Viscous compressible fluids with only bounded density Raphaël Danchin LAMA, Université Paris-Est Créteil danchin@u-pec.fr

We are concerned with the multi-dimensional compressible Navier-Stokes equations supplemented with discontinuous initial density ρ_0 .

In the case where ρ_0 is a small perturbation in L^{∞} of some positive constant reference density $\bar{\rho}$ and the velocity is smooth enough, we use parabolic maximal regularity so as to construct local-in-time solutions.

If in addition ρ_0 has some tangential regularity along a nondegenerate family of vectorfields (like e.g. in the case where ρ_0 takes two constant values about a smooth interface) and the pressure law P satisfies $P'(\bar{\rho}) > 0$, we get uniqueness and propagation of tangential regularity. The key to that second result is that our geometric assumptions guarantee that the gradient of the velocity is in $L^1(0,T;L^{\infty})$ for some T > 0, which enables us to go to Lagrangian coordinates for proving uniqueness.

This is a joint work with F. Fanelli (Université de Lyon 1) and M. Paicu (Université de Bordeaux).