

2-28-2014

Improved Conductivity Measurements of Highly Disordered Insulating Materials

Phil Lundgreen
Utah State University

Justin Dekany
Utah State University

JR Dennison
Utah State University

Follow this and additional works at: https://digitalcommons.usu.edu/mp_presentations

 Part of the [Condensed Matter Physics Commons](#)

Recommended Citation

Phillip Lundgreen, Justin Dekany and, JR Dennison, "Improved Conductivity Measurements of Highly Disordered Insulating Materials," Utah Conference on Undergraduate Research (UCUR) Meeting, Brigham Young University, Provo, UT, February, 28, 2014.

This Presentation is brought to you for free and open access by the Materials Physics at DigitalCommons@USU. It has been accepted for inclusion in Presentations by an authorized administrator of DigitalCommons@USU. For more information, please contact rebecca.nelson@usu.edu.





Spring 2014 Utah Conference for
Undergraduate Researchers

*BYU University
Provo, Ut
February 28, 2014*

***Methods to Decrease Error in Conductivity Measurements of
Highly Disordered Materials***

Phil Lundgreen, Justin Dekany and JR Dennison

Physics Department, Utah State University

Abstract

By developing a low-noise, high-voltage battery power supply, system noise has been reduced, increasing accuracy of conductivity measurements of highly disordered insulating materials. The method involves a simple parallel plate capacitor setup with the sample sandwiched between electrodes, a voltage potential applied to one electrode, and a measurement device applied to the back electrode measuring current. Previous methods involved use of a commercial power supply with a claimed low noise and high linearity, but with a low AC output ripple. At high voltages (1000 V), however, the noise became apparent in the readings and an unacceptable uncertainty was introduced in our precision conductivity measurements. Through the use of a stable dc battery high-voltage power supply, we were able to reduce noise in current measurements and achieve a more accurate measurement of conductivity for various samples.