PHYSICAL MATHEMATICS SEMINAR

Turbulence and pattern formation in a minimal model for active fluids

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ABSTRACT:

Continuum theories of active fluids display a fascinating range of dynamical states, including stationary patterns and turbulent phases. While the former can be tackled with classical pattern formation theory, the spatio-temporal disorder of active turbulence calls for a statistical description. In this presentation, new results on turbulence and pattern formation in a minimal continuum model for active fluids, which has been recently proposed by Wensink et al. [PNAS 109(36):14308 (2012)], will be discussed. Adopting techniques from turbulence theory, we establish a quantitative description of correlation functions and spectra for active turbulence. We furthermore report on a novel type of turbulence-driven pattern formation far beyond linear onset: the emergence of a dynamic vortex lattice state after an extended turbulent transient, which can only be explained taking into account turbulent energy transfer across scales.

TUESDAY, NOVEMBER 14, 2017
2:30 PM
Building 2, Room 142

Reception following in Building 2, Room 290
(Math Dept. Common Room)

http://math.mit.edu/seminars/pms/

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