

## Lab 8: Electromagnetic Induction

### Background

You were wondering how your electric toothbrush is charged. Then you heard that cellphones can be charged remotely at far distance from a source. You decided to get your hands dirty and find the truth yourself.

### Challenge

Devise an apparatus that will generate current without connecting to a battery. It is OK if you have only qualitative results, but it would be even better if your device can lead to quantitative results. Compare your results to those expected from theoretical considerations.

### Available materials:

multimeter & probes

Logger Pro software

coils

rheostat

wires, voltage source, clips

ruler/timer

$B$  field sensor

Vernier high current sensor

iron rods

### Technical details

Familiarize yourself with the equipment and software. Think about your methods to measure the variables you can control like  $B$  field, changes and/or motion as well as the induced current that you are seeking.

### Lab report considerations

Use the dataset to report both the average *errors* on the  $B$  field, speed, induced current and their *uncertainties*.

Your lab report must provide an example circuit diagram.

A photo, sketch, or diagram of the lab setup must also be included.

### Teacher signatures

Please get your TA to sign off on your experimental plan, the pre-lab equipment practice, and the completion of the lab. These signatures will help to promote a successful experience.

