

Kinetic equations and weighted inequalities

NESTOR GUILLEN

University of Massachusetts Amherst, USA

Kinetic equations such as the (homogeneous) Boltzmann equation (or the Landau approximation) may be approached as integro-differential (respectively second order) parabolic equations whose coefficients depend nonlocally on the solution, and may become singular. I will discuss recent work with Maria Gualdani that suggests a certain criticality for the Landau equations: while the diffusion becomes stronger when the solution becomes larger, the strength seems to be barely sufficient to control the quadratic term. In particular, we show a solution to the Landau equation regularizes under the assumption that a certain weighted Poincaré inequality holds – a condition which is nontrivial to verify but which we show almost holds for an arbitrary solution.