

Topological states in a swarmalator model

jeudi 15 décembre 2022 15:50 (45 minutes)

Swarmalators are agents that combine the features of swarming particles and oscillators hence the name, contraction of ‘swarmer’ and ‘oscillator’. Each particle is endowed with a phase which modulates its interaction force with the other particles. In return, relative positions modulate phase synchronization between interacting particles. In the talk, I will present a model where there is no force reciprocity: when a particle attracts another one, the latter repels the former. This results in a pursuit behavior. I will derive a hydrodynamic model and show that it has explicit special solutions enjoying a non-trivial topology quantified by a phase index. I will present a theoretical and numerical study of these solutions. This is joint work with Antoine Diez (Kyoto University) and Adam Walczak (Imperial College London).

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