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Novel ordered phases in coupled driven systems: large compact clusters and fast dynamics

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We demonstrate particle clustering on macroscopic scales in a coupled nonequilibrium system where two species of particles are advected by a fluctuating landscape and modify the landscape in the process. The phase diagram generated by varying the particle-landscape coupling, valid for all particle density and in both one and two dimensions, shows novel nonequilibrium phases. While particle species are completely phase separated, the landscape develops macroscopically ordered regions coexisting with a disordered region, resulting in coarsening and steady state dynamics on time scales which grow algebraically with size, not seen earlier in systems with pure domains.

(1) Large compact clusters and fast dynamics in coupled nonequilibrium systems,
S Chakraborty, S Pal, S Chatterjee, M Barma, Phys Rev E **93**, 050102(R) (2016).

(2) Ordered phases in coupled nonequilibrium systems: static properties, S Chakraborty, S Chatterjee, M Barma, Phys Rev E (accepted), arXiv 1704.03309.

(3) Ordered phases in coupled nonequilibrium systems: dynamic properties, S Chakraborty, S Chatterjee, M Barma, Phys Rev E (accepted), arXiv 1704.03320.

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