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Joint PDE Seminar

Nonlocal Aggregation-Diffusion Equations: fast diffusion and partial concentration

Abstract: We will discuss several recent results for aggregation-diffusion equations related to partial concentration of the density of particles. Nonlinear diffusions with homogeneous kernels will be reviewed quickly in the case of degenerate diffusions to have a full picture of the problem. Most of the talk will be devoted to discuss the less explored case of fast diffusion with homogeneous kernels with positive powers. We will first concentrate in the case of stationary solutions by looking at minimisers of the associated free energy showing that the minimiser must consist of a regular smooth solution with singularity at the origin plus possibly a partial concentration of the mass at the origin. We will give necessary conditions for this partial mass concentration to and not to happen. We will then look at the related evolution problem and show that for a given confinement potential this concentration happens in infinite time under certain conditions. We will briefly discuss the latest developments when we introduce the aggregation term. This talk is based on a series of works in collaboration with M. Delgadino, J. Dolbeault, A. Fernández, R. Frank, D. Gómez-Castro, F. Hoffmann, M. Lewin, and J. L. Vázquez.

by

Professor Jose A. Carrillo

Mathematical Institute
University of Oxford

Date: November 15, 2023 (Wednesday)
Time: 4:00pm – 5:00pm
Venue: Room 501a, Academic Building No. 1, CUHK

All are Welcome