

## Masterthesis Summary

# Modeling and Simulation of Nanomagnetic Logic in Cadence Virtuoso®

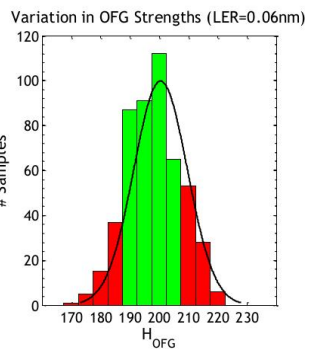
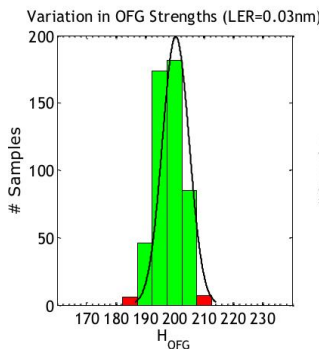
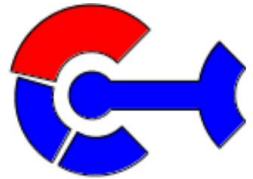
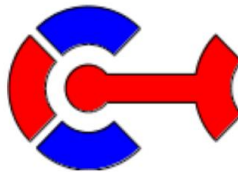
### Abstract

As circuits designed in Nanomagnetic logic (NML) increase in complexity, the need to simulate them in an efficient compact manner also increases. A novel compact model for NML circuits using the industry standard circuit simulator Cadence Virtuoso is described in this thesis. This model provides many features not present in any of the few existing compact models in the literature. The model is fully customizable allowing a researcher to

easily change the underlying physics simulated to better analyze their interests. Using Virtuoso's built-in simulation tools, Monte Carlo analysis can be performed on NML. To validate that this model can simulate complex logic, non-trivial circuits such as a multiplier and a vector multiplier are designed and simulated. Additionally, the implementation of a complex real-world application, JPEG decoding, is described using NML.

### Number One Result

The implementation of a customizable compact simulator for NML in Cadence Virtuoso that can simulate the logic with varying levels of complexity from basic logical analysis to full statistical analysis using Monte Carlo simulations.



### Supervisors

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