

Experiment E: Electromagnetism (age 14 – 16) – Induction

Experiment Objective:

The demonstration experiment is a useful aid to students learning of the principles of electromagnetic induction.

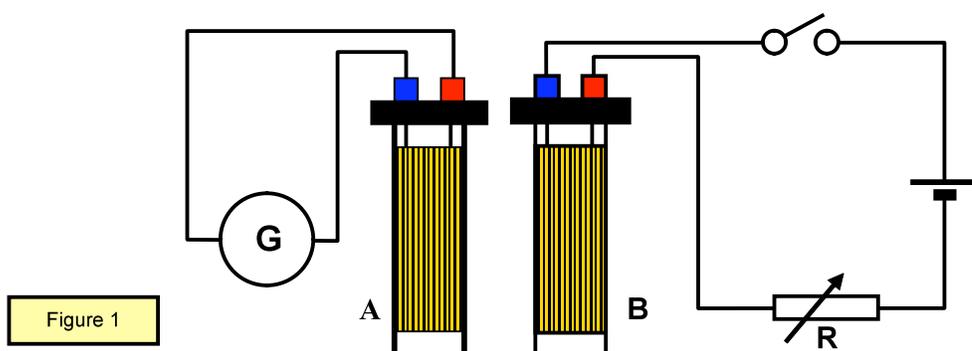
Experiment:

If magnetic flux through a coil is altered then an e.m.f. will be generated in the coil. This effect was first observed and explained by Ampere and Faraday between 1825 and 1831. Faraday discovered that an e.m.f. could be generated by either:

- moving the coil or the source of flux relative to each other or by
- changing the magnitude of the source of magnetic flux in some way.

Note that the e.m.f. is only produced while the flux is changing.

For example, consider two coils as shown in Figure 1.



Coil A is connected to a galvanometer and coil B is connected to a battery and has direct current flowing through it. Coil A is within the magnetic field produced by B and an e.m.f. can be produced in A by moving the coils relative to each other or by changing the size of the current in B. This can be done by using the rheostat R, switching the current on or off, or (c) using an a.c. supply for B. (An e.m.f. could also be produced in A by replacing B with a permanent magnet and moving this relative to A.)

Resource materials needed:

Two coils; galvanometer; rheostat; switch; battery.

Expected outcomes:

Student learning of the principles of electromagnetic induction.

Linked Resources

www.twothirtyvolts.org

Electromagnetic Induction Student Revision Notes

Electromagnetic Induction Revision Quiz

Electromagnetic Induction Lesson Plan