RISHABH GVALANI, Max Planck Institut

The McKean–Vlasov equation on the torus: Stationary solutions, phase transitions, and mountain passes.

We study the McKean–Vlasov equation on the torus which is obtained as the mean field limit of a system of interacting diffusion processes enclosed in a periodic box. We focus our attention on the stationary problem - under certain assumptions on the interaction potential, we show that the system exhibits multiple equilibria which arise from the uniform state through continuous bifurcations. We then attempt to classify continuous and discontinuous phase transitions for this system and show that at the point of discontinuous transition the free energy possesses a mountain pass point. Finally, we comment on further work generalising these results to equations with porous medium-type diffusion. Joint work with José A. Carrillo, Greg Pavliotis, and André Schlichting.