

# Lab 6: Magnetic Fields

Due Date: May 03

## Background

During your interstellar voyage to Kepler-186f, one of your crew members smacks their noggin during a game of *Pokémon Go* gone horribly wrong. You quickly cobble together a simple MRI machine to assess the severity of the injury.

## Challenge

Devise an apparatus that will generate magnetic fields of approximately 1.0 mT, 1.25 mT, and 1.5 mT. Compare your results to those expected from theoretical considerations.

## Available materials:

multimeter & probes  
*Logger Pro* software  
metal slinky

rheostat  
wires, voltage source, clips  
ruler

$B$  field sensor  
Vernier high current sensor  
tape

## Technical details

Before attempting to measure a magnetic field, familiarize yourself with the equipment and software. For example, measure the current through the slinky by using both a multimeter and Ohm's Law.

## Lab report considerations

Use the dataset to report both an average *error* on the  $B$  field and its *uncertainty*. Your lab report must provide an example circuit diagram. A photo of the lab setup must also be included.

## Teacher approval of your game plan

Please get either Prof. Dale or a TA to approve your experimental and theoretical plans before grabbing equipment. These approvals are worth 4% of the lab grade and will help to promote a successful experience.

