Abstract Submitted
for the OSS16 Meeting of
The American Physical Society

Development of an Apparatus for Measuring the Nernst Effect in Semiconductors[1] JEFFREY S. DYCK, CHRISTOPHER J. WRENN, Department of Physics, John Carroll University — An apparatus for measuring the Nernst Effect in bar-shaped semiconductor samples was designed. The Nernst Effect is a key thermoelectric effect used to understand transport properties of materials. Measurement of this phenomenon is part of ongoing research to understand Bi_2Te_3-based nanostructured materials, specifically, characterization of the details of the charge carrier scattering mechanisms in these materials. A special sample mount was designed to accommodate semiconductor samples that are only a few millimeters in size, and that can position the sample perpendicular to both an applied magnetic field and an imposed temperature gradient, as required to measure the effect. Further, the entire measurement takes place inside a small cryostat enclosure, enabling measurements from room temperature down to 7 K. The apparatus was used to measure the Nernst Coefficient in a sample of germanium as a proof of concept since such values are easily found in literature. The measurement yielded a Nernst Coefficient of -316 $\mu V/KT$ at room temperature. This value is within 5% of the value from literature, confirming that the apparatus works as hoped.

[1]We gratefully acknowledge financial support from the Davenport Fund of the Department of Physics at JCU.

Jeffrey S. Dyck
Department of Physics, John Carroll University

Date submitted: 18 Mar 2016 Electronic form version 1.4