

PPDO-092

Electron and Phonon Contribution to Heat Dissipation in Data Storage Media

Sreekant Narumanchi

Research Scientist, Institute for Complex Engineered Systems, Carnegie Mellon University, Pittsburgh, PA

Marcela Madrid

Senior Scientific Specialist, Pittsburgh Supercomputing Center, Pittsburgh, PA

Industry Participant

Dr. Yiao-Tee Hsia

Director, Mechanical Integration and Tribology, Seagate Research, Pittsburgh PA

Abstract

An important goal of data storage industries is to increase the aerial density of the recorded data. As a consequence, the data bits become smaller and closer together. Heat dissipation and concentration of heat in very small areas have become important issues that, unless addressed, can limit further advances in data storage technology. In the presence of hotspots and in very thin metallic media, the contributions of both electrons and phonons to thermal transport can no longer be neglected. The objective of this research is to further the understanding of heat transport by electrons and phonons in thin metallic films. This project proposes to solve the coupled electron-phonon Boltzmann transport equations, and apply this methodology to the study of concentrated heat sources (hotspots) in magnetic media.