

Colloquium Notice

Vincenzo Vitelli

University of Chicago

Non-reciprocity in collective phenomena: pattern-formation, synchronization and flocking

The interaction between a peregrine falcon and a dove is visibly non-reciprocal. Unlike the dogma preached by Newton's third law, the actions they exert on each other are by no means equal and opposite. What happens to the well established framework of phase transitions in non-reciprocal systems far from equilibrium?

In this talk, I will answer this question by looking at three archetypal classes of self-organization out of equilibrium: synchronization, flocking and pattern formation. Simple demonstrations with robots will be presented along with naturally occurring phenomena from various domains of science that share a common feature: reciprocity has no reason to exist. In all these cases, the emergence of unique time-dependent many-body phases can be captured by combining insights from non-Hermitian quantum mechanics and bifurcation theory. This approach lays the foundation for a general theory of critical phenomena in non-reciprocal matter.

Monday

December 7, 2020

Starts at **12:15 pm**

Coffee at **1:15 pm**

Physics Conference Room, SB B326