

## SEMINAR OF ANALYSIS

**FRIDAY 15 MARCH 2019 - ROOM: MA B1 11 at 3.15 pm**

*Prof. Gianluca **CRIPPA** (University of Basel)*

will present a seminar entitled:

« Uniqueness and Lagrangianity for Solutions with Lack of Integrability of the Continuity Equation »

Abstract:

We discuss the question of the uniqueness (and of the property of being transported by a flow) for solutions to the continuity equation with Sobolev velocity field when the integrability of the solution is below that requested by the DiPerna-Lions theory. Striking examples of nonuniqueness have been recently constructed in certain regimes by Modena and Székelyhidi. In this talk we present a strategy to show uniqueness of  $L^1$  solutions in the case of  $W^{1,p}$  velocity fields, where  $p$  is larger than the space dimension, under the additional assumption that the so-called "forward-backward integral curves" associated to the vector field are trivial for almost every starting point. Our approach is based on a disintegration argument combined with a Lipschitz extension lemma in which the extension procedure simultaneously preserves the Lipschitz continuity for two non-equivalent distances. The two distances under consideration are the Euclidean distance and, roughly speaking, the geodesic distance along integral curves of the flow of the velocity field. The Lipschitz constant for the geodesic distance of the extension can be estimated in terms of the Lipschitz constant for the geodesic distance of the original function. This is a work in collaboration with Laura Caravenna (University of Padova).

Lausanne, February 22, 2019

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