Abstract Submitted
for the TS4CF08 Meeting of
The American Physical Society

Micromachined thermal isolation devices for measuring in-plane thermal conductivity of thin films from 77 to 325 K AZURE AVERY, RUBINA SULTAN, BARRY ZINK, University of Denver — Thin films and nanostructures are some of the potential materials being studied for improved thermoelectric properties. Thermal properties of these thin films can often differ from those of bulk materials. Although there are several well established techniques for measuring cross plane thermal conductivity $k_{\perp}$, measuring in plane thermal conductivity $k_{\parallel}$ is often difficult. We describe our technique to measure $k_{\parallel}$ of thin films from 77 K to 325 K using micromachined thermal isolation structures. The geometry of the structures dramatically reduces the contribution of radiation heating to thermal conductance which often complicates steady state measurements at temperatures above 100 K. We will present our $k_{\parallel}$ measurements for 500 nm thick amorphous silicon nitride (a-Si-N) and 200 nm thick Molybdenum (Mo) thin film samples. We will compare the Mo measurements to those calculated for Mo using the Wiedemann-Franz law to establish the validity of our measurement technique. Finally, we will discuss how our technique can be applied to measurements of thermal transport in ferromagnetic thin films.

Azure Avery
University of Denver

Date submitted: 22 Sep 2008 Electronic form version 1.4