Calderón-Zygmund Analysis Seminar

Wednesday, February 23rd, 3:00 pm

On the implosion of a three dimensional compressible fluid

Frank Merle

Abstract. We consider the compressible three dimensional Navier-Stokes and Euler equations. In a suitable regime of barotropic laws, we construct a set of finite energy smooth initial data for which the corresponding solutions to both equations implode (with infinite density) at a later time at a point, and completely describe the associated formation of singularity. Two essential steps of analysis are the existence of very regular self-similar solutions to the compressible Euler equations for quantized values of the speed and the derivation of spectral gap estimates for the associated linearized flow. All blow up dynamics obtained for the Navier-Stokes problem are of type II, i.e. non self-similar.