

[P18] Emergence of macroscopic time irreversibility out of microscopic dynamics with broken detailed balance

Pyoung-Seop Shim, University of Seoul

We investigate the entropy production in a globally coupled Brownian particles system with the velocity-aligning force that favors a collective motion. In this model, the velocity-aligning force breaks the detailed balance and drives an order-disorder phase transition. We find that the entropy production rate is subextensive in the disordered phase and extensive in the ordered phase. We derive the scaling relations for associated critical exponents. †.

† Pyoung-Seop Shim, Hyun-Myung Chun, and Jae Dong Noh, *Phys. Rev. E* **93**, 012113 (2016).