Nonlocal particle approximation for diffusion PDEs

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The seminar will focus on the connection between nonlocal PDEs and diffusion equations, including fast, linear, and nonlinear degenerate diffusion. As byproduct of this link, one can obtain a rigorous deterministic particle approximation for the PDEs considered. The analysis is based on a suitable regularisation of the associated free energy, which allows to construct weak solutions as the limit of a sequence of weak measure solutions by using the so-called JKO scheme. Upon proving geodesic convexity of the regularised energies one can obtain convergence of the particle solutions to the nonlocal equations towards weak solutions of the local equations. The seminar is based on joint works with M. Burger (Hamburg), J. A. Carrillo (Oxford), J. Skrzeczkowski (Oxford), and J. Wu (UCLA).