Contribution ID: **15** Type: **Workshop**

Classroom Experimentation –Arduino Projects to Teach Electromagnetism

Friday 8 September 2023 15:30 (1h 20m)

Using the Arduino and various relatively inexpensive sensors that can be connected to it, teachers and students can perform a wide range of experiments, from simple qualitative experiments to research-level problems. Investigating the conductivity of liquids [1] and the magnetic field of a solenoid [2] using Arduino can be an exciting and useful task for both general high school students and those attending advanced physics classes.
Our workshop aims to provide an engaging and effective approach to teaching electromagnetism in high school. Following a brief overview of the methodology, we will invite colleagues to participate in two physics projects: measuring the conductance of liquid with a developed measurement setup: the use of Arduino-controlled H-bridge provides with alternate current in order to avoid electrolysis. It continuously switches the polarity of voltage; thus, it changes the direction of the voltage supplied. In our second project, participants have the opportunity to investigate the magnetic field of a solenoid using Arduino-controlled Hall-sensor.
We will provide a simple setup (Fig.1.) and easy-to-use code for operating the sensors and devices, along with a worksheet designed to support colleagues in their work enabling differentiation between students with different skills and motivation.
For data acquisition participants can rely on Arduino and Data Streamer [3], and for data analysis we offer different ways –only qualitative explanation for general physics classes and quantitative description (e.g., function plotting) for advanced students.

Contribution categories - primary focus

Primary and secondary school

Contribution categories - type

Application (shared experience, activity suggestions)

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Session Classification: Presentations/Workshops