Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Self Organized Sorting in Swarms KATHERINE COPENHAGEN, DAVID QUINT, AJAY GOPINATHAN, Univ of California - Merced — Swarming behavior extends across multiple length scales in biology ranging from bacteria to whales. Natural swarms are affected by erratic, or dissenting behavior by individuals within the swarm who may display different types of behaviors than the rest of the swarm. This research investigates the introduction of heterogenous behavior amongst individuals within a swarm and their impact on swarm formation and robustness. We model swarms with a finite number of agents utilizing a velocity alignment interaction and a Lennard-Jones potential, which provides both cohesive and repulsive interactions between neighboring agents. Depending on the parameters governing the swarming interactions and the level of heterogeneity in behavior introduced, we found a variety of collective behavior including sharp transitions from swarming to non-swarming regimes and self organized sorting of individuals based on their types of behavior. Our research sheds light on the varied responses of swarms to internal dissent and suggests optimal strategies to tolerate errant individuals.

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Date submitted: 15 Nov 2013 Electronic form version 1.4