

**A liquid-solid phase transition in a simple model for
swarming**

Rupert Frank

Caltech / LMU Munich

rlfrank@caltech.edu

We consider a non-local shape optimization problem, which is motivated by a simple model for swarming and other self-assembly/aggregation models, and prove the existence of different phases. In particular, we show that in the large mass regime the ground state density profile is the characteristic function of a round ball. An essential ingredient in our proof is a strict rearrangement inequality with a quantitative error estimate. The talk is based on joint work with E. Lieb.