Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Coarsening dynamics in the Vicsek model SUPRAVAT DEY, School Of Physics and Astronomy, Rochester Institute of Technology, Rochester, NY 14623, NISHA KATYAL, School of Physical Sciences, Jawaharlal Nehru University, New Delhi- 110067, India., DIBYENDU DAS, Department of Physics, Indian Institute of Technology Bombay, Powai, Mumbai 400076, India., SANJAY PURI, School of Physical Sciences, Jawaharlal Nehru University, New Delhi- 110067, India. — We numerically study the flocking model introduced by Vicsek et al. (1995) in the coarsening regime. At standard self-propulsion speeds, we find two distinct growth laws for the coupled density and velocity fields. The characteristic length scale of the density domains grows as $L_\rho(t) \sim t^{1/4}$, while the velocity length scale grows much faster, *viz.*, $L_v(t) \sim t^{5/6}$. The spatial fluctuations in the density and velocity ordering are studied by calculating the two-point correlation function and the structure factor, which show deviations from the well-known Porod's law. This is a natural consequence of scattering from irregular morphologies that dynamically arise in the system. In contrast, at lower self-propulsion speeds, the morphology is distinct, and as a result a new set of scaling exponents emerge. Most strikingly, the velocity order follows the density order with $L_\rho(t) \sim L_v(t) \sim t^{1/4}$.

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Date submitted: 20 Nov 2016 Electronic form version 1.4