Self-replicating devices with dipolar colloids\textsuperscript{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.

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