

24.05.2021

**Monday's Nonstandard Seminar 34**

**15:00**

Author: Tadeusz Iwaniec (Syracuse University, USA)

Title: **Monotone Hopf-Harmonics**

Abstract: We are primarily concerned with Sobolev homeomorphisms and their weak and strong limits. Such limits turn out to be monotone mappings. This includes the weak limits of energy-minimizing sequences of homeomorphisms (hyperelastic deformations). Usually, the injectivity is lost when passing to the limit of homeomorphisms. Call such circumstance *weak collapse of matter*. In case of Dirichlet energy, we shall provide plausible mathematical explanation of the collapsing phenomena and, consequently, formation of cracks.

- The interpenetration of matter occurs exactly in the region of the body where the energy-minimal monotone Sobolev map fails to satisfy the Lagrange-Euler equation.
- Cracks propagate along trajectories of the Hopf quadratic differential associated with the inner variation of the energy integral.
- We believe that planar Monotone Sobolev Mappings (Cellular Sobolev Mappings in higher dimensions) are profoundly insightful and as such should take legitimate place in the theory of Nonlinear Elasticity.