Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Self-replicating devices with dipolar colloids[1] JOSHUA DEMPSTER, Department of Physics and Astronomy, Northwestern University, Evanston, IL 60208, RUI ZHANG, MONICA OLVERA DE LA CRUZ, Department of Materials Science and Engineering, Northwestern University, Evanston, IL 60208 — Ubiquitous in nature, self-replication on the nano-scale has been challenging to produce in the laboratory. Recent efforts with DNA tiles have shown great success in correctly replicating tile-sequence templates but require frequent manipulation by the experimenter. We propose a scheme for achieving self-replication with dipolar colloids. Dimers in these systems replicate exponentially over millisecond time scales with no intervention other than periodic energy pulses supplied by external fields. We develop a general formalism governing the rate of self-replication as a function of the interval between pulses. Results from kinetic Monte Carlo simulations show good agreement with the growth rates predicted by simple models of the replication process.

[1]We thank the Office of the Director of Defense Research and Engineering (DDR&E) and Air Force Office of Scientific Research (AFOSR) for their support under Award FA9550-10-1-0167.

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Date submitted: 14 Nov 2013 Electronic form version 1.4