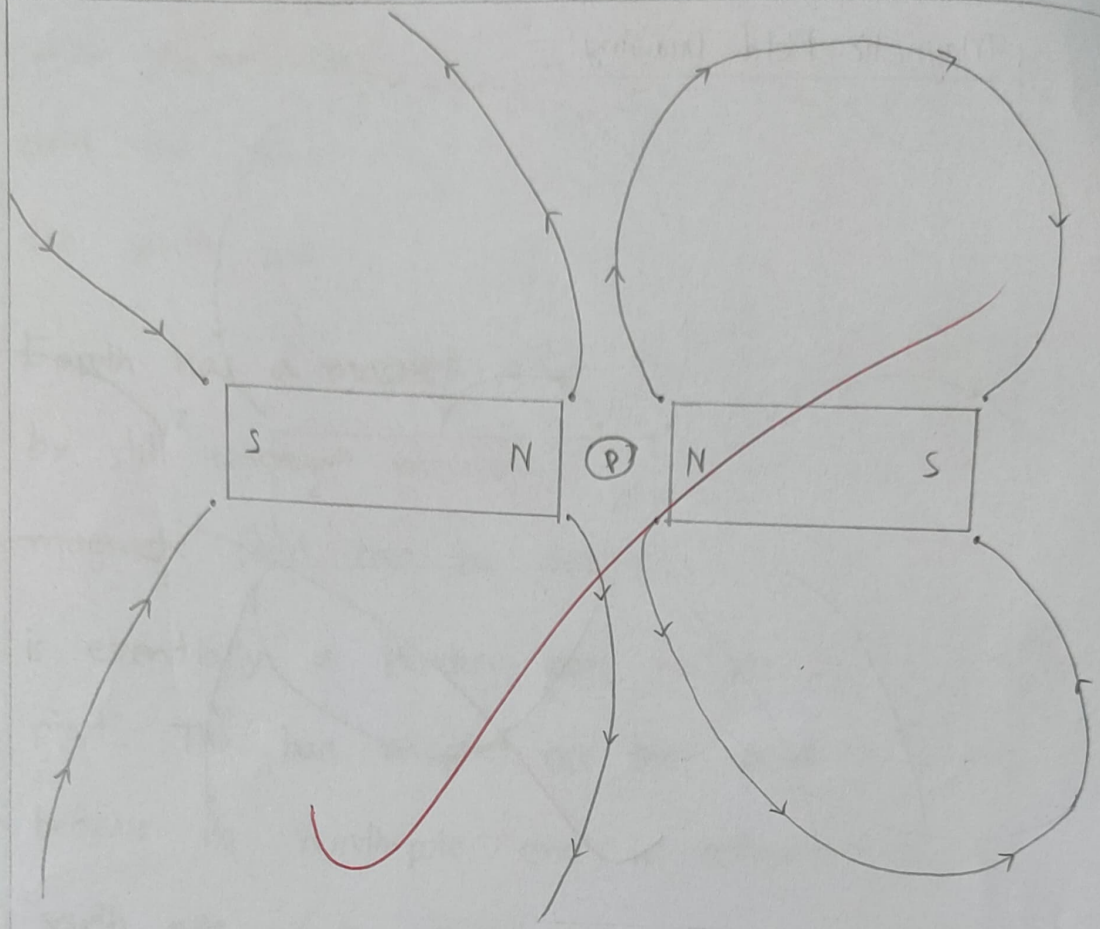
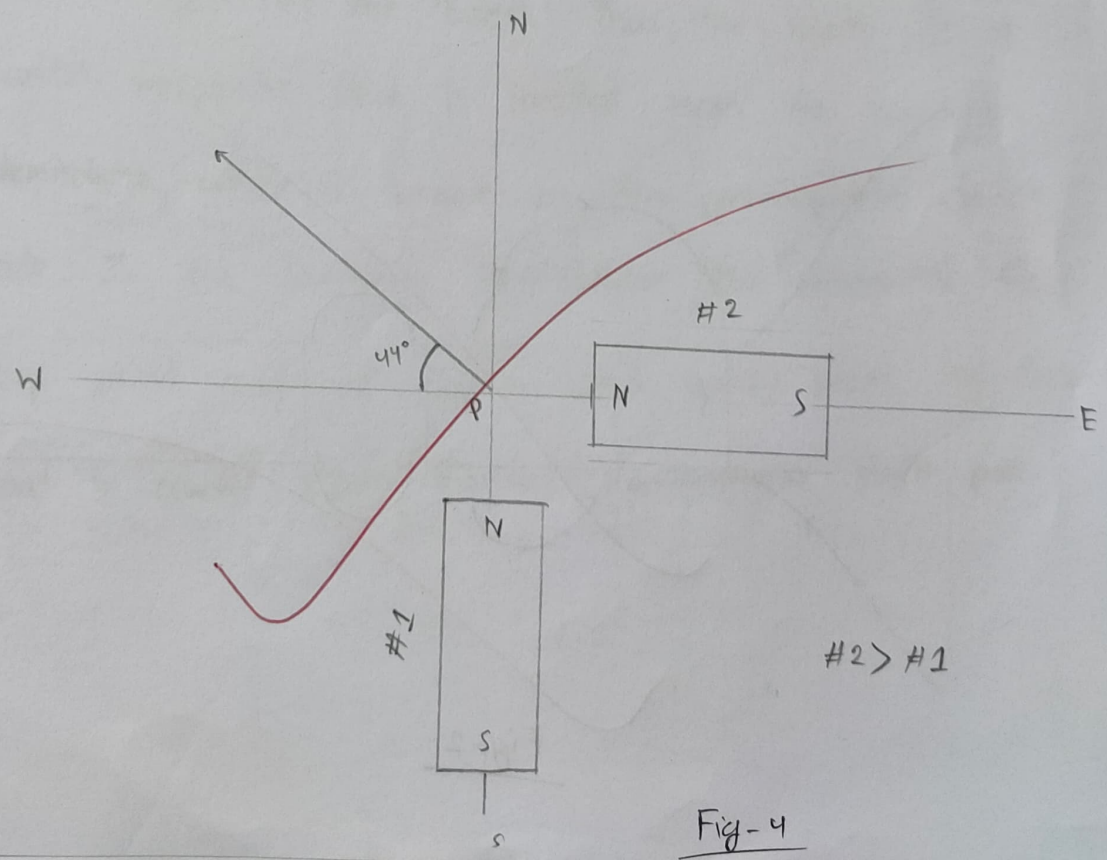


Fig-3



#2 > #1

Fig-4

Questions and Answers:

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In part 1 of the experiment, we found some magnetic field lines from the north pole wander off and never come back to the bar magnet. After some distance magnetic force becames weak and does not work. That's why these lines never come back to the bar magnet.

In fig-1, lines from point number 5, 6, 7, 8 never comes back.

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In part 2, when we ~~kee~~ place the magnetic bar by north pole face to face, then the magnetic field starts to repeal each other. For repeal, in the middle point magnetic force does not exist. ~~because of rep~~ That's why there magnitude or magnetic field becomes zero.

In fig-3, at the point 'P' there, magnetic field is zero.

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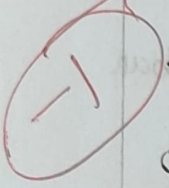
When two bar magnet placed at right angles to one another, a compass is placed at point P in fig-4. the first bar attract the south pole of the compas and second bar also attract the south pole towards it's north pole. For two directional vector force, needle stand to point the ~~digar~~ diagonal of two forces. And which streanth is higher than others, needle move towards that bar.



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From experiment we found that the needle of the compas ~~point~~ makes an angle with west side is 44°. As it is not 45°, that's means streanth of two magnetic bar is not equal. As the angle is less than 45°, that means south pole of compas moved towards the second bar magnet. That's mean, second bar magnet has the higher streangth.

Results :

After the experiments we found some line wander from north pole but never come back. And most of the ~~p~~ magnetic field lines ~~co~~ wander from north pole and come back to the south pole. Also we found that, the second magnetic bar have the higher streanth.

Discussion:

From this experiment, we analyze the magnetic field and learnt about the characteristic of magnetic field liner. How these lines wander and comes back. Also, we learnn to ~~identify~~ compare the streanth of two bar magnet. And most important thing, if we place tw bar magnet facing north pole each other. In the middle point there became an empty space, where no magnetic force exist as well as magnetic field. Because the p repeal each other. In this experiment we don't face any problem. We learn a lot about the magnetic field lines.