Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Fault Tolerance Calculations for Quantum-dot Cellular Automata devices MAHFUZA KHATUN, TRAVIS BARCLAY, IOAN STURZU, Center for Computational Nanoscience, Department of Physics and Astronomy, Ball State University, Muncie, IN 47306 — A numerical study of the joint influence of temperature and positional defects on Quantum-dot Cellular Automata (QCA) operation will be presented. The statistical model that has been introduced, simulates the random distribution of positional defects of the dots within cells, and of cells within arrays. We have studied specific clocked and non-clocked QCA devices using both a full basis quantum statistical method and Inter-cellular Hartree Approximation for different temperatures. Parameters such as success rate and breakdown displacement factor were defined and calculated numerically. Results show the thermal dependence of breakdown displacement factor of the QCA devices. The breakdown displacement factor decreases with the temperature. The work has been supported by the Indiana 21^{st} Century Research and Technology Fund (# 04-492)

Mahfuza Khatun
Center for Computational Nanoscience
Department of Physics and Astronomy
Ball State University, Muncie, IN 47306

Date submitted: 18 Nov 2004 Electronic form version 1.4