Investigating the Effect of the Magnetic Field From a Wire on a Compass

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Supported by the NSF under grant number DUE 04-26754

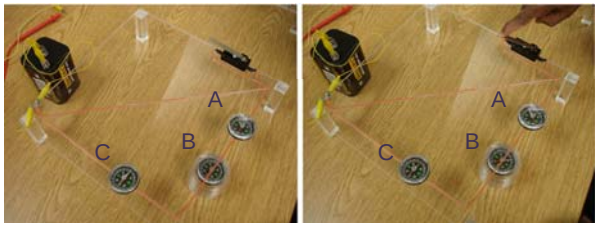
Applications of the Apparatus

1. To observe the concept of resonance in the context of magnetic fields.
2. To investigate the magnetic field around a wire and the superposition of magnetic fields.

To Observe Resonance

1. Remove the bar magnet from the apparatus.
2. Place a compass above a wire such that the needle is parallel to the wire.
3. Tap and release the switch. Observe the oscillation of the compass needle to get a feel for its natural frequency (typically 1-2 Hz).
4. Tap the switch at the natural frequency you observed.

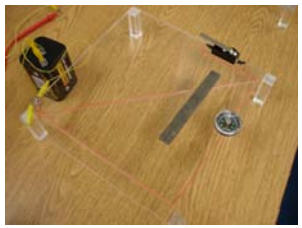
Compass Deflection



Open Circuit Closed Circuit

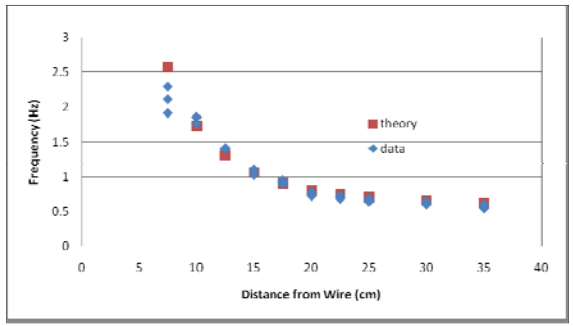
A. Above wire, initial direction parallel to wire
B. Below wire, initial direction parallel to wire
C. Above wire, initial direction perpendicular to wire

Resonance Data



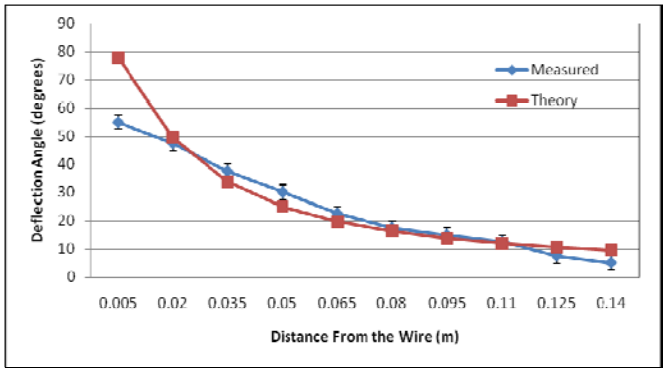
Data were taken with a bar magnet placed parallel to the wire as shown in the picture to the left.

The distance between the bar magnet and the wire was varied.



Deflection Data

The data were taken as a function of the height of the compass above the wire. The deflection angle is determined by a superposition of the field due to the wire and the Earth's magnetic field.



For more details, see my poster on Monday night!
PST1A-10