Ill-posedness for isentropic Euler in 2d

In this talk I will review some recent theorems (joint works with Elisabetta Chiodaroli and Ondrej Kreml) showing that none of the criteria proposed in the literature so far single out a unique bounded L^∞ solution of the isentropic system of gas dynamics in Eulerian coordinates. In particular we consider a special class of Lipschitz initial data which develop a shock singularity in finite time. After the blow-up the solution can be continued in a "classical" fashion by solving a standard 1-d Riemann problem, but there are also infinitely many other (very irregular) bounded weak solutions which satisfy the local energy inequality. Moreover, Chiodaroli and Kreml showed recently that some of these solutions dissipate the energy more quickly than the "classical" one.

We will also discuss a new admissibility criterion proposed very recently by Eduard Feireisl.