Pinning Without Disorder in Active Ising Model

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We report a novel type of pinning transition in the active Ising model for self-propelled particle systems with discrete symmetry. Quenched disorder has been considered essential for pinning. We demonstrate that motility can induce pinning of interfaces between two groups of particles confronting each other. Due to this motility-induced pinning, the active Ising model undergoes a phase transition from a disordered unpinned phase to a globally pinned phase. We present numerical evidence for the phase transition, along with analytical arguments for the pinning mechanism and interface coarsening dynamics.

[Ref] Chul-Ung Woo and Jae Dong Noh, arXiv:2403.10106