

PHYSICAL MATH SEMINAR

Origin of non-equilibrium order



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ABSTRACT:

Since at least Schrodinger, physicists have seen life as a non-equilibrium process that has successfully fought the 2nd law of thermodynamics by maintaining order for 4 billion years. While we understand how extant biological Maxwell Demons work, much less is known about how such Demons come into existence in the first place. Using theoretical and experimental work on the molecular machinery that copies DNA-based information, we suggest that surprisingly little might be needed - proofreading mechanisms that maintain non-equilibrium order can potentially arise due to selection for faster replication, even if the order itself is not beneficial in any way. We argue that such order-through-speed mechanisms might also be relevant for any high-dimensional disordered process that creates a wide variance in the distribution of replication times. Our work suggests the intriguing possibility that non-equilibrium order can arise more easily than assumed, as a byproduct of fast self-replication, even before that order is directly functional.

TUESDAY, MAY 7, 2024

2:30 PM – 3:30 PM

Building 2, Room 449

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