Abstract Submitted
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**The effect of thermoelectric contributions in switching dynamics and resistance drift of Phase Change Memory devices**[1] EGECAN COGULU, IBRAHIM CINAR, AISHA GOKCE, Bogazici University, BARRY STIPE, JORDAN KATINE, HGST, A Western Digital Company, GULEN AKTAS, OZHAN OZATAY, Bogazici University — Phase Change Memory (PCM) is a promising non-volatile data storage technology that allows for multiple-bit-per-cell operation due to its high contrast in the resistance levels between 0 and 1 logic states. To visualize the complex nature and the stability of the switching dynamics in PCM devices with or without an intermediate resistance state, 3D finite element simulations were carried out in cells with a single Ge2Sb2Te5(GST) layer incorporating temperature and phase dependent thermal and electrical conductivities as well as thermoelectric effects. We compare our results with the experimental data and with our previous simulations to understand the influence of the thermo-electric effect on the phase switching. In addition, we integrated drift equations into our multiphysics simulation to get a complete picture of structural relaxation in time in amorphous and mixed phases of the GST. We compare our results with experimental resistance drift measurements to calculate a decay rate for defect concentration. Our results yield a complete picture of switching dynamics and post-switching resistance drift phenomena on the microscopic scale.

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