Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Thermoelectric Effects in Simulations of Phase Change Memory Mushroom Cells AZER FARACLAS, GOKHAN BAKAN, ALI GOKIRMAK, HELENA SILVA, University of Connecticut — Phase change memory is a potential candidate for the future of high-speed non-volatile memory, however significant improvements in cell design is crucial for its success in the mainstream market. Due to the asymmetric geometry of phase change mushroom cells and the high temperature gradients generated, thermoelectric effects play a key role in determining energy consumption, cell performance, and reliability. In this study, rotationally symmetric 2D finite element simulations using COMSOL Multiphysics are implemented for GeSbTe (GST). Temperature dependent material parameters (electrical conductivity, thermal conductivity, heat capacity, and Seebeck coefficient) are included in the model for accuracy. Switching the direction of current shows a large change in peak molten volume within the cell, as well as current and power consumption.

Azer Faraclas
University of Connecticut

Date submitted: 11 Nov 2011 Electronic form version 1.4