Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Micro- and nanomachined tools for measuring thermopower and in-plane thermal conductivity of thermoelectric thin films AZURE AVERY, RUBINA SULTAN, GREG STIEHL, BARRY ZINK, University of Denver — Many of the potential next-generation thermoelectric materials being studied are either thin films or nanostructures that are expected to have anisotropic properties. Techniques such as the 3ω method and picosecond thermoreflectance allow accurate measurements of $k_\perp$ at temperatures relevant to thermoelectrics, but measuring $k_\parallel$ is often difficult. In this talk we discuss our efforts to design and demonstrate accurate measurements of $k_\parallel$ of thin films from $77 - 475$ K using micro- and nanomachined thermal isolation platforms. Using thin-film structures to support the thin-film sample reduces background contributions, and careful control of the geometry keeps radiation errors small. We will discuss the optimization and micromachining of the measurement platforms and their application for studying the growth and characteristics of our first doped amorphous thin films. We will present our first tests of the devices on materials with established thermal properties. Finally, we will discuss the use of these measurement platforms to determine k and ZT for doped amorphous silicon thin films.

Azure Avery
University of Denver

Date submitted: 27 Nov 2007 Electronic form version 1.4