Enhanced low current, voltage, and power dissipation measurements via Arduino Uno microcontroller with modified commercially available sensors.[1] MEGHAN TANNER, RYAN ECKEL, INDRAJITH SENEVI-RATHNE, Lock Haven University Department of Geology Physics — The versatility, simplicity, and robustness of Arduino microcontroller architecture have won a huge following with increasingly serious engineering and physical science applications. Arduino microcontroller environment coupled with commercially available sensors have been used to systematically measure, record, and analyze low currents, low voltages and corresponding dissipated power for assessing secondary physical properties in a diverse array of engineering systems. Setup was assembled via breadboard, wire, and simple soldering with an Arduino Uno with ATmega328P microcontroller connected to a PC. The microcontroller was programmed with Arduino Software while the bootloader was used to upload the code. Commercial Hall effect current sensor modules ACS712 and INA169 current shunt monitor was used to measure corresponding low to ultra-low currents and voltages. Stable measurement data was obtained via sensors and compared with corresponding oscilloscope measurements to assess reliability and uncertainty. Sensor breakout boards were modified to enhance the sensitivity of the measurements and to expand the applicability. Discussion of these measurements will focus on capabilities, capacities and limitations of the systems with examples of possible applications.

[1]Lock Haven Nanotechnology Program

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