Monday's Nonstandard Seminar 10

15:00

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Title: **Non-Newtonian fluids. From ketchup to convex integration**

Abstract: It is much easier to make hair gel or shaving foam flow after applying some force to it. Such fluid is called non-Newtonian: it changes its viscosity under applied force. This behaviour is quite abundant in nature: ice, concrete, molten lava, blood, certain polymers, porridge, or the eponymous ketchup are all non-Newtonian.

First I will recall existence results on a simple model of such fluids: the power-law model. It is well-posed in 'subcritical' regime and has energy solutions above the 'compactness threshold'.

Next, I will focus on recent results obtained with S. Modena and L. Székelyhidi jr: it turns out that a picture dual to the above one holds. Namely, the power-law model is ill posed below 'compactness threshold' and it has many (very) weak solutions in 'supercritical regime'. The last result is of consequence to the classical Navier-Stokes equations.