Jose Antonio Carrillo (Universidad de Granada, Spain)

Title: Asymptotic behavior of fast diffusion equations

Rates of convergence towards self-similar profiles are discussed based on the entropy - entropy dissipation method for the fast diffussion equation u_t =Laplace(u^m) with m less than 1. Previous literature were able to deal with the cases in which m is larger or equal to $d - 1/d$ where d is the dimension. However, there was a gap between the exponent $d - 2/d$ for which the Barenblatt solutions start to exist and the exponent $d - 1/d$. The last exponent is the one that marked the displacement convexity of the internal energy functional associated to the fast diffusion equation. We will explain the appearance of such an exponent based on the linearized analysis, later we will show a convergence rate $t^-1/2$ of the L1 difference towards the self-similar profile based on the Aronson Benilan estimate which allows us to overcome the lack of convexity of the internal energy on the solutions of the fast diffusion equation. We will characterize the basin of attraction of the self similar profiles based on the relative entropy towards the Barenblatt profile and show optimal rates of convergence for radial solutions.