



## **Thematic Research Programme**

## Current Trends in Geometric Methods in Natural Sciences

2 September - 20 December 2019 ICMAT, Madrid www.icmat.es/RT/2019/CTIGMINS/

## Seminar A CONTACT TOPOLOGY APPROACH TO EULER FLOWS UNIVERSALITY

SPEAKER: Robert Cardona (Universitat Politècnica de Catalunya)

DATE: Wednesday, 2 October 2019 - 16:00

VENUE: Aula Gris 1, ICMAT

**ABSTRACT:** There have been some steps towards showing the "universal" nature of Euler flows in Riemmanian manifolds in the last years, specifically in two papers by Tao. In this talk, we propose a new approach to this question. By means of high dimensional contact topology and h-principle techniques we prove embedding theorems on Reeb dynamics. Using a correspondence theorem between particular steady Euler flows and Reeb vector fields in contact geometry, we obtain new results in the direction of Tao's programme. We comment some applications, deducing new universality properties for steady Euler flows. In particular we solve the conjecture that Euler flows are "Turing complete", one of the suggested open questions in those papers. This is joint work in progress with Eva Miranda, Daniel Peralta-Salas and Francisco Presas.

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