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Faraday's Law Low-Cost Experiment Without Permanent Magnets

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ABSTRACT

Electromagnetism is a complex topic for students at different educational levels. Perhaps one of the reasons for this is that students are unable to visualize the forces, fields, currents, and other electromagnetism key concepts that are related to the topic. Most teachers address this difficulty by including the use of some technological instruments such as virtual simulations, as well as hands-on experiments. This paper describes a simple experiment related to electromagnetic induction. The central principle of electromagnetic induction is Faraday's law. Michael Faraday first stated his law in 1832 as "if a terminated wire moves so as to cut a magnetic curve, a power is called into action which tends to urge an electric current through it." Nowadays, physicists use modern language to describe Faraday's law of induction: "the induced emf in a closed loop equals the negative of the time rate of change of magnetic flux through the loop"; see Eq. (1):

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